# Department of Defense
# Fiscal Year (FY) 2016 President's Budget Submission

February 2015

## Navy

*Justification Book Volume 2 of 5*

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

## Budget Activity 4

The estimated total cost for producing the Department of Navy budget justification material is approximately $1,436,000 for the 2015 fiscal year. This includes $74,000 in supplies and $1,362,000 in labor.

# Table of Volumes

**Budget Activities 1, 2, and 3.....Volume 1**

**Budget Activity 4.....Volume 2**

**Budget Activity 5.....Volume 3**

**Budget Activity 6.....Volume 4**

**Budget Activity 7.....Volume 5**

THIS PAGE INTENTIONALLY LEFT BLANK

# Volume 2 Table of Contents

**Introduction and Explanation of Contents.....Volume 2 - v**

**Comptroller Exhibit R-1..... Volume 2 - vii**

**Master Program Element Table of Contents (by Budget Activity then Line Item Number)..... Volume 2 - xxiii**

**Master Program Element Table of Contents (Alphabetically by Program Element Title)..... Volume 2 - xxxix**

**Program Element Table of Contents (by Budget Activity then Line Item Number).....Volume 2 - li**

**Program Element Table of Contents (Alphabetically by Program Element Title).....Volume 2 - lv**

**Exhibit R-2's..... Volume 2 - 1**

THIS PAGE INTENTIONALLY LEFT BLANK

## 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, $17,921,663,000, to remain available for obligation until September 30, 2016.

THIS PAGE INTENTIONALLY LEFT BLANK

Department of Defense
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

| Summary Recap of Budget Activities | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|---|---|
| Basic Research | 604,155 | 650,153 | | 650,153 | 586,928 | | 586,928 |
| Applied Research | 844,152 | 869,912 | | 869,912 | 864,570 | | 864,570 |
| Advanced Technology Development | 622,947 | 635,203 | | 635,203 | 662,864 | | 662,864 |
| Advanced Component Development & Prototypes | 4,151,886 | 4,443,594 | | 4,443,594 | 5,024,626 | | 5,024,626 |
| System Development & Demonstration | 4,174,217 | 5,236,176 | 470 | 5,236,646 | 6,308,800 | | 6,308,800 |
| Management Support | 1,153,417 | 972,892 | | 972,892 | 955,955 | | 955,955 |
| Operational Systems Development | 3,395,279 | 3,146,674 | 35,550 | 3,182,224 | 3,482,173 | 35,747 | 3,517,920 |
| Total Research, Development, Test & Evaluation | 14,946,053 | 15,954,604 | 36,020 | 15,990,624 | 17,885,916 | 35,747 | 17,921,663 |

| Summary Recap of FYDP Programs | | | | | | | |
|---|---|---|---|---|---|---|---|
| Strategic Forces | 139,615 | 142,745 | | 142,745 | 174,014 | | 174,014 |
| General Purpose Forces | 1,292,622 | 1,265,259 | 470 | 1,265,729 | 1,429,549 | | 1,429,549 |
| Intelligence and Communications | 644,998 | 713,250 | 470 | 713,720 | 766,221 | | 766,221 |
| Research and Development | 11,368,895 | 12,607,993 | | 12,607,993 | 14,235,441 | | 14,235,441 |
| Central Supply and Maintenance | 79,240 | 62,684 | | 62,684 | 28,506 | | 28,506 |
| Administration and Associated Activities | 1,209 | | | | | | |
| Classified Programs | 1,419,474 | 1,162,673 | 35,080 | 1,197,753 | 1,252,185 | 35,747 | 1,287,932 |
| Total Research, Development, Test & Evaluation | 14,946,053 | 15,954,604 | 36,020 | 15,990,624 | 17,885,916 | 35,747 | 17,921,663 |

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

| Summary Recap of Budget Activities | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|---|---|
| Basic Research | 604,155 | 650,153 | | 650,153 | 586,928 | | 586,928 |
| Applied Research | 844,152 | 869,912 | | 869,912 | 864,570 | | 864,570 |
| Advanced Technology Development | 622,947 | 635,203 | | 635,203 | 662,864 | | 662,864 |
| Advanced Component Development & Prototypes | 4,151,886 | 4,443,594 | | 4,443,594 | 5,024,626 | | 5,024,626 |
| System Development & Demonstration | 4,174,217 | 5,236,176 | 470 | 5,236,646 | 6,308,800 | | 6,308,800 |
| Management Support | 1,153,417 | 972,892 | | 972,892 | 955,955 | | 955,955 |
| Operational Systems Development | 3,395,279 | 3,146,674 | 35,550 | 3,182,224 | 3,482,173 | 35,747 | 3,517,920 |
| Total Research, Development, Test & Evaluation | 14,946,053 | 15,954,604 | 36,020 | 15,990,624 | 17,885,916 | 35,747 | 17,921,663 |

| Summary Recap of FYDP Programs | | | | | | | |
|---|---|---|---|---|---|---|---|
| Strategic Forces | 139,615 | 142,745 | | 142,745 | 174,014 | | 174,014 |
| General Purpose Forces | 1,292,622 | 1,265,259 | 470 | 1,265,729 | 1,429,549 | | 1,429,549 |
| Intelligence and Communications | 644,998 | 713,250 | 470 | 713,720 | 766,221 | | 766,221 |
| Research and Development | 11,368,895 | 12,607,993 | | 12,607,993 | 14,235,441 | | 14,235,441 |
| Central Supply and Maintenance | 79,240 | 62,684 | | 62,684 | 28,506 | | 28,506 |
| Administration and Associated Activities | 1,209 | | | | | | |
| Classified Programs | 1,419,474 | 1,162,673 | 35,080 | 1,197,753 | 1,252,185 | 35,747 | 1,287,932 |
| Total Research, Development, Test & Evaluation | 14,946,053 | 15,954,604 | 36,020 | 15,990,624 | 17,885,916 | 35,747 | 17,921,663 |

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0601103N | University Research Initiatives | 01 | 108,617 | 133,908 | | 133,908 | 116,196 | | 116,196 | U |
| 2 | 0601152N | In-House Laboratory Independent Research | 01 | 18,135 | 19,142 | | 19,142 | 19,126 | | 19,126 | U |
| 3 | 0601153N | Defense Research Sciences | 01 | 477,403 | 497,103 | | 497,103 | 451,606 | | 451,606 | U |
| | Basic Research | | | 604,155 | 650,153 | | 650,153 | 586,928 | | 586,928 | |
| 4 | 0602114N | Power Projection Applied Research | 02 | 104,413 | 95,753 | | 95,753 | 68,723 | | 68,723 | U |
| 5 | 0602123N | Force Protection Applied Research | 02 | 168,311 | 163,660 | | 163,660 | 154,963 | | 154,963 | U |
| 6 | 0602131M | Marine Corps Landing Force Technology | 02 | 45,834 | 45,782 | | 45,782 | 49,001 | | 49,001 | U |
| 7 | 0602235N | Common Picture Applied Research | 02 | 35,411 | 43,533 | | 43,533 | 42,551 | | 42,551 | U |
| 8 | 0602236N | Warfighter Sustainment Applied Research | 02 | 49,083 | 46,923 | | 46,923 | 45,056 | | 45,056 | U |
| 9 | 0602271N | Electromagnetic Systems Applied Research | 02 | 98,551 | 107,663 | | 107,663 | 115,051 | | 115,051 | U |
| 10 | 0602435N | Ocean Warfighting Environment Applied Research | 02 | 43,698 | 65,388 | | 65,388 | 42,252 | | 42,252 | U |
| 11 | 0602651M | Joint Non-Lethal Weapons Applied Research | 02 | 5,805 | 5,880 | | 5,880 | 6,119 | | 6,119 | U |
| 12 | 0602747N | Undersea Warfare Applied Research | 02 | 99,302 | 86,880 | | 86,880 | 123,750 | | 123,750 | U |
| 13 | 0602750N | Future Naval Capabilities Applied Research | 02 | 162,580 | 175,924 | | 175,924 | 179,686 | | 179,686 | U |
| 14 | 0602782N | Mine and Expeditionary Warfare Applied Research | 02 | 31,164 | 32,526 | | 32,526 | 37,418 | | 37,418 | U |
| | Applied Research | | | 844,152 | 869,912 | | 869,912 | 864,570 | | 864,570 | |
| 15 | 0603114N | Power Projection Advanced Technology | 03 | 67,601 | 37,734 | | 37,734 | 37,093 | | 37,093 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 0603123N | Force Protection Advanced Technology | 03 | 28,194 | 25,831 | | 25,831 | 38,044 | | 38,044 | U |
| 17 | 0603271N | Electromagnetic Systems Advanced Technology | 03 | 53,519 | 64,574 | | 64,574 | 34,899 | | 34,899 | U |
| 18 | 0603640M | USMC Advanced Technology Demonstration (ATD) | 03 | 128,772 | 128,320 | | 128,320 | 137,562 | | 137,562 | U |
| 19 | 0603651M | Joint Non-Lethal Weapons Technology Development | 03 | 11,452 | 11,498 | | 11,498 | 12,745 | | 12,745 | U |
| 20 | 0603673N | Future Naval Capabilities Advanced Technology Development | 03 | 241,652 | 260,847 | | 260,847 | 258,860 | | 258,860 | U |
| 21 | 0603680N | Manufacturing Technology Program | 03 | | | | | 57,074 | | 57,074 | U |
| 22 | 0603729N | Warfighter Protection Advanced Technology | 03 | 40,260 | 40,538 | | 40,538 | 4,807 | | 4,807 | U |
| 23 | 0603747N | Undersea Warfare Advanced Technology | 03 | | 9,985 | | 9,985 | 13,748 | | 13,748 | U |
| 24 | 0603758N | Navy Warfighting Experiments and Demonstrations | 03 | 49,581 | 53,876 | | 53,876 | 66,041 | | 66,041 | U |
| 25 | 0603782N | Mine and Expeditionary Warfare Advanced Technology | 03 | 1,916 | 2,000 | | 2,000 | 1,991 | | 1,991 | U |
| | | Advanced Technology Development | | 622,947 | 635,203 | | 635,203 | 662,864 | | 662,864 | |
| 26 | 0603207N | Air/Ocean Tactical Applications | 04 | 41,138 | 40,429 | | 40,429 | 41,832 | | 41,832 | U |
| 27 | 0603216N | Aviation Survivability | 04 | 6,637 | 4,325 | | 4,325 | 5,404 | | 5,404 | U |
| 28 | 0603237N | Deployable Joint Command and Control | 04 | 3,195 | 2,991 | | 2,991 | 3,086 | | 3,086 | U |
| 29 | 0603251N | Aircraft Systems | 04 | 10,072 | 12,651 | | 12,651 | 11,643 | | 11,643 | U |
| 30 | 0603254N | ASW Systems Development | 04 | 6,809 | 7,782 | | 7,782 | 5,555 | | 5,555 | U |
| 31 | 0603261N | Tactical Airborne Reconnaissance | 04 | 5,257 | 5,270 | | 5,270 | 3,087 | | 3,087 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 0603382N | Advanced Combat Systems Technology | 04 | 1,510 | 1,639 | | 1,639 | 1,636 | | 1,636 | U |
| 33 | 0603502N | Surface and Shallow Water Mine Countermeasures | 04 | 150,540 | 86,333 | | 86,333 | 118,588 | | 118,588 | U |
| 34 | 0603506N | Surface Ship Torpedo Defense | 04 | 83,366 | 50,781 | | 50,781 | 77,385 | | 77,385 | U |
| 35 | 0603512N | Carrier Systems Development | 04 | 78,928 | 5,959 | | 5,959 | 8,348 | | 8,348 | U |
| 36 | 0603525N | PILOT FISH | 04 | 107,210 | 138,865 | | 138,865 | 123,246 | | 123,246 | U |
| 37 | 0603527N | RETRACT LARCH | 04 | 11,797 | 25,365 | | 25,365 | 28,819 | | 28,819 | U |
| 38 | 0603536N | RETRACT JUNIPER | 04 | 77,292 | 76,477 | | 76,477 | 112,678 | | 112,678 | U |
| 39 | 0603542N | Radiological Control | 04 | 757 | 669 | | 669 | 710 | | 710 | U |
| 40 | 0603553N | Surface ASW | 04 | 8,543 | 1,053 | | 1,053 | 1,096 | | 1,096 | U |
| 41 | 0603561N | Advanced Submarine System Development | 04 | 832,736 | 67,551 | | 67,551 | 87,160 | | 87,160 | U |
| 42 | 0603562N | Submarine Tactical Warfare Systems | 04 | 8,675 | 8,044 | | 8,044 | 10,371 | | 10,371 | U |
| 43 | 0603563N | Ship Concept Advanced Design | 04 | 17,604 | 17,864 | | 17,864 | 11,888 | | 11,888 | U |
| 44 | 0603564N | Ship Preliminary Design & Feasibility Studies | 04 | 37,380 | 1,773 | | 1,773 | 4,332 | | 4,332 | U |
| 45 | 0603570N | Advanced Nuclear Power Systems | 04 | 428,933 | 499,961 | | 499,961 | 482,040 | | 482,040 | U |
| 46 | 0603573N | Advanced Surface Machinery Systems | 04 | 17,551 | 21,026 | | 21,026 | 25,904 | | 25,904 | U |
| 47 | 0603576N | CHALK EAGLE | 04 | 511,633 | 542,415 | | 542,415 | 511,802 | | 511,802 | U |
| 48 | 0603581N | Littoral Combat Ship (LCS) | 04 | 256,456 | 86,705 | | 86,705 | 118,416 | | 118,416 | U |
| 49 | 0603582N | Combat System Integration | 04 | 4,270 | 20,881 | | 20,881 | 35,901 | | 35,901 | U |
| 50 | 0603595N | Ohio Replacement | 04 | | 853,277 | | 853,277 | 971,393 | | 971,393 | U |
| 51 | 0603596N | LCS Mission Modules | 04 | 105,682 | 176,948 | | 176,948 | 206,149 | | 206,149 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 52 | 0603597N | Automated Test and Re-Test (ATRT) | 04 | 9,639 | 8,115 | | 8,115 | 8,000 | | 8,000 | U |
| 53 | 0603609N | Conventional Munitions | 04 | 8,380 | 7,603 | | 7,603 | 7,678 | | 7,678 | U |
| 54 | 0603611M | Marine Corps Assault Vehicles | 04 | 34,956 | 105,749 | | 105,749 | 219,082 | | 219,082 | U |
| 55 | 0603635M | Marine Corps Ground Combat/Support System | 04 | 1,362 | 1,342 | | 1,342 | 623 | | 623 | U |
| 56 | 0603654N | Joint Service Explosive Ordnance Development | 04 | 34,773 | 21,384 | | 21,384 | 18,260 | | 18,260 | U |
| 57 | 0603658N | Cooperative Engagement | 04 | 52,539 | 37,310 | | 37,310 | 76,247 | | 76,247 | U |
| 58 | 0603713N | Ocean Engineering Technology Development | 04 | 7,530 | 6,264 | | 6,264 | 4,520 | | 4,520 | U |
| 59 | 0603721N | Environmental Protection | 04 | 18,812 | 13,200 | | 13,200 | 20,711 | | 20,711 | U |
| 60 | 0603724N | Navy Energy Program | 04 | 43,851 | 63,804 | | 63,804 | 47,761 | | 47,761 | U |
| 61 | 0603725N | Facilities Improvement | 04 | 2,893 | 2,588 | | 2,588 | 5,226 | | 5,226 | U |
| 62 | 0603734N | CHALK CORAL | 04 | 121,021 | 176,301 | | 176,301 | 182,771 | | 182,771 | U |
| 63 | 0603739N | Navy Logistic Productivity | 04 | 3,715 | 3,473 | | 3,473 | 3,866 | | 3,866 | U |
| 64 | 0603746N | RETRACT MAPLE | 04 | 293,872 | 376,028 | | 376,028 | 360,065 | | 360,065 | U |
| 65 | 0603748N | LINK PLUMERIA | 04 | 153,214 | 260,096 | | 260,096 | 237,416 | | 237,416 | U |
| 66 | 0603751N | RETRACT ELM | 04 | 56,519 | 42,233 | | 42,233 | 37,944 | | 37,944 | U |
| 67 | 0603764N | LINK EVERGREEN | 04 | 54,613 | 46,504 | | 46,504 | 47,312 | | 47,312 | U |
| 68 | 0603787N | Special Processes | 04 | 47,227 | 25,109 | | 25,109 | 17,408 | | 17,408 | U |
| 69 | 0603790N | NATO Research and Development | 04 | 7,502 | 9,659 | | 9,659 | 9,359 | | 9,359 | U |
| 70 | 0603795N | Land Attack Technology | 04 | | 318 | | 318 | 887 | | 887 | U |
| 71 | 0603851M | Joint Non-Lethal Weapons Testing | 04 | 39,470 | 35,627 | | 35,627 | 29,448 | | 29,448 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 72 | 0603860N | Joint Precision Approach and Landing Systems - Dem/Val | 04 | 126,802 | 41,886 | | 41,886 | 91,479 | | 91,479 | U |
| 73 | 0603925N | Directed Energy and Electric Weapon Systems | 04 | 4,349 | 55,696 | | 55,696 | 67,360 | | 67,360 | U |
| 74 | 0604112N | Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78 - 80) | 04 | | 43,613 | | 43,613 | 48,105 | | 48,105 | U |
| 75 | 0604122N | Remote Minehunting System (RMS) | 04 | | 21,110 | | 21,110 | 20,089 | | 20,089 | U |
| 76 | 0604272N | Tactical Air Directional Infrared Countermeasures (TADIRCM) | 04 | 24,562 | 5,556 | | 5,556 | 18,969 | | 18,969 | U |
| 77 | 0604279N | ASE Self-Protection Optimization | 04 | 169 | 3,921 | | 3,921 | 7,874 | | 7,874 | U |
| 78 | 0604292N | MH-XX | 04 | | 3,055 | | 3,055 | 5,298 | | 5,298 | U |
| 79 | 0604454N | LX (R) | 04 | | 36,859 | | 36,859 | 46,486 | | 46,486 | U |
| 80 | 0604653N | Joint Counter Radio Controlled IED Electronic Warfare (JCREW) | 04 | 15,582 | 15,197 | | 15,197 | 3,817 | | 3,817 | U |
| 81 | 0604659N | Precision Strike Weapons Development Program | 04 | 2,191 | | | | 9,595 | | 9,595 | U |
| 82 | 0604707N | Space and Electronic Warfare (SEW) Architecture/Engineering Support | 04 | 30,377 | 18,749 | | 18,749 | 29,581 | | 29,581 | U |
| 83 | 0604786N | Offensive Anti-Surface Warfare Weapon Development | 04 | 86,683 | 181,939 | | 181,939 | 285,849 | | 285,849 | U |
| 84 | 0605812M | Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph | 04 | 50,251 | 9,445 | | 9,445 | 36,656 | | 36,656 | U |
| 85 | 0303354N | ASW Systems Development - MIP | 04 | 4,908 | 6,495 | | 6,495 | 9,835 | | 9,835 | U |
| 86 | 0304270N | Electronic Warfare Development - MIP | 04 | 153 | 332 | | 332 | 580 | | 580 | U |
| | | Advanced Component Development & Prototypes | | 4,151,886 | 4,443,594 | | 4,443,594 | 5,024,626 | | 5,024,626 | |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 87 | 0603208N | Training System Aircraft | 05 | | 25,153 | | 25,153 | 21,708 | | 21,708 | U |
| 88 | 0604212N | Other Helo Development | 05 | 24,910 | 35,099 | | 35,099 | 11,101 | | 11,101 | U |
| 89 | 0604214N | AV-8B Aircraft - Eng Dev | 05 | 30,291 | 25,372 | | 25,372 | 39,878 | | 39,878 | U |
| 90 | 0604215N | Standards Development | 05 | 66,594 | 53,706 | | 53,706 | 53,059 | | 53,059 | U |
| 91 | 0604216N | Multi-Mission Helicopter Upgrade Development | 05 | 20,365 | 11,434 | | 11,434 | 21,358 | | 21,358 | U |
| 92 | 0604218N | Air/Ocean Equipment Engineering | 05 | 3,915 | 2,164 | | 2,164 | 4,515 | | 4,515 | U |
| 93 | 0604221N | P-3 Modernization Program | 05 | 779 | 710 | | 710 | 1,514 | | 1,514 | U |
| 94 | 0604230N | Warfare Support System | 05 | 9,630 | 9,094 | | 9,094 | 5,875 | | 5,875 | U |
| 95 | 0604231N | Tactical Command System | 05 | 62,298 | 60,195 | | 60,195 | 81,553 | | 81,553 | U |
| 96 | 0604234N | Advanced Hawkeye | 05 | 103,489 | 176,700 | | 176,700 | 272,149 | | 272,149 | U |
| 97 | 0604245N | H-1 Upgrades | 05 | 48,994 | 44,115 | | 44,115 | 27,235 | | 27,235 | U |
| 98 | 0604261N | Acoustic Search Sensors | 05 | 28,344 | 23,214 | | 23,214 | 35,763 | | 35,763 | U |
| 99 | 0604262N | V-22A | 05 | 42,205 | 57,749 | | 57,749 | 87,918 | | 87,918 | U |
| 100 | 0604264N | Air Crew Systems Development | 05 | 7,418 | 15,014 | | 15,014 | 12,679 | | 12,679 | U |
| 101 | 0604269N | EA-18 | 05 | 10,550 | 18,730 | | 18,730 | 56,921 | | 56,921 | U |
| 102 | 0604270N | Electronic Warfare Development | 05 | 34,239 | 28,742 | | 28,742 | 23,685 | | 23,685 | U |
| 103 | 0604273N | Executive Helo Development | 05 | 92,840 | 368,084 | | 368,084 | 507,093 | | 507,093 | U |
| 104 | 0604274N | Next Generation Jammer (NGJ) | 05 | 153,552 | 230,713 | | 230,713 | 411,767 | | 411,767 | U |
| 105 | 0604280N | Joint Tactical Radio System - Navy (JTRS-Navy) | 05 | 3,909 | 6,945 | | 6,945 | 25,071 | | 25,071 | U |
| 106 | 0604307N | Surface Combatant Combat System Engineering | 05 | 249,940 | 179,112 | | 179,112 | 443,433 | | 443,433 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 107 | 0604311N | LPD-17 Class Systems Integration | 05 | 1,175 | 376 | | 376 | 747 | | 747 | U |
| 108 | 0604329N | Small Diameter Bomb (SDB) | 05 | 24,215 | 56,286 | | 56,286 | 97,002 | | 97,002 | U |
| 109 | 0604366N | Standard Missile Improvements | 05 | 60,933 | 36,698 | | 36,698 | 129,649 | | 129,649 | U |
| 110 | 0604373N | Airborne MCM | 05 | 109,485 | 38,941 | | 38,941 | 11,647 | | 11,647 | U |
| 111 | 0604376M | Marine Air Ground Task Force (MAGTF) Electronic Warfare (EW) for Aviation | 05 | 12,032 | 7,832 | | 7,832 | 2,778 | | 2,778 | U |
| 112 | 0604378N | Naval Integrated Fire Control - Counter Air Systems Engineering | 05 | 20,937 | 15,263 | | 15,263 | 23,695 | | 23,695 | U |
| 113 | 0604404N | Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) System | 05 | 115,275 | 403,008 | | 403,008 | 134,708 | | 134,708 | U |
| 114 | 0604501N | Advanced Above Water Sensors | 05 | 144,589 | 19,809 | | 19,809 | 43,914 | | 43,914 | U |
| 115 | 0604503N | SSN-688 and Trident Modernization | 05 | 83,361 | 71,551 | | 71,551 | 109,908 | | 109,908 | U |
| 116 | 0604504N | Air Control | 05 | 9,664 | 29,037 | | 29,037 | 57,928 | | 57,928 | U |
| 117 | 0604512N | Shipboard Aviation Systems | 05 | 77,046 | 122,083 | | 122,083 | 120,217 | | 120,217 | U |
| 118 | 0604522N | Air and Missile Defense Radar (AMDR) System | 05 | | 129,706 | | 129,706 | 241,754 | | 241,754 | U |
| 119 | 0604558N | New Design SSN | 05 | 60,843 | 87,695 | | 87,695 | 122,556 | | 122,556 | U |
| 120 | 0604562N | Submarine Tactical Warfare System | 05 | 47,777 | 38,985 | | 38,985 | 48,213 | | 48,213 | U |
| 121 | 0604567N | Ship Contract Design/ Live Fire T&E | 05 | 174,375 | 40,016 | | 40,016 | 49,712 | | 49,712 | U |
| 122 | 0604574N | Navy Tactical Computer Resources | 05 | 3,582 | 3,935 | | 3,935 | 4,096 | | 4,096 | U |
| 123 | 0604580N | Virginia Payload Module (VPM) | 05 | 57,282 | 120,602 | | 120,602 | 167,719 | | 167,719 | U |
| 124 | 0604601N | Mine Development | 05 | 4,903 | 14,067 | | 14,067 | 15,122 | | 15,122 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 125 | 0604610N | Lightweight Torpedo Development | 05 | 26,098 | 35,280 | | 35,280 | 33,738 | | 33,738 | U |
| 126 | 0604654N | Joint Service Explosive Ordnance Development | 05 | 8,872 | 8,985 | | 8,985 | 8,123 | | 8,123 | U |
| 127 | 0604703N | Personnel, Training, Simulation, and Human Factors | 05 | 4,233 | 7,669 | | 7,669 | 7,686 | | 7,686 | U |
| 128 | 0604727N | Joint Standoff Weapon Systems | 05 | 434 | 4,400 | | 4,400 | 405 | | 405 | U |
| 129 | 0604755N | Ship Self Defense (Detect & Control) | 05 | 98,382 | 56,884 | | 56,884 | 153,836 | | 153,836 | U |
| 130 | 0604756N | Ship Self Defense (Engage: Hard Kill) | 05 | 42,551 | 96,937 | | 96,937 | 99,619 | | 99,619 | U |
| 131 | 0604757N | Ship Self Defense (Engage: Soft Kill/EW) | 05 | 112,900 | 116,904 | | 116,904 | 116,798 | | 116,798 | U |
| 132 | 0604761N | Intelligence Engineering | 05 | 1,984 | 200 | | 200 | 4,353 | | 4,353 | U |
| 133 | 0604771N | Medical Development | 05 | 27,725 | 27,287 | | 27,287 | 9,443 | | 9,443 | U |
| 134 | 0604777N | Navigation/ID System | 05 | 41,735 | 29,504 | | 29,504 | 32,469 | | 32,469 | U |
| 135 | 0604800M | Joint Strike Fighter (JSF) - EMD | 05 | 410,080 | 499,048 | | 499,048 | 537,901 | | 537,901 | U |
| 136 | 0604800N | Joint Strike Fighter (JSF) - EMD | 05 | 425,340 | 502,260 | | 502,260 | 504,736 | | 504,736 | U |
| 137 | 0604810M | Joint Strike Fighter Follow On Development - Marine Corps | 05 | | 10,399 | | 10,399 | 59,265 | | 59,265 | U |
| 138 | 0604810N | Joint Strike Fighter Follow On Development - Navy | 05 | | 10,622 | | 10,622 | 47,579 | | 47,579 | U |
| 139 | 0605013M | Information Technology Development | 05 | 4,787 | 2,887 | | 2,887 | 5,914 | | 5,914 | U |
| 140 | 0605013N | Information Technology Development | 05 | 51,746 | 66,317 | | 66,317 | 89,711 | | 89,711 | U |
| 141 | 0605212N | CH-53K RDTE | 05 | 447,511 | 559,687 | | 559,687 | 632,092 | | 632,092 | U |
| 142 | 0605220N | Ship to Shore Connector (SSC) | 05 | | 42,778 | | 42,778 | 7,778 | | 7,778 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 143 | 0605450N | Joint Air-to-Ground Missile (JAGM) | 05 | 4,757 | 6,300 | | 6,300 | 25,898 | | 25,898 | U |
| 144 | 0605500N | Multi-mission Maritime Aircraft (MMA) | 05 | 252,426 | 306,033 | | 306,033 | 247,929 | | 247,929 | U |
| 145 | 0204202N | DDG-1000 | 05 | 189,580 | 202,517 | | 202,517 | 103,199 | | 103,199 | U |
| 146 | 0304231N | Tactical Command System - MIP | 05 | 2,140 | 1,011 | | 1,011 | 998 | | 998 | U |
| 147 | 0304785N | Tactical Cryptologic Systems | 05 | 9,406 | 10,357 | 470 | 10,827 | 17,785 | | 17,785 | U |
| 148 | 0305124N | Special Applications Program | 05 | 9,794 | 23,975 | | 23,975 | 35,905 | | 35,905 | U |
| | | System Development & Demonstration | | 4,174,217 | 5,236,176 | 470 | 5,236,646 | 6,308,800 | | 6,308,800 | |
| 149 | 0604256N | Threat Simulator Development | 06 | 42,177 | 40,793 | | 40,793 | 30,769 | | 30,769 | U |
| 150 | 0604258N | Target Systems Development | 06 | 70,263 | 66,718 | | 66,718 | 112,606 | | 112,606 | U |
| 151 | 0604759N | Major T&E Investment | 06 | 37,974 | 123,993 | | 123,993 | 61,234 | | 61,234 | U |
| 152 | 0605126N | Joint Theater Air and Missile Defense Organization | 06 | 1,322 | 4,960 | | 4,960 | 6,995 | | 6,995 | U |
| 153 | 0605152N | Studies and Analysis Support - Navy | 06 | 5,453 | 3,484 | | 3,484 | 4,011 | | 4,011 | U |
| 154 | 0605154N | Center for Naval Analyses | 06 | 44,928 | 44,696 | | 44,696 | 48,563 | | 48,563 | U |
| 155 | 0605285N | Next Generation Fighter | 06 | | 4,794 | | 4,794 | 5,000 | | 5,000 | U |
| 156 | 0605502N | Small Business Innovative Research | 06 | 294,649 | | | | | | | U |
| 157 | 0605804N | Technical Information Services | 06 | 1,046 | 876 | | 876 | 925 | | 925 | U |
| 158 | 0605853N | Management, Technical & International Support | 06 | 81,918 | 87,038 | | 87,038 | 78,143 | | 78,143 | U |
| 159 | 0605856N | Strategic Technical Support | 06 | 3,085 | 2,590 | | 2,590 | 3,258 | | 3,258 | U |
| 160 | 0605861N | RDT&E Science and Technology Management | 06 | 71,998 | 73,033 | | 73,033 | 76,948 | | 76,948 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 161 | 0605863N | RDT&E Ship and Aircraft Support | 06 | 140,064 | 138,304 | | 138,304 | 132,122 | | 132,122 | U |
| 162 | 0605864N | Test and Evaluation Support | 06 | 303,177 | 336,286 | | 336,286 | 351,912 | | 351,912 | U |
| 163 | 0605865N | Operational Test and Evaluation Capability | 06 | 16,304 | 16,650 | | 16,650 | 17,985 | | 17,985 | U |
| 164 | 0605866N | Navy Space and Electronic Warfare (SEW) Support | 06 | 3,885 | 2,503 | | 2,503 | 5,316 | | 5,316 | U |
| 165 | 0605867N | SEW Surveillance/Reconnaissance Support | 06 | 7,134 | 8,325 | | 8,325 | 6,519 | | 6,519 | U |
| 166 | 0605873M | Marine Corps Program Wide Support | 06 | 26,831 | 17,849 | | 17,849 | 13,649 | | 13,649 | U |
| 167 | 0909999N | Financing for Cancelled Account Adjustments | 06 | 1,209 | | | | | | | U |
| | | Management Support | | 1,153,417 | 972,892 | | 972,892 | 955,955 | | 955,955 | |
| 169 | 0604227N | HARPOON Modifications | 07 | 199 | | | | | | | U |
| 170 | 0604402N | Unmanned Combat Air Vehicle (UCAV) Advanced Component and Prototype Development | 07 | 24,893 | 35,877 | | 35,877 | | | | U |
| 171 | 0604766M | Marine Corps Data Systems | 07 | 34 | | | | | | | U |
| 172 | 0605525N | Carrier Onboard Delivery (COD) Follow On | 07 | 1,230 | 8,873 | | 8,873 | | | | U |
| 173 | 0605555N | Strike Weapons Development | 07 | 8,955 | | | | | | | U |
| 174 | 0101221N | Strategic Sub & Weapons System Support | 07 | 86,197 | 94,525 | | 94,525 | 107,039 | | 107,039 | U |
| 175 | 0101224N | SSBN Security Technology Program | 07 | 30,719 | 30,039 | | 30,039 | 46,506 | | 46,506 | U |
| 176 | 0101226N | Submarine Acoustic Warfare Development | 07 | 1,430 | 4,509 | | 4,509 | 3,900 | | 3,900 | U |
| 177 | 0101402N | Navy Strategic Communications | 07 | 21,269 | 13,672 | | 13,672 | 16,569 | | 16,569 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 178 | 0203761N | Rapid Technology Transition (RTT) | 07 | 8,561 | 8,480 | | 8,480 | 18,632 | | 18,632 | U |
| 179 | 0204136N | F/A-18 Squadrons | 07 | 110,487 | 86,216 | | 86,216 | 133,265 | | 133,265 | U |
| 180 | 0204152N | E-2 Squadrons | 07 | 1,903 | | | | | | | U |
| 181 | 0204163N | Fleet Telecommunications (Tactical) | 07 | 22,576 | 27,039 | | 27,039 | 62,867 | | 62,867 | U |
| 182 | 0204228N | Surface Support | 07 | 2,320 | 2,878 | | 2,878 | 36,045 | | 36,045 | U |
| 183 | 0204229N | Tomahawk and Tomahawk Mission Planning Center (TMPC) | 07 | 12,015 | 26,145 | | 26,145 | 25,228 | | 25,228 | U |
| 184 | 0204311N | Integrated Surveillance System | 07 | 41,609 | 34,471 | | 34,471 | 54,218 | | 54,218 | U |
| 185 | 0204413N | Amphibious Tactical Support Units (Displacement Craft) | 07 | 4,534 | 4,609 | | 4,609 | 11,335 | | 11,335 | U |
| 186 | 0204460M | Ground/Air Task Oriented Radar (G/ATOR) | 07 | 74,432 | 99,082 | | 99,082 | 80,129 | | 80,129 | U |
| 187 | 0204571N | Consolidated Training Systems Development | 07 | 38,444 | 37,922 | | 37,922 | 39,087 | | 39,087 | U |
| 188 | 0204574N | Cryptologic Direct Support | 07 | 2,703 | 1,157 | 470 | 1,627 | 1,915 | | 1,915 | U |
| 189 | 0204575N | Electronic Warfare (EW) Readiness Support | 07 | 18,859 | 16,567 | | 16,567 | 46,609 | | 46,609 | U |
| 190 | 0205601N | HARM Improvement | 07 | 13,581 | 17,420 | | 17,420 | 52,708 | | 52,708 | U |
| 191 | 0205604N | Tactical Data Links | 07 | 162,499 | 121,680 | | 121,680 | 149,997 | | 149,997 | U |
| 192 | 0205620N | Surface ASW Combat System Integration | 07 | 30,985 | 26,366 | | 26,366 | 24,460 | | 24,460 | U |
| 193 | 0205632N | MK-48 ADCAP | 07 | 10,050 | 25,952 | | 25,952 | 42,206 | | 42,206 | U |
| 194 | 0205633N | Aviation Improvements | 07 | 76,009 | 85,037 | | 85,037 | 117,759 | | 117,759 | U |
| 195 | 0205675N | Operational Nuclear Power Systems | 07 | 116,928 | 104,023 | | 104,023 | 101,323 | | 101,323 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 196 | 0206313M | Marine Corps Communications Systems | 07 | 157,440 | 73,982 | | 73,982 | 67,763 | | 67,763 | U |
| 197 | 0206335M | Common Aviation Command and Control System (CAC2S) | 07 | | 32,495 | | 32,495 | 13,431 | | 13,431 | U |
| 198 | 0206623M | Marine Corps Ground Combat/ Supporting Arms Systems | 07 | 116,944 | 52,377 | | 52,377 | 56,769 | | 56,769 | U |
| 199 | 0206624M | Marine Corps Combat Services Support | 07 | 23,883 | 20,999 | | 20,999 | 20,729 | | 20,729 | U |
| 200 | 0206625M | USMC Intelligence/Electronic Warfare Systems (MIP) | 07 | 35,213 | 14,170 | | 14,170 | 13,152 | | 13,152 | U |
| 201 | 0206629M | Amphibious Assault Vehicle | 07 | | 96,207 | | 96,207 | 48,535 | | 48,535 | U |
| 202 | 0207161N | Tactical AIM Missiles | 07 | 17,518 | 37,258 | | 37,258 | 76,016 | | 76,016 | U |
| 203 | 0207163N | Advanced Medium Range Air-to-Air Missile (AMRAAM) | 07 | 2,575 | 10,210 | | 10,210 | 32,172 | | 32,172 | U |
| 204 | 0208058N | Joint High Speed Vessel (JHSV) | 07 | 974 | | | | | | | U |
| 208 | 0303109N | Satellite Communications (SPACE) | 07 | 63,642 | 41,729 | | 41,729 | 53,239 | | 53,239 | U |
| 209 | 0303138N | Consolidated Afloat Network Enterprise Services (CANES) | 07 | 23,965 | 22,773 | | 22,773 | 21,677 | | 21,677 | U |
| 210 | 0303140N | Information Systems Security Program | 07 | 25,604 | 23,016 | | 23,016 | 28,102 | | 28,102 | U |
| 211 | 0303150M | WWMCCS/Global Command and Control System | 07 | | | | | 294 | | 294 | U |
| 213 | 0305160N | Navy Meteorological and Ocean Sensors-Space (METOC) | 07 | 726 | 359 | | 359 | 599 | | 599 | U |
| 214 | 0305192N | Military Intelligence Program (MIP) Activities | 07 | 5,758 | 6,166 | | 6,166 | 6,207 | | 6,207 | U |
| 215 | 0305204N | Tactical Unmanned Aerial Vehicles | 07 | 8,381 | 8,505 | | 8,505 | 8,550 | | 8,550 | U |
| 216 | 0305205N | UAS Integration and Interoperability | 07 | | | | | 41,831 | | 41,831 | U |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

Department of the Navy
FY 2016 President's Budget
Exhibit R-1 FY 2016 President's Budget
Total Obligational Authority
(Dollars in Thousands)

09 Jan 2015

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

| Line No | Program Element Number | Item | Act | FY 2014 (Base & OCO) | FY 2015 Base Enacted | FY 2015 OCO Enacted | FY 2015 Total Enacted | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 217 | 0305208M | Distributed Common Ground/Surface Systems | 07 | 5,207 | 11,606 | | 11,606 | 1,105 | | 1,105 | U |
| 218 | 0305208N | Distributed Common Ground/Surface Systems | 07 | 17,718 | 18,146 | | 18,146 | 33,149 | | 33,149 | U |
| 219 | 0305220N | RQ-4 UAV | 07 | 375,235 | 451,442 | | 451,442 | 227,188 | | 227,188 | U |
| 220 | 0305231N | MQ-8 UAV | 07 | 41,713 | 43,294 | | 43,294 | 52,770 | | 52,770 | U |
| 221 | 0305232M | RQ-11 UAV | 07 | | 718 | | 718 | 635 | | 635 | U |
| 222 | 0305233N | RQ-7 UAV | 07 | 710 | 851 | | 851 | 688 | | 688 | U |
| 223 | 0305234N | Small (Level 0) Tactical UAS (STUASL0) | 07 | 5,033 | 4,813 | | 4,813 | 4,647 | | 4,647 | U |
| 224 | 0305239M | RQ-21A | 07 | 11,122 | 8,192 | | 8,192 | 6,435 | | 6,435 | U |
| 225 | 0305241N | Multi-Intelligence Sensor Development | 07 | 28,851 | 17,751 | | 17,751 | 49,145 | | 49,145 | U |
| 226 | 0305242M | Unmanned Aerial Systems (UAS) Payloads (MIP) | 07 | | 2,000 | | 2,000 | 9,246 | | 9,246 | U |
| 227 | 0305421N | RQ-4 Modernization | 07 | | 5,000 | | 5,000 | 150,854 | | 150,854 | U |
| 228 | 0308601N | Modeling and Simulation Support | 07 | 4,932 | 4,719 | | 4,719 | 4,757 | | 4,757 | U |
| 229 | 0702207N | Depot Maintenance (Non-IF) | 07 | 25,630 | 21,168 | | 21,168 | 24,185 | | 24,185 | U |
| 230 | 0708011N | Industrial Preparedness | 07 | 48,795 | 37,169 | | 37,169 | | | | U |
| 231 | 0708730N | Maritime Technology (MARITECH) | 07 | 4,815 | 4,347 | | 4,347 | 4,321 | | 4,321 | U |
| 9999 | 9999999999 | Classified Programs | | 1,419,474 | 1,162,673 | 35,080 | 1,197,753 | 1,252,185 | 35,747 | 1,287,932 | U |
| | | Operational Systems Development | | 3,395,279 | 3,146,674 | 35,550 | 3,182,224 | 3,482,173 | 35,747 | 3,517,920 | |
| Total Research, Development, Test & Eval, Navy | | | | 14,946,053 | 15,954,604 | 36,020 | 15,990,624 | 17,885,916 | 35,747 | 17,921,663 | |

R-1C1: FY 2016 President's Budget (Published Version of PB Position), as of January 9, 2015 at 15:38:04

THIS PAGE INTENTIONALLY LEFT BLANK

## Master Program Element Table of Contents (by Budget Activity then Line Item Number)

***Budget Activity 01: Basic Research***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 1 | 01 | 0601103N | University Research Initiatives | Volume 1 - 1 |
| 2 | 01 | 0601152N | In-House Lab Independent Res | Volume 1 - 9 |
| 3 | 01 | 0601153N | Defense Research Sciences | Volume 1 - 29 |


***Budget Activity 02: Applied Research***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 4 | 02 | 0602114N | Power Proj Applied Research | Volume 1 - 87 |
| 5 | 02 | 0602123N | Force Protection Applied Res | Volume 1 - 99 |
| 6 | 02 | 0602131M | Marine Corps Lndg Force Tech | Volume 1 - 123 |
| 7 | 02 | 0602235N | Common Picture Applied Research | Volume 1 - 161 |
| 8 | 02 | 0602236N | Warfighter Sustainment Applied Res | Volume 1 - 183 |
| 9 | 02 | 0602271N | Electromagnetic Systems Applied Research | Volume 1 - 205 |

***Budget Activity 02: Applied Research***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 10 | 02 | 0602435N | Ocean Wrfghtg Env Applied Res | Volume 1 - 233 |
| 11 | 02 | 0602651M | JT Non-Lethal Wpns Applied Res | Volume 1 - 251 |
| 12 | 02 | 0602747N | Undersea Warfare Applied Res | Volume 1 - 257 |
| 13 | 02 | 0602750N | (U)Future Naval Capabilities Applied Research | Volume 1 - 269 |
| 14 | 02 | 0602782N | Mine & Exp Warfare Applied Res | Volume 1 - 317 |


***Budget Activity 03: Advanced Technology Development (ATD)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 15 | 03 | 0603114N | Power Projection Advanced Technology | Volume 1 - 327 |
| 16 | 03 | 0603123N | Force Protection Advanced Technology | Volume 1 - 331 |
| 17 | 03 | 0603271N | Electromagnetic Systems Advanced Technology | Volume 1 - 341 |
| 18 | 03 | 0603640M | MC Advanced Technology Demo | Volume 1 - 353 |
| 19 | 03 | 0603651M | JT Non-Lethal Wpns Tech Dev | Volume 1 - 397 |
| 20 | 03 | 0603673N | (U)Future Naval Capabilities Advanced Tech Dev | Volume 1 - 403 |
| 21 | 03 | 0603680N | (U)Manufacturing Technology Program | Volume 1 - 451 |

***Budget Activity 03: Advanced Technology Development (ATD)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 22 | 03 | 0603729N | Warfighter Protection Adv Tech | Volume 1 - 459 |
| 23 | 03 | 0603747N | Undersea Warfare Advanced Tech | Volume 1 - 465 |
| 24 | 03 | 0603758N | Navy Warfighting Exp & Demo | Volume 1 - 471 |
| 25 | 03 | 0603782N | Mine and Expeditionary Warfare Advanced Technology | Volume 1 - 479 |


***Budget Activity 04: Advanced Component Development & Prototypes (ACD&P)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 26 | 04 | 0603207N | Air/Ocean Tactical Applications | Volume 2 - 1 |
| 27 | 04 | 0603216N | Aviation Survivability | Volume 2 - 67 |
| 28 | 04 | 0603237N | Deployable JT Cmd & Control | Volume 2 - 95 |
| 29 | 04 | 0603251N | (U)AIRCRAFT SYSTEMS | Volume 2 - 103 |
| 30 | 04 | 0603254N | ASW Systems Development | Volume 2 - 123 |
| 31 | 04 | 0603261N | Tactical Airborne Reconnaissance | Volume 2 - 137 |
| 32 | 04 | 0603382N | Advanced Combat Systems Tech | Volume 2 - 145 |
| 33 | 04 | 0603502N | Surface & Shallow Water MCM | Volume 2 - 157 |

***Budget Activity 04: Advanced Component Development & Prototypes (ACD&P)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 34 | 04 | 0603506N | Surface Ship Torpedo Defense | Volume 2 - 253 |
| 35 | 04 | 0603512N | Carrier Systems Development | Volume 2 - 265 |
| 36 | 04 | 0603525N | (U)PILOT FISH | Volume 2 - 299 |
| 37 | 04 | 0603527N | (U)RETRACT LARCH | Volume 2 - 301 |
| 38 | 04 | 0603536N | (U)RETRACT JUNIPER | Volume 2 - 303 |
| 39 | 04 | 0603542N | Radiological Control | Volume 2 - 305 |
| 40 | 04 | 0603553N | Surface ASW | Volume 2 - 327 |
| 41 | 04 | 0603561N | Advanced Submarine System Development | Volume 2 - 343 |
| 42 | 04 | 0603562N | Submarine Tactical Warfare Sys | Volume 2 - 391 |
| 43 | 04 | 0603563N | Ship Concept Advanced Design | Volume 2 - 413 |
| 44 | 04 | 0603564N | Ship Prel Design & Feasibility Studies | Volume 2 - 437 |
| 45 | 04 | 0603570N | Advanced Nuclear Power Systems | Volume 2 - 461 |
| 46 | 04 | 0603573N | Advanced Surface Machinery Sys | Volume 2 - 467 |
| 47 | 04 | 0603576N | (U)CHALK EAGLE | Volume 2 - 481 |
| 48 | 04 | 0603581N | (U)LITTORAL COMBAT SHIP | Volume 2 - 485 |
| 49 | 04 | 0603582N | Combat System Integration | Volume 2 - 535 |
| 50 | 04 | 0603595N | (U)Ohio Replacement | Volume 2 - 569 |
| 51 | 04 | 0603596N | (U)LCS Mission Modules | Volume 2 - 589 |

***Budget Activity 04: Advanced Component Development & Prototypes (ACD&P)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 52 | 04 | 0603597N | (U)Automated Test and Re-Test (ATRT) | Volume 2 - 625 |
| 53 | 04 | 0603609N | Conventional Munitions | Volume 2 - 633 |
| 54 | 04 | 0603611M | Marine Corps Assault Vehicles | Volume 2 - 643 |
| 55 | 04 | 0603635M | Marine Corps Grnd Cmbt/Supt Sys | Volume 2 - 653 |
| 56 | 04 | 0603654N | JT Service Explosive Ordn Dev | Volume 2 - 667 |
| 57 | 04 | 0603658N | Cooperative Engagement | Volume 2 - 693 |
| 58 | 04 | 0603713N | Ocean Engineering Tech Dev | Volume 2 - 711 |
| 59 | 04 | 0603721N | Environmental Protection | Volume 2 - 729 |
| 60 | 04 | 0603724N | Navy Energy Program | Volume 2 - 759 |
| 61 | 04 | 0603725N | Facilities Improvement | Volume 2 - 795 |
| 62 | 04 | 0603734N | (U)CHALK CORAL | Volume 2 - 821 |
| 63 | 04 | 0603739N | Navy Logistic Productivity | Volume 2 - 823 |
| 64 | 04 | 0603746N | (U)RETRACT MAPLE | Volume 2 - 843 |
| 65 | 04 | 0603748N | (U)LINK PLUMERIA | Volume 2 - 845 |
| 66 | 04 | 0603751N | (U)RETRACT ELM | Volume 2 - 847 |
| 67 | 04 | 0603764N | (U)LINK EVERGREEN | Volume 2 - 849 |
| 68 | 04 | 0603787N | (U)SPECIAL PROCESSES | Volume 2 - 851 |
| 69 | 04 | 0603790N | NATO Research and Deve | Volume 2 - 855 |

***Budget Activity 04: Advanced Component Development & Prototypes (ACD&P)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 70 | 04 | 0603795N | Land Attack Tech | Volume 2 - 863 |
| 71 | 04 | 0603851M | Joint Non-Lethal Weapons Testing | Volume 2 - 869 |
| 72 | 04 | 0603860N | JT Precision Approach & Ldg Sys | Volume 2 - 883 |
| 73 | 04 | 0603925N | Directed Energy and Electric Weapon System | Volume 2 - 895 |
| 74 | 04 | 0604112N | (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80 | Volume 2 - 915 |
| 75 | 04 | 0604122N | (U)Remote Minehunting System (RMS) | Volume 2 - 931 |
| 76 | 04 | 0604272N | Tact Air Dir Infrared CM (TADIRCM) | Volume 2 - 943 |
| 77 | 04 | 0604279N | (U)ASE Self Protection Optimization | Volume 2 - 959 |
| 78 | 04 | 0604292N | MH-XX | Volume 2 - 977 |
| 79 | 04 | 0604454N | (U)LX (R) | Volume 2 - 983 |
| 80 | 04 | 0604653N | JT Cntr Radio Controlled IED Elec War (JCREW) | Volume 2 - 989 |
| 81 | 04 | 0604659N | (U)Precision Strike Weapons Development Program | Volume 2 - 997 |
| 82 | 04 | 0604707N | SEW Architecture/Eng Support | Volume 2 - 1011 |
| 83 | 04 | 0604786N | (U)Offensive Anti-Surface Warfare Weapon Dev | Volume 2 - 1117 |
| 84 | 04 | 0605812M | (U)Joint Light Tactical Vehicle(JLTV) EMD | Volume 2 - 1131 |
| 85 | 04 | 0303354N | ASW Systems Development - MIP | Volume 2 - 1145 |
| 86 | 04 | 0304270N | Electronic Warfare Development - MIP | Volume 2 - 1155 |

***Budget Activity 05: System Development & Demonstration (SDD)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 87 | 05 | 0603208N | Training System Aircraft | Volume 3 - 1 |
| 88 | 05 | 0604212N | Other Helicopter Development | Volume 3 - 13 |
| 89 | 05 | 0604214N | AV-8B Aircraft - Engine Dev | Volume 3 - 45 |
| 90 | 05 | 0604215N | Standards Development | Volume 3 - 59 |
| 91 | 05 | 0604216N | Multi-Mssn Helicopter Upgrade Dev | Volume 3 - 113 |
| 92 | 05 | 0604218N | Air/Ocean Equipment Engineering | Volume 3 - 125 |
| 93 | 05 | 0604221N | P-3 Modernization Program | Volume 3 - 143 |
| 94 | 05 | 0604230N | Warfare Support System | Volume 3 - 151 |
| 95 | 05 | 0604231N | Tactical Command System | Volume 3 - 175 |
| 96 | 05 | 0604234N | Advanced Hawkeye | Volume 3 - 241 |
| 97 | 05 | 0604245N | H-1 Upgrades | Volume 3 - 281 |
| 98 | 05 | 0604261N | Acoustic Search Sensors | Volume 3 - 295 |
| 99 | 05 | 0604262N | V-22A | Volume 3 - 313 |
| 100 | 05 | 0604264N | Air Crew Systems Development | Volume 3 - 333 |
| 101 | 05 | 0604269N | EA-18 Squadrons | Volume 3 - 347 |
| 102 | 05 | 0604270N | Electronic Warfare (EW) Dev | Volume 3 - 361 |

***Budget Activity 05: System Development & Demonstration (SDD)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 103 | 05 | 0604273N | (U)Executive Helo Development | Volume 3 - 389 |
| 104 | 05 | 0604274N | Next Generation Jammer (NGJ) | Volume 3 - 401 |
| 105 | 05 | 0604280N | JT Tact Radio Sys (JTRS) | Volume 3 - 423 |
| 106 | 05 | 0604307N | Surface Combatant Cmbt Sys Eng | Volume 3 - 439 |
| 107 | 05 | 0604311N | LPD-17 Class Systems Integration | Volume 3 - 467 |
| 108 | 05 | 0604329N | Small Diameter Bomb (SDB) | Volume 3 - 475 |
| 109 | 05 | 0604366N | Standard Missile Improvements | Volume 3 - 497 |
| 110 | 05 | 0604373N | Airborne Mine Countermeasures (AMCM) | Volume 3 - 521 |
| 111 | 05 | 0604376M | (U)Marine Air Grnd Task Force(MAGTF)EW for Aviatio | Volume 3 - 565 |
| 112 | 05 | 0604378N | Nav Integrated Fire Control-Counter Air Sys Eng | Volume 3 - 583 |
| 113 | 05 | 0604404N | (U)Unman Carrier Launch A/B Surv & Strk(UCLASS)Sys | Volume 3 - 593 |
| 114 | 05 | 0604501N | Advanced Above Water Sensors | Volume 3 - 609 |
| 115 | 05 | 0604503N | SSN-688 & Trident Modernization | Volume 3 - 655 |
| 116 | 05 | 0604504N | Air Control | Volume 3 - 705 |
| 117 | 05 | 0604512N | Shipboard Aviation Systems | Volume 3 - 737 |
| 118 | 05 | 0604522N | (U)Air and Missile Defense Radar (AMDR) System | Volume 3 - 755 |
| 119 | 05 | 0604558N | New Design SSN | Volume 3 - 769 |
| 120 | 05 | 0604562N | Submarine Tactical Warfare System | Volume 3 - 795 |

***Budget Activity 05: System Development & Demonstration (SDD)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 121 | 05 | 0604567N | Ship Contract Design/ Live Fire T&E | Volume 3 - 807 |
| 122 | 05 | 0604574N | Navy Tactical Computer Resources | Volume 3 - 871 |
| 123 | 05 | 0604580N | (U)Virginia Payload Module (VPM | Volume 3 - 887 |
| 124 | 05 | 0604601N | Mine Development | Volume 3 - 895 |
| 125 | 05 | 0604610N | Lightweight Torpedo Development | Volume 3 - 903 |
| 126 | 05 | 0604654N | JT Service EOD | Volume 3 - 919 |
| 127 | 05 | 0604703N | Personnel, Trng, Sim, & Human Factors | Volume 3 - 927 |
| 128 | 05 | 0604727N | Joint Standoff Weapon Systems | Volume 3 - 939 |
| 129 | 05 | 0604755N | Ship Self Def (Detect & Cntrl) | Volume 3 - 947 |
| 130 | 05 | 0604756N | Ship Self Def (Engage: Hard Kill) | Volume 3 - 993 |
| 131 | 05 | 0604757N | Ship Self Def (Engage: Soft Kill/EW) | Volume 3 - 1019 |
| 132 | 05 | 0604761N | Intelligence Engineering | Volume 3 - 1075 |
| 133 | 05 | 0604771N | Medical Development | Volume 3 - 1081 |
| 134 | 05 | 0604777N | Navigation/Id System | Volume 3 - 1101 |
| 135 | 05 | 0604800M | (U)Joint Strike Fighter (JSF) - EMD | Volume 3 - 1139 |
| 136 | 05 | 0604800N | JT Strike Fighter (JSF) - EMD | Volume 3 - 1175 |
| 137 | 05 | 0604810M | Joint Strike Fighter Follow On Development - MC | Volume 3 - 1211 |
| 138 | 05 | 0604810N | Joint Strike Fighter Follow On Development - Navy | Volume 3 - 1221 |

***Budget Activity 05: System Development & Demonstration (SDD)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 139 | 05 | 0605013M | Marine Corps IT Dev/Mod | Volume 3 - 1231 |
| 140 | 05 | 0605013N | Information Technology Development | Volume 3 - 1251 |
| 141 | 05 | 0605212N | CH-53K | Volume 3 - 1369 |
| 142 | 05 | 0605220N | Ship to Shore Connector (SSC) | Volume 3 - 1383 |
| 143 | 05 | 0605450N | Joint Air-to-ground Missile (JAGM) | Volume 3 - 1399 |
| 144 | 05 | 0605500N | Multi-mssn Maritime Aircraft (MMA) (P-8A) | Volume 3 - 1407 |
| 145 | 05 | 0204202N | DDG-1000 | Volume 3 - 1447 |
| 146 | 05 | 0304231N | Tactical Command System - MIP | Volume 3 - 1457 |
| 147 | 05 | 0304785N | Tactical Cryptologic Systems | Volume 3 - 1465 |
| 148 | 05 | 0305124N | Special Applications Program | Volume 3 - 1485 |


***Budget Activity 06: RDT&E Management Support***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 149 | 06 | 0604256N | Threat Simulator Development | Volume 4 - 1 |
| 150 | 06 | 0604258N | Target Systems Development | Volume 4 - 13 |

***Budget Activity 06: RDT&E Management Support***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 151 | 06 | 0604759N | Major T&E Investment | Volume 4 - 29 |
| 152 | 06 | 0605126N | (U)Joint Theater Air and Missile Defense Org | Volume 4 - 37 |
| 153 | 06 | 0605152N | Studies & Analysis Supt - Navy | Volume 4 - 41 |
| 154 | 06 | 0605154N | Center For Naval Analyses | Volume 4 - 49 |
| 155 | 06 | 0605285N | Next Generation Fighter | Volume 4 - 57 |
| 156 | 06 | 0605502N | Small Business Innovative Research | Volume 4 - 61 |
| 157 | 06 | 0605804N | Technical Information Services | Volume 4 - 107 |
| 158 | 06 | 0605853N | Management, Technical & Intl Supt | Volume 4 - 113 |
| 159 | 06 | 0605856N | Strategic Technical Support | Volume 4 - 179 |
| 160 | 06 | 0605861N | RDT&E Science & Tech Mgmt | Volume 4 - 185 |
| 161 | 06 | 0605863N | RDT&E Ship & Aircraft Support | Volume 4 - 195 |
| 162 | 06 | 0605864N | Test & Evaluation Support | Volume 4 - 209 |
| 163 | 06 | 0605865N | Operational Test & Eval Capability | Volume 4 - 235 |
| 164 | 06 | 0605866N | Navy Space & Electr Warfare Supt | Volume 4 - 241 |
| 165 | 06 | 0605867N | Space & Elec War Surv/Recon | Volume 4 - 251 |
| 166 | 06 | 0605873M | Marine Corps Program Wide Supt | Volume 4 - 259 |
| 167 | 06 | 0909999N | Cancelled Account Adjustments | Volume 4 - 277 |

***Budget Activity 07: Operational Systems Development***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 169 | 07 | 0604227N | Harpoon Modifications | Volume 5 - 1 |
| 170 | 07 | 0604402N | Unmanned Combat Air Veh(UCAV) Adv Cp/Proto Dev | Volume 5 - 7 |
| 171 | 07 | 0604766M | (U)MARINE CORPS DATA SYSTEMS | Volume 5 - 17 |
| 172 | 07 | 0605525N | (U)CARRIER ONBOARD DELIVERY (COD) FOLLOW ON | Volume 5 - 23 |
| 173 | 07 | 0605555N | (U)STRIKE WEAPONS DEVELOPMENT | Volume 5 - 29 |
| 174 | 07 | 0101221N | Strategic Sub & Wpns Sys Supt | Volume 5 - 47 |
| 175 | 07 | 0101224N | SSBN Security Tech Program | Volume 5 - 73 |
| 176 | 07 | 0101226N | Submarine Acoustic War Dev | Volume 5 - 75 |
| 177 | 07 | 0101402N | Navy Strategic Comms | Volume 5 - 85 |
| 178 | 07 | 0203761N | Rapid Technology Transition (RTT) | Volume 5 - 107 |
| 179 | 07 | 0204136N | F/A-18 Squadrons | Volume 5 - 125 |
| 180 | 07 | 0204152N | E-2 Squadrons | Volume 5 - 161 |
| 181 | 07 | 0204163N | Fleet Tactical Development | Volume 5 - 169 |
| 182 | 07 | 0204228N | Surface Support | Volume 5 - 189 |
| 183 | 07 | 0204229N | Tomahawk Mssn Planning Ctr | Volume 5 - 203 |
| 184 | 07 | 0204311N | Integrated Surveillance System | Volume 5 - 221 |

***Budget Activity 07: Operational Systems Development***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 185 | 07 | 0204413N | Amphibious Tactical Supt Units | Volume 5 - 239 |
| 186 | 07 | 0204460M | (U)Ground/Air Task Oriented Radar (G/ATOR) | Volume 5 - 255 |
| 187 | 07 | 0204571N | Consolidated Trng Sys Dev | Volume 5 - 267 |
| 188 | 07 | 0204574N | Cryptologic Direct Support | Volume 5 - 317 |
| 189 | 07 | 0204575N | Elect Warfare Readiness Supt | Volume 5 - 327 |
| 190 | 07 | 0205601N | Harm Improvement | Volume 5 - 347 |
| 191 | 07 | 0205604N | Tactical Data Links | Volume 5 - 369 |
| 192 | 07 | 0205620N | Surface ASW Cmbt Sys Integr | Volume 5 - 415 |
| 193 | 07 | 0205632N | MK-48 ADCAP | Volume 5 - 429 |
| 194 | 07 | 0205633N | Aviation Improvements | Volume 5 - 439 |
| 195 | 07 | 0205675N | Operational Nuclear Power Sys | Volume 5 - 497 |
| 196 | 07 | 0206313M | Marine Corps Comms Systems | Volume 5 - 499 |
| 197 | 07 | 0206335M | Common Aviation Command and Control System (CAC2S) | Volume 5 - 647 |
| 198 | 07 | 0206623M | MC Ground Cmbt Spt Arms Sys | Volume 5 - 659 |
| 199 | 07 | 0206624M | Marine Corps Cmbt Services Supt | Volume 5 - 791 |
| 200 | 07 | 0206625M | USMC Intelligence/Electronics Warfare Sys | Volume 5 - 863 |
| 201 | 07 | 0206629M | Amphibious Assault Vehicle | Volume 5 - 895 |
| 202 | 07 | 0207161N | Tactical Aim Missiles | Volume 5 - 905 |

***Budget Activity 07: Operational Systems Development***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 203 | 07 | 0207163N | AMRAAM | Volume 5 - 923 |
| 204 | 07 | 0208058N | Joint High Speed Vessel (JHSV) | Volume 5 - 933 |
| 208 | 07 | 0303109N | Satellite Communications (Space) | Volume 5 - 941 |
| 209 | 07 | 0303138N | Consolidated Afloat Network Ent Services(CANES) | Volume 5 - 969 |
| 210 | 07 | 0303140N | Information Sys Security Program | Volume 5 - 989 |
| 211 | 07 | 0303150M | WWMCCS/GLOBAL COMMAND AND CONTROL SYSTEM | Volume 5 - 1019 |
| 213 | 07 | 0305160N | Navy Meteorological and Ocean Sensors-Space(METOC) | Volume 5 - 1025 |
| 214 | 07 | 0305192N | JT Military Intel Programs | Volume 5 - 1037 |
| 215 | 07 | 0305204N | Tactical Unmanned Aer Vehicles | Volume 5 - 1039 |
| 216 | 07 | 0305205N | (U)UAS Integration and Interoperability | Volume 5 - 1051 |
| 217 | 07 | 0305208M | (U)Distributed Common Ground/Surface Systems | Volume 5 - 1061 |
| 218 | 07 | 0305208N | Distributed Common Ground Sys | Volume 5 - 1073 |
| 219 | 07 | 0305220N | RQ-4 UAV | Volume 5 - 1097 |
| 220 | 07 | 0305231N | MQ-8 UAV | Volume 5 - 1109 |
| 221 | 07 | 0305232M | RQ-11 UAV | Volume 5 - 1121 |
| 222 | 07 | 0305233N | RQ-7 UAV | Volume 5 - 1127 |
| 223 | 07 | 0305234N | (U)SMALL (LEVEL 0) TACTICAL UAS (STUASL0) | Volume 5 - 1133 |
| 224 | 07 | 0305239M | (U)RQ-21A | Volume 5 - 1143 |

***Budget Activity 07: Operational Systems Development***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 225 | 07 | 0305241N | (U) MULTI-INTELLIGENCE SENSOR DEVELOPMENT | Volume 5 - 1153 |
| 226 | 07 | 0305242M | Unmanned Aerial Systems (UAS) Payloads | Volume 5 - 1157 |
| 227 | 07 | 0305421N | RQ-4 Modernization | Volume 5 - 1179 |
| 228 | 07 | 0308601N | Modeling & Simulation Support | Volume 5 - 1191 |
| 229 | 07 | 0702207N | Depot Maintenance (NON-IF) | Volume 5 - 1207 |
| 230 | 07 | 0708011N | Industrial Preparedness | Volume 5 - 1221 |
| 231 | 07 | 0708730N | Maritime Tech (MARITECH) | Volume 5 - 1239 |

THIS PAGE INTENTIONALLY LEFT BLANK

## Master Program Element Table of Contents (Alphabetically by Program Element Title)


| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| (U) MULTI-INTELLIGENCE SENSOR DEVELOPMENT | 0305241N | 225 | 07 | Volume 5 - 1153 |
| (U)AIRCRAFT SYSTEMS | 0603251N | 29 | 04 | Volume 2 - 103 |
| (U)ASE Self Protection Optimization | 0604279N | 77 | 04 | Volume 2 - 959 |
| (U)Air and Missile Defense Radar (AMDR) System | 0604522N | 118 | 05 | Volume 3 - 755 |
| (U)Automated Test and Re-Test (ATRT) | 0603597N | 52 | 04 | Volume 2 - 625 |
| (U)CARRIER ONBOARD DELIVERY (COD) FOLLOW ON | 0605525N | 172 | 07 | Volume 5 - 23 |
| (U)CHALK CORAL | 0603734N | 62 | 04 | Volume 2 - 821 |
| (U)CHALK EAGLE | 0603576N | 47 | 04 | Volume 2 - 481 |
| (U)Distributed Common Ground/Surface Systems | 0305208M | 217 | 07 | Volume 5 - 1061 |
| (U)Executive Helo Development | 0604273N | 103 | 05 | Volume 3 - 389 |
| (U)Future Naval Capabilities Advanced Tech Dev | 0603673N | 20 | 03 | Volume 1 - 403 |
| (U)Future Naval Capabilities Applied Research | 0602750N | 13 | 02 | Volume 1 - 269 |
| (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80 | 0604112N | 74 | 04 | Volume 2 - 915 |
| (U)Ground/Air Task Oriented Radar (G/ATOR) | 0204460M | 186 | 07 | Volume 5 - 255 |
| (U)Joint Light Tactical Vehicle(JLTV) EMD | 0605812M | 84 | 04 | Volume 2 - 1131 |
| (U)Joint Strike Fighter (JSF) - EMD | 0604800M | 135 | 05 | Volume 3 - 1139 |
| (U)Joint Theater Air and Missile Defense Org | 0605126N | 152 | 06 | Volume 4 - 37 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| (U)LCS Mission Modules | 0603596N | 51 | 04 | Volume 2 - 589 |
| (U)LINK EVERGREEN | 0603764N | 67 | 04 | Volume 2 - 849 |
| (U)LINK PLUMERIA | 0603748N | 65 | 04 | Volume 2 - 845 |
| (U)LITTORAL COMBAT SHIP | 0603581N | 48 | 04 | Volume 2 - 485 |
| (U)LX (R) | 0604454N | 79 | 04 | Volume 2 - 983 |
| (U)MARINE CORPS DATA SYSTEMS | 0604766M | 171 | 07 | Volume 5 - 17 |
| (U)Manufacturing Technology Program | 0603680N | 21 | 03 | Volume 1 - 451 |
| (U)Marine Air Grnd Task Force(MAGTF)EW for Aviatio | 0604376M | 111 | 05 | Volume 3 - 565 |
| (U)Offensive Anti-Surface Warfare Weapon Dev | 0604786N | 83 | 04 | Volume 2 - 1117 |
| (U)Ohio Replacement | 0603595N | 50 | 04 | Volume 2 - 569 |
| (U)PILOT FISH | 0603525N | 36 | 04 | Volume 2 - 299 |
| (U)Precision Strike Weapons Development Program | 0604659N | 81 | 04 | Volume 2 - 997 |
| (U)RETRACT ELM | 0603751N | 66 | 04 | Volume 2 - 847 |
| (U)RETRACT JUNIPER | 0603536N | 38 | 04 | Volume 2 - 303 |
| (U)RETRACT LARCH | 0603527N | 37 | 04 | Volume 2 - 301 |
| (U)RETRACT MAPLE | 0603746N | 64 | 04 | Volume 2 - 843 |
| (U)RQ-21A | 0305239M | 224 | 07 | Volume 5 - 1143 |
| (U)Remote Minehunting System (RMS) | 0604122N | 75 | 04 | Volume 2 - 931 |
| (U)SMALL (LEVEL 0) TACTICAL UAS (STUASL0) | 0305234N | 223 | 07 | Volume 5 - 1133 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| (U)SPECIAL PROCESSES | 0603787N | 68 | 04 | Volume 2 - 851 |
| (U)STRIKE WEAPONS DEVELOPMENT | 0605555N | 173 | 07 | Volume 5 - 29 |
| (U)UAS Integration and Interoperability | 0305205N | 216 | 07 | Volume 5 - 1051 |
| (U)Unman Carrier Launch A/B Surv & Strk(UCLASS)Sys | 0604404N | 113 | 05 | Volume 3 - 593 |
| (U)Virginia Payload Module (VPM | 0604580N | 123 | 05 | Volume 3 - 887 |
| AMRAAM | 0207163N | 203 | 07 | Volume 5 - 923 |
| ASW Systems Development | 0603254N | 30 | 04 | Volume 2 - 123 |
| ASW Systems Development - MIP | 0303354N | 85 | 04 | Volume 2 - 1145 |
| AV-8B Aircraft - Engine Dev | 0604214N | 89 | 05 | Volume 3 - 45 |
| Acoustic Search Sensors | 0604261N | 98 | 05 | Volume 3 - 295 |
| Advanced Above Water Sensors | 0604501N | 114 | 05 | Volume 3 - 609 |
| Advanced Combat Systems Tech | 0603382N | 32 | 04 | Volume 2 - 145 |
| Advanced Hawkeye | 0604234N | 96 | 05 | Volume 3 - 241 |
| Advanced Nuclear Power Systems | 0603570N | 45 | 04 | Volume 2 - 461 |
| Advanced Submarine System Development | 0603561N | 41 | 04 | Volume 2 - 343 |
| Advanced Surface Machinery Sys | 0603573N | 46 | 04 | Volume 2 - 467 |
| Air Control | 0604504N | 116 | 05 | Volume 3 - 705 |
| Air Crew Systems Development | 0604264N | 100 | 05 | Volume 3 - 333 |
| Air/Ocean Equipment Engineering | 0604218N | 92 | 05 | Volume 3 - 125 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Air/Ocean Tactical Applications | 0603207N | 26 | 04 | Volume 2 - 1 |
| Airborne Mine Countermeasures (AMCM) | 0604373N | 110 | 05 | Volume 3 - 521 |
| Amphibious Assault Vehicle | 0206629M | 201 | 07 | Volume 5 - 895 |
| Amphibious Tactical Supt Units | 0204413N | 185 | 07 | Volume 5 - 239 |
| Aviation Improvements | 0205633N | 194 | 07 | Volume 5 - 439 |
| Aviation Survivability | 0603216N | 27 | 04 | Volume 2 - 67 |
| CH-53K | 0605212N | 141 | 05 | Volume 3 - 1369 |
| Cancelled Account Adjustments | 0909999N | 167 | 06 | Volume 4 - 277 |
| Carrier Systems Development | 0603512N | 35 | 04 | Volume 2 - 265 |
| Center For Naval Analyses | 0605154N | 154 | 06 | Volume 4 - 49 |
| Combat System Integration | 0603582N | 49 | 04 | Volume 2 - 535 |
| Common Aviation Command and Control System (CAC2S) | 0206335M | 197 | 07 | Volume 5 - 647 |
| Common Picture Applied Research | 0602235N | 7 | 02 | Volume 1 - 161 |
| Consolidated Afloat Network Ent Services(CANES) | 0303138N | 209 | 07 | Volume 5 - 969 |
| Consolidated Trng Sys Dev | 0204571N | 187 | 07 | Volume 5 - 267 |
| Conventional Munitions | 0603609N | 53 | 04 | Volume 2 - 633 |
| Cooperative Engagement | 0603658N | 57 | 04 | Volume 2 - 693 |
| Cryptologic Direct Support | 0204574N | 188 | 07 | Volume 5 - 317 |
| DDG-1000 | 0204202N | 145 | 05 | Volume 3 - 1447 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Defense Research Sciences | 0601153N | 3 | 01 | Volume 1 - 29 |
| Deployable JT Cmd & Control | 0603237N | 28 | 04 | Volume 2 - 95 |
| Depot Maintenance (NON-IF) | 0702207N | 229 | 07 | Volume 5 - 1207 |
| Directed Energy and Electric Weapon System | 0603925N | 73 | 04 | Volume 2 - 895 |
| Distributed Common Ground Sys | 0305208N | 218 | 07 | Volume 5 - 1073 |
| E-2 Squadrons | 0204152N | 180 | 07 | Volume 5 - 161 |
| EA-18 Squadrons | 0604269N | 101 | 05 | Volume 3 - 347 |
| Elect Warfare Readiness Supt | 0204575N | 189 | 07 | Volume 5 - 327 |
| Electromagnetic Systems Advanced Technology | 0603271N | 17 | 03 | Volume 1 - 341 |
| Electromagnetic Systems Applied Research | 0602271N | 9 | 02 | Volume 1 - 205 |
| Electronic Warfare (EW) Dev | 0604270N | 102 | 05 | Volume 3 - 361 |
| Electronic Warfare Development - MIP | 0304270N | 86 | 04 | Volume 2 - 1155 |
| Environmental Protection | 0603721N | 59 | 04 | Volume 2 - 729 |
| F/A-18 Squadrons | 0204136N | 179 | 07 | Volume 5 - 125 |
| Facilities Improvement | 0603725N | 61 | 04 | Volume 2 - 795 |
| Fleet Tactical Development | 0204163N | 181 | 07 | Volume 5 - 169 |
| Force Protection Advanced Technology | 0603123N | 16 | 03 | Volume 1 - 331 |
| Force Protection Applied Res | 0602123N | 5 | 02 | Volume 1 - 99 |
| H-1 Upgrades | 0604245N | 97 | 05 | Volume 3 - 281 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Harm Improvement | 0205601N | 190 | 07 | Volume 5 - 347 |
| Harpoon Modifications | 0604227N | 169 | 07 | Volume 5 - 1 |
| In-House Lab Independent Res | 0601152N | 2 | 01 | Volume 1 - 9 |
| Industrial Preparedness | 0708011N | 230 | 07 | Volume 5 - 1221 |
| Information Sys Security Program | 0303140N | 210 | 07 | Volume 5 - 989 |
| Information Technology Development | 0605013N | 140 | 05 | Volume 3 - 1251 |
| Integrated Surveillance System | 0204311N | 184 | 07 | Volume 5 - 221 |
| Intelligence Engineering | 0604761N | 132 | 05 | Volume 3 - 1075 |
| JT Cntr Radio Controlled IED Elec War (JCREW) | 0604653N | 80 | 04 | Volume 2 - 989 |
| JT Military Intel Programs | 0305192N | 214 | 07 | Volume 5 - 1037 |
| JT Non-Lethal Wpns Applied Res | 0602651M | 11 | 02 | Volume 1 - 251 |
| JT Non-Lethal Wpns Tech Dev | 0603651M | 19 | 03 | Volume 1 - 397 |
| JT Precision Approach & Ldg Sys | 0603860N | 72 | 04 | Volume 2 - 883 |
| JT Service EOD | 0604654N | 126 | 05 | Volume 3 - 919 |
| JT Service Explosive Ordn Dev | 0603654N | 56 | 04 | Volume 2 - 667 |
| JT Strike Fighter (JSF) - EMD | 0604800N | 136 | 05 | Volume 3 - 1175 |
| JT Tact Radio Sys (JTRS) | 0604280N | 105 | 05 | Volume 3 - 423 |
| Joint Air-to-ground Missile (JAGM) | 0605450N | 143 | 05 | Volume 3 - 1399 |
| Joint High Speed Vessel (JHSV) | 0208058N | 204 | 07 | Volume 5 - 933 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Joint Non-Lethal Weapons Testing | 0603851M | 71 | 04 | Volume 2 - 869 |
| Joint Standoff Weapon Systems | 0604727N | 128 | 05 | Volume 3 - 939 |
| Joint Strike Fighter Follow On Development - MC | 0604810M | 137 | 05 | Volume 3 - 1211 |
| Joint Strike Fighter Follow On Development - Navy | 0604810N | 138 | 05 | Volume 3 - 1221 |
| LPD-17 Class Systems Integration | 0604311N | 107 | 05 | Volume 3 - 467 |
| Land Attack Tech | 0603795N | 70 | 04 | Volume 2 - 863 |
| Lightweight Torpedo Development | 0604610N | 125 | 05 | Volume 3 - 903 |
| MC Advanced Technology Demo | 0603640M | 18 | 03 | Volume 1 - 353 |
| MC Ground Cmbt Spt Arms Sys | 0206623M | 198 | 07 | Volume 5 - 659 |
| MH-XX | 0604292N | 78 | 04 | Volume 2 - 977 |
| MK-48 ADCAP | 0205632N | 193 | 07 | Volume 5 - 429 |
| MQ-8 UAV | 0305231N | 220 | 07 | Volume 5 - 1109 |
| Major T&E Investment | 0604759N | 151 | 06 | Volume 4 - 29 |
| Management, Technical & Intl Supt | 0605853N | 158 | 06 | Volume 4 - 113 |
| Marine Corps Assault Vehicles | 0603611M | 54 | 04 | Volume 2 - 643 |
| Marine Corps Cmbt Services Supt | 0206624M | 199 | 07 | Volume 5 - 791 |
| Marine Corps Comms Systems | 0206313M | 196 | 07 | Volume 5 - 499 |
| Marine Corps Grnd Cmbt/Supt Sys | 0603635M | 55 | 04 | Volume 2 - 653 |
| Marine Corps IT Dev/Mod | 0605013M | 139 | 05 | Volume 3 - 1231 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Marine Corps Lndg Force Tech | 0602131M | 6 | 02 | Volume 1 - 123 |
| Marine Corps Program Wide Supt | 0605873M | 166 | 06 | Volume 4 - 259 |
| Maritime Tech (MARITECH) | 0708730N | 231 | 07 | Volume 5 - 1239 |
| Medical Development | 0604771N | 133 | 05 | Volume 3 - 1081 |
| Mine & Exp Warfare Applied Res | 0602782N | 14 | 02 | Volume 1 - 317 |
| Mine Development | 0604601N | 124 | 05 | Volume 3 - 895 |
| Mine and Expeditionary Warfare Advanced Technology | 0603782N | 25 | 03 | Volume 1 - 479 |
| Modeling & Simulation Support | 0308601N | 228 | 07 | Volume 5 - 1191 |
| Multi-Mssn Helicopter Upgrade Dev | 0604216N | 91 | 05 | Volume 3 - 113 |
| Multi-mssn Maritime Aircraft (MMA) (P-8A) | 0605500N | 144 | 05 | Volume 3 - 1407 |
| NATO Research and Deve | 0603790N | 69 | 04 | Volume 2 - 855 |
| Nav Integrated Fire Control-Counter Air Sys Eng | 0604378N | 112 | 05 | Volume 3 - 583 |
| Navigation/Id System | 0604777N | 134 | 05 | Volume 3 - 1101 |
| Navy Energy Program | 0603724N | 60 | 04 | Volume 2 - 759 |
| Navy Logistic Productivity | 0603739N | 63 | 04 | Volume 2 - 823 |
| Navy Meteorological and Ocean Sensors-Space(METOC) | 0305160N | 213 | 07 | Volume 5 - 1025 |
| Navy Space & Electr Warfare Supt | 0605866N | 164 | 06 | Volume 4 - 241 |
| Navy Strategic Comms | 0101402N | 177 | 07 | Volume 5 - 85 |
| Navy Tactical Computer Resources | 0604574N | 122 | 05 | Volume 3 - 871 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Navy Warfighting Exp & Demo | 0603758N | 24 | 03 | Volume 1 - 471 |
| New Design SSN | 0604558N | 119 | 05 | Volume 3 - 769 |
| Next Generation Fighter | 0605285N | 155 | 06 | Volume 4 - 57 |
| Next Generation Jammer (NGJ) | 0604274N | 104 | 05 | Volume 3 - 401 |
| Ocean Engineering Tech Dev | 0603713N | 58 | 04 | Volume 2 - 711 |
| Ocean Wrfghtg Env Applied Res | 0602435N | 10 | 02 | Volume 1 - 233 |
| Operational Nuclear Power Sys | 0205675N | 195 | 07 | Volume 5 - 497 |
| Operational Test & Eval Capability | 0605865N | 163 | 06 | Volume 4 - 235 |
| Other Helicopter Development | 0604212N | 88 | 05 | Volume 3 - 13 |
| P-3 Modernization Program | 0604221N | 93 | 05 | Volume 3 - 143 |
| Personnel, Trng, Sim, & Human Factors | 0604703N | 127 | 05 | Volume 3 - 927 |
| Power Proj Applied Research | 0602114N | 4 | 02 | Volume 1 - 87 |
| Power Projection Advanced Technology | 0603114N | 15 | 03 | Volume 1 - 327 |
| RDT&E Science & Tech Mgmt | 0605861N | 160 | 06 | Volume 4 - 185 |
| RDT&E Ship & Aircraft Support | 0605863N | 161 | 06 | Volume 4 - 195 |
| RQ-11 UAV | 0305232M | 221 | 07 | Volume 5 - 1121 |
| RQ-4 Modernization | 0305421N | 227 | 07 | Volume 5 - 1179 |
| RQ-4 UAV | 0305220N | 219 | 07 | Volume 5 - 1097 |
| RQ-7 UAV | 0305233N | 222 | 07 | Volume 5 - 1127 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Radiological Control | 0603542N | 39 | 04 | Volume 2 - 305 |
| Rapid Technology Transition (RTT) | 0203761N | 178 | 07 | Volume 5 - 107 |
| SEW Architecture/Eng Support | 0604707N | 82 | 04 | Volume 2 - 1011 |
| SSBN Security Tech Program | 0101224N | 175 | 07 | Volume 5 - 73 |
| SSN-688 & Trident Modernization | 0604503N | 115 | 05 | Volume 3 - 655 |
| Satellite Communications (Space) | 0303109N | 208 | 07 | Volume 5 - 941 |
| Ship Concept Advanced Design | 0603563N | 43 | 04 | Volume 2 - 413 |
| Ship Contract Design/ Live Fire T&E | 0604567N | 121 | 05 | Volume 3 - 807 |
| Ship Prel Design & Feasibility Studies | 0603564N | 44 | 04 | Volume 2 - 437 |
| Ship Self Def (Detect & Cntrl) | 0604755N | 129 | 05 | Volume 3 - 947 |
| Ship Self Def (Engage: Hard Kill) | 0604756N | 130 | 05 | Volume 3 - 993 |
| Ship Self Def (Engage: Soft Kill/EW) | 0604757N | 131 | 05 | Volume 3 - 1019 |
| Ship to Shore Connector (SSC) | 0605220N | 142 | 05 | Volume 3 - 1383 |
| Shipboard Aviation Systems | 0604512N | 117 | 05 | Volume 3 - 737 |
| Small Business Innovative Research | 0605502N | 156 | 06 | Volume 4 - 61 |
| Small Diameter Bomb (SDB) | 0604329N | 108 | 05 | Volume 3 - 475 |
| Space & Elec War Surv/Recon | 0605867N | 165 | 06 | Volume 4 - 251 |
| Special Applications Program | 0305124N | 148 | 05 | Volume 3 - 1485 |
| Standard Missile Improvements | 0604366N | 109 | 05 | Volume 3 - 497 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Standards Development | 0604215N | 90 | 05 | Volume 3 - 59 |
| Strategic Sub & Wpns Sys Supt | 0101221N | 174 | 07 | Volume 5 - 47 |
| Strategic Technical Support | 0605856N | 159 | 06 | Volume 4 - 179 |
| Studies & Analysis Supt - Navy | 0605152N | 153 | 06 | Volume 4 - 41 |
| Submarine Acoustic War Dev | 0101226N | 176 | 07 | Volume 5 - 75 |
| Submarine Tactical Warfare Sys | 0603562N | 42 | 04 | Volume 2 - 391 |
| Submarine Tactical Warfare System | 0604562N | 120 | 05 | Volume 3 - 795 |
| Surface & Shallow Water MCM | 0603502N | 33 | 04 | Volume 2 - 157 |
| Surface ASW | 0603553N | 40 | 04 | Volume 2 - 327 |
| Surface ASW Cmbt Sys Integr | 0205620N | 192 | 07 | Volume 5 - 415 |
| Surface Combatant Cmbt Sys Eng | 0604307N | 106 | 05 | Volume 3 - 439 |
| Surface Ship Torpedo Defense | 0603506N | 34 | 04 | Volume 2 - 253 |
| Surface Support | 0204228N | 182 | 07 | Volume 5 - 189 |
| Tact Air Dir Infrared CM (TADIRCM) | 0604272N | 76 | 04 | Volume 2 - 943 |
| Tactical Aim Missiles | 0207161N | 202 | 07 | Volume 5 - 905 |
| Tactical Airborne Reconnaissance | 0603261N | 31 | 04 | Volume 2 - 137 |
| Tactical Command System | 0604231N | 95 | 05 | Volume 3 - 175 |
| Tactical Command System - MIP | 0304231N | 146 | 05 | Volume 3 - 1457 |
| Tactical Cryptologic Systems | 0304785N | 147 | 05 | Volume 3 - 1465 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Tactical Data Links | 0205604N | 191 | 07 | Volume 5 - 369 |
| Tactical Unmanned Aer Vehicles | 0305204N | 215 | 07 | Volume 5 - 1039 |
| Target Systems Development | 0604258N | 150 | 06 | Volume 4 - 13 |
| Technical Information Services | 0605804N | 157 | 06 | Volume 4 - 107 |
| Test & Evaluation Support | 0605864N | 162 | 06 | Volume 4 - 209 |
| Threat Simulator Development | 0604256N | 149 | 06 | Volume 4 - 1 |
| Tomahawk Mssn Planning Ctr | 0204229N | 183 | 07 | Volume 5 - 203 |
| Training System Aircraft | 0603208N | 87 | 05 | Volume 3 - 1 |
| USMC Intelligence/Electronics Warfare Sys | 0206625M | 200 | 07 | Volume 5 - 863 |
| Undersea Warfare Advanced Tech | 0603747N | 23 | 03 | Volume 1 - 465 |
| Undersea Warfare Applied Res | 0602747N | 12 | 02 | Volume 1 - 257 |
| University Research Initiatives | 0601103N | 1 | 01 | Volume 1 - 1 |
| Unmanned Aerial Systems (UAS) Payloads | 0305242M | 226 | 07 | Volume 5 - 1157 |
| Unmanned Combat Air Veh(UCAV) Adv Cp/Proto Dev | 0604402N | 170 | 07 | Volume 5 - 7 |
| V-22A | 0604262N | 99 | 05 | Volume 3 - 313 |
| WWMCCS/GLOBAL COMMAND AND CONTROL SYSTEM | 0303150M | 211 | 07 | Volume 5 - 1019 |
| Warfare Support System | 0604230N | 94 | 05 | Volume 3 - 151 |
| Warfighter Protection Adv Tech | 0603729N | 22 | 03 | Volume 1 - 459 |
| Warfighter Sustainment Applied Res | 0602236N | 8 | 02 | Volume 1 - 183 |

## Program Element Table of Contents (by Budget Activity then Line Item Number)

***Budget Activity 04: Advanced Component Development & Prototypes (ACD&P)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 26 | 04 | 0603207N | Air/Ocean Tactical Applications | Volume 2 - 1 |
| 27 | 04 | 0603216N | Aviation Survivability | Volume 2 - 67 |
| 28 | 04 | 0603237N | Deployable JT Cmd & Control | Volume 2 - 95 |
| 29 | 04 | 0603251N | (U)AIRCRAFT SYSTEMS | Volume 2 - 103 |
| 30 | 04 | 0603254N | ASW Systems Development | Volume 2 - 123 |
| 31 | 04 | 0603261N | Tactical Airborne Reconnaissance | Volume 2 - 137 |
| 32 | 04 | 0603382N | Advanced Combat Systems Tech | Volume 2 - 145 |
| 33 | 04 | 0603502N | Surface & Shallow Water MCM | Volume 2 - 157 |
| 34 | 04 | 0603506N | Surface Ship Torpedo Defense | Volume 2 - 253 |
| 35 | 04 | 0603512N | Carrier Systems Development | Volume 2 - 265 |
| 36 | 04 | 0603525N | (U)PILOT FISH | Volume 2 - 299 |
| 37 | 04 | 0603527N | (U)RETRACT LARCH | Volume 2 - 301 |
| 38 | 04 | 0603536N | (U)RETRACT JUNIPER | Volume 2 - 303 |
| 39 | 04 | 0603542N | Radiological Control | Volume 2 - 305 |
| 40 | 04 | 0603553N | Surface ASW | Volume 2 - 327 |

***Budget Activity 04: Advanced Component Development & Prototypes (ACD&P)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 41 | 04 | 0603561N | Advanced Submarine System Development | Volume 2 - 343 |
| 42 | 04 | 0603562N | Submarine Tactical Warfare Sys | Volume 2 - 391 |
| 43 | 04 | 0603563N | Ship Concept Advanced Design | Volume 2 - 413 |
| 44 | 04 | 0603564N | Ship Prel Design & Feasibility Studies | Volume 2 - 437 |
| 45 | 04 | 0603570N | Advanced Nuclear Power Systems | Volume 2 - 461 |
| 46 | 04 | 0603573N | Advanced Surface Machinery Sys | Volume 2 - 467 |
| 47 | 04 | 0603576N | (U)CHALK EAGLE | Volume 2 - 481 |
| 48 | 04 | 0603581N | (U)LITTORAL COMBAT SHIP | Volume 2 - 485 |
| 49 | 04 | 0603582N | Combat System Integration | Volume 2 - 535 |
| 50 | 04 | 0603595N | (U)Ohio Replacement | Volume 2 - 569 |
| 51 | 04 | 0603596N | (U)LCS Mission Modules | Volume 2 - 589 |
| 52 | 04 | 0603597N | (U)Automated Test and Re-Test (ATRT) | Volume 2 - 625 |
| 53 | 04 | 0603609N | Conventional Munitions | Volume 2 - 633 |
| 54 | 04 | 0603611M | Marine Corps Assault Vehicles | Volume 2 - 643 |
| 55 | 04 | 0603635M | Marine Corps Grnd Cmbt/Supt Sys | Volume 2 - 653 |
| 56 | 04 | 0603654N | JT Service Explosive Ordn Dev | Volume 2 - 667 |
| 57 | 04 | 0603658N | Cooperative Engagement | Volume 2 - 693 |
| 58 | 04 | 0603713N | Ocean Engineering Tech Dev | Volume 2 - 711 |

***Budget Activity 04: Advanced Component Development & Prototypes (ACD&P)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 59 | 04 | 0603721N | Environmental Protection | Volume 2 - 729 |
| 60 | 04 | 0603724N | Navy Energy Program | Volume 2 - 759 |
| 61 | 04 | 0603725N | Facilities Improvement | Volume 2 - 795 |
| 62 | 04 | 0603734N | (U)CHALK CORAL | Volume 2 - 821 |
| 63 | 04 | 0603739N | Navy Logistic Productivity | Volume 2 - 823 |
| 64 | 04 | 0603746N | (U)RETRACT MAPLE | Volume 2 - 843 |
| 65 | 04 | 0603748N | (U)LINK PLUMERIA | Volume 2 - 845 |
| 66 | 04 | 0603751N | (U)RETRACT ELM | Volume 2 - 847 |
| 67 | 04 | 0603764N | (U)LINK EVERGREEN | Volume 2 - 849 |
| 68 | 04 | 0603787N | (U)SPECIAL PROCESSES | Volume 2 - 851 |
| 69 | 04 | 0603790N | NATO Research and Deve | Volume 2 - 855 |
| 70 | 04 | 0603795N | Land Attack Tech | Volume 2 - 863 |
| 71 | 04 | 0603851M | Joint Non-Lethal Weapons Testing | Volume 2 - 869 |
| 72 | 04 | 0603860N | JT Precision Approach & Ldg Sys | Volume 2 - 883 |
| 73 | 04 | 0603925N | Directed Energy and Electric Weapon System | Volume 2 - 895 |
| 74 | 04 | 0604112N | (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80 | Volume 2 - 915 |
| 75 | 04 | 0604122N | (U)Remote Minehunting System (RMS) | Volume 2 - 931 |
| 76 | 04 | 0604272N | Tact Air Dir Infrared CM (TADIRCM) | Volume 2 - 943 |

***Budget Activity 04: Advanced Component Development & Prototypes (ACD&P)***
***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line Item | Budget Activity | Program Element Number | Program Element Title | Page |
|---|---|---|---|---|
| 77 | 04 | 0604279N | (U)ASE Self Protection Optimization | Volume 2 - 959 |
| 78 | 04 | 0604292N | MH-XX | Volume 2 - 977 |
| 79 | 04 | 0604454N | (U)LX (R) | Volume 2 - 983 |
| 80 | 04 | 0604653N | JT Cntr Radio Controlled IED Elec War (JCREW) | Volume 2 - 989 |
| 81 | 04 | 0604659N | (U)Precision Strike Weapons Development Program | Volume 2 - 997 |
| 82 | 04 | 0604707N | SEW Architecture/Eng Support | Volume 2 - 1011 |
| 83 | 04 | 0604786N | (U)Offensive Anti-Surface Warfare Weapon Dev | Volume 2 - 1117 |
| 84 | 04 | 0605812M | (U)Joint Light Tactical Vehicle(JLTV) EMD | Volume 2 - 1131 |
| 85 | 04 | 0303354N | ASW Systems Development - MIP | Volume 2 - 1145 |
| 86 | 04 | 0304270N | Electronic Warfare Development - MIP | Volume 2 - 1155 |

## Program Element Table of Contents (Alphabetically by Program Element Title)


| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| (U)AIRCRAFT SYSTEMS | 0603251N | 29 | 04 | Volume 2 - 103 |
| (U)ASE Self Protection Optimization | 0604279N | 77 | 04 | Volume 2 - 959 |
| (U)Automated Test and Re-Test (ATRT) | 0603597N | 52 | 04 | Volume 2 - 625 |
| (U)CHALK CORAL | 0603734N | 62 | 04 | Volume 2 - 821 |
| (U)CHALK EAGLE | 0603576N | 47 | 04 | Volume 2 - 481 |
| (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80 | 0604112N | 74 | 04 | Volume 2 - 915 |
| (U)Joint Light Tactical Vehicle(JLTV) EMD | 0605812M | 84 | 04 | Volume 2 - 1131 |
| (U)LCS Mission Modules | 0603596N | 51 | 04 | Volume 2 - 589 |
| (U)LINK EVERGREEN | 0603764N | 67 | 04 | Volume 2 - 849 |
| (U)LINK PLUMERIA | 0603748N | 65 | 04 | Volume 2 - 845 |
| (U)LITTORAL COMBAT SHIP | 0603581N | 48 | 04 | Volume 2 - 485 |
| (U)LX (R) | 0604454N | 79 | 04 | Volume 2 - 983 |
| (U)Offensive Anti-Surface Warfare Weapon Dev | 0604786N | 83 | 04 | Volume 2 - 1117 |
| (U)Ohio Replacement | 0603595N | 50 | 04 | Volume 2 - 569 |
| (U)PILOT FISH | 0603525N | 36 | 04 | Volume 2 - 299 |
| (U)Precision Strike Weapons Development Program | 0604659N | 81 | 04 | Volume 2 - 997 |
| (U)RETRACT ELM | 0603751N | 66 | 04 | Volume 2 - 847 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| (U)RETRACT JUNIPER | 0603536N | 38 | 04 | Volume 2 - 303 |
| (U)RETRACT LARCH | 0603527N | 37 | 04 | Volume 2 - 301 |
| (U)RETRACT MAPLE | 0603746N | 64 | 04 | Volume 2 - 843 |
| (U)Remote Minehunting System (RMS) | 0604122N | 75 | 04 | Volume 2 - 931 |
| (U)SPECIAL PROCESSES | 0603787N | 68 | 04 | Volume 2 - 851 |
| ASW Systems Development | 0603254N | 30 | 04 | Volume 2 - 123 |
| ASW Systems Development - MIP | 0303354N | 85 | 04 | Volume 2 - 1145 |
| Advanced Combat Systems Tech | 0603382N | 32 | 04 | Volume 2 - 145 |
| Advanced Nuclear Power Systems | 0603570N | 45 | 04 | Volume 2 - 461 |
| Advanced Submarine System Development | 0603561N | 41 | 04 | Volume 2 - 343 |
| Advanced Surface Machinery Sys | 0603573N | 46 | 04 | Volume 2 - 467 |
| Air/Ocean Tactical Applications | 0603207N | 26 | 04 | Volume 2 - 1 |
| Aviation Survivability | 0603216N | 27 | 04 | Volume 2 - 67 |
| Carrier Systems Development | 0603512N | 35 | 04 | Volume 2 - 265 |
| Combat System Integration | 0603582N | 49 | 04 | Volume 2 - 535 |
| Conventional Munitions | 0603609N | 53 | 04 | Volume 2 - 633 |
| Cooperative Engagement | 0603658N | 57 | 04 | Volume 2 - 693 |
| Deployable JT Cmd & Control | 0603237N | 28 | 04 | Volume 2 - 95 |
| Directed Energy and Electric Weapon System | 0603925N | 73 | 04 | Volume 2 - 895 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Electronic Warfare Development - MIP | 0304270N | 86 | 04 | Volume 2 - 1155 |
| Environmental Protection | 0603721N | 59 | 04 | Volume 2 - 729 |
| Facilities Improvement | 0603725N | 61 | 04 | Volume 2 - 795 |
| JT Cntr Radio Controlled IED Elec War (JCREW) | 0604653N | 80 | 04 | Volume 2 - 989 |
| JT Precision Approach & Ldg Sys | 0603860N | 72 | 04 | Volume 2 - 883 |
| JT Service Explosive Ordn Dev | 0603654N | 56 | 04 | Volume 2 - 667 |
| Joint Non-Lethal Weapons Testing | 0603851M | 71 | 04 | Volume 2 - 869 |
| Land Attack Tech | 0603795N | 70 | 04 | Volume 2 - 863 |
| MH-XX | 0604292N | 78 | 04 | Volume 2 - 977 |
| Marine Corps Assault Vehicles | 0603611M | 54 | 04 | Volume 2 - 643 |
| Marine Corps Grnd Cmbt/Supt Sys | 0603635M | 55 | 04 | Volume 2 - 653 |
| NATO Research and Deve | 0603790N | 69 | 04 | Volume 2 - 855 |
| Navy Energy Program | 0603724N | 60 | 04 | Volume 2 - 759 |
| Navy Logistic Productivity | 0603739N | 63 | 04 | Volume 2 - 823 |
| Ocean Engineering Tech Dev | 0603713N | 58 | 04 | Volume 2 - 711 |
| Radiological Control | 0603542N | 39 | 04 | Volume 2 - 305 |
| SEW Architecture/Eng Support | 0604707N | 82 | 04 | Volume 2 - 1011 |
| Ship Concept Advanced Design | 0603563N | 43 | 04 | Volume 2 - 413 |
| Ship Prel Design & Feasibility Studies | 0603564N | 44 | 04 | Volume 2 - 437 |

| Program Element Title | Program Element Number | Line Item | Budget Activity | Page |
|---|---|---|---|---|
| Submarine Tactical Warfare Sys | 0603562N | 42 | 04 | Volume 2 - 391 |
| Surface & Shallow Water MCM | 0603502N | 33 | 04 | Volume 2 - 157 |
| Surface ASW | 0603553N | 40 | 04 | Volume 2 - 327 |
| Surface Ship Torpedo Defense | 0603506N | 34 | 04 | Volume 2 - 253 |
| Tact Air Dir Infrared CM (TADIRCM) | 0604272N | 76 | 04 | Volume 2 - 943 |
| Tactical Airborne Reconnaissance | 0603261N | 31 | 04 | Volume 2 - 137 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603207N *I Air/Ocean Tactical Applications* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 474.775 | 41.137 | 40.429 | 41.832 | - | 41.832 | 50.430 | 46.304 | 47.122 | 44.825 | Continuing | Continuing |
| 2341: *METOC Data Acquisition* | 155.413 | 6.146 | 2.518 | 3.763 | - | 3.763 | 4.797 | 5.321 | 5.211 | 5.315 | Continuing | Continuing |
| 2342.: *METOC Data Assimilation and Mod* | 187.327 | 14.733 | 12.582 | 16.360 | - | 16.360 | 19.869 | 20.121 | 21.011 | 21.419 | Continuing | Continuing |
| 2343: *Tactical METOC Applications* | 126.540 | 8.908 | 9.124 | 13.260 | - | 13.260 | 14.642 | 15.517 | 15.400 | 15.715 | Continuing | Continuing |
| 2344.: *Precise Time and Astrometry* | 2.936 | 8.600 | 8.954 | 4.977 | - | 4.977 | 9.134 | 3.331 | 3.480 | 0.313 | Continuing | Continuing |
| 2363: *Remote Sensing Capability Development* | 0.000 | - | 4.988 | 2.479 | - | 2.479 | 0.977 | 0.981 | 0.965 | 0.987 | Continuing | Continuing |
| 3207: *Fleet Synthetic Training* | 2.559 | 2.750 | 2.263 | 0.993 | - | 0.993 | 1.011 | 1.033 | 1.055 | 1.076 | Continuing | Continuing |

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

The Air Ocean Tactical Applications (AOTA) Program Element is aligned with the Navy's maritime strategy to enhance the future mission capabilities of the Navy-Marine Corps Meteorological and Oceanographic (METOC) Team supporting naval warfighters worldwide. New state-of-the art government and commercial technologies are identified, transitioned, demonstrated and then integrated into Combat Systems and programs of record to provide capabilities that provide real-time and near-real-time operational effects of the physical environment on the performance of combat forces and their new and emerging platforms, sensors, systems and munitions. The AOTA program element focuses on sensing and characterizing and predicting the littoral and deep-strike battlespace in the context of regional conflicts and crisis response scenarios. Projects in this program element transition state-of-the art sensing, assimilation, modeling and decision aid technologies from government and commercial sources. Unique project development efforts include atmospheric and oceanographic data assimilation techniques, forecast models, data base management systems and associated software for use in mainframe, desktop and laptop computers. Model data, products and services can be used by forward-deployed personnel or in a reach-back mode to optimize sensor placement and force allocation decisions. Global Geospatial Information and Services efforts within this program address the bathymetric needs of the Navy. Also developed are algorithms to process new satellite sensor data for integration into Navy and Marine Corps decision support systems and for display as part of the common operational and tactical pictures. In addition, the projects provide for demonstration and validation of specialized atmospheric and oceanographic instrumentation and measurement techniques, new sensors, communications and interfaces. Included are new capabilities to assess, predict and enhance the performance of current and emerging undersea warfare and mine warfare weapons systems. AOTA capabilities are designed to support the latest versions of the Global Command and Control System and specific unit-level combat systems. This program element develops technological upgrades for the U.S. Naval Observatory's Master Clock system to meet requirements of Department of Defense communications, cryptographic, intelligence, geolocation, and targeting systems; develops near-real-time earth orientation predictions; develops very precise determination of positions of both faint and bright stars; and supports satellite tracking and space debris studies.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603207N *I Air/Ocean Tactical Applications* |

Major emphasis areas include the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) and the METOC Future Mission Capabilities (FMC), the METOC Space-Based Sensing Capabilities, the Precise Timing and Astrometry, the Fleet Synthetic Training, the Tactical Oceanographic Capabilities for Under Sea Warfare, the Earth System Prediction Capability projects, and the Remote Sensing Capability Development.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 39.246 | 40.429 | 40.974 | - | 40.974 |
| Current President's Budget | 41.137 | 40.429 | 41.832 | - | 41.832 |
| Total Adjustments | 1.891 | - | 0.858 | - | 0.858 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 3.000 | - | | | |
| • SBIR/STTR Transfer | -1.109 | - | | | |
| • Program Adjustments | - | - | -6.491 | - | -6.491 |
| • Rate/Misc Adjustments | - | - | 7.349 | - | 7.349 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $3.6 million to account for the availability of prior year execution balances.

Technical - Increase in funding in FY16 - FY19 for Precise Time and Astrometry (PTA) program efforts.

Schedule- The schedule for PTA is updated to reflect the additional required research and upgrades.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2341 / *METOC Data Acquisition* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2341: *METOC Data Acquisition* | 155.413 | 6.146 | 2.518 | 3.763 | - | 3.763 | 4.797 | 5.321 | 5.211 | 5.315 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The major thrust of the Meteorology and Oceanography (METOC) Data Acquisition Project is to provide future mission capabilities to warfighters that will allow them to detect and monitor the conditions of the physical environment throughout the entire battlespace. New sensor technologies (including unmanned vehicles, tactical sensor exploitation, in-situ sensors) identified as the most promising candidates are transitioned from the government's and commercial industry's technology base. These new sensor technologies are demonstrated, validated and integrated into operational programs for warfighters. These new sensor capabilities provide timely and accurate METOC data and products to operational and tactical commanders. METOC data requirements have likewise evolved as the emphasis on naval warfare has evolved from blue water operations to the littoral and deep strike battlespace. The littoral and deep strike regions typically have dynamic and complex oceanographic and atmospheric conditions. The need to accurately characterize these conditions is more crucial than ever in planning and executing warfare operations and effectively allocating force weapon and sensor systems. Routinely available data sources, such as climatology, oceanographic and meteorological numerical models, and satellite remote sensing are necessary but not sufficient to support these warfare areas in the littoral and deep strike regions. Operational sensors are deployed great distances from the target area of interest. The challenge is to collect and disseminate METOC data in variable and dynamic littoral environmental conditions or in denied, remote or inaccessible areas over extended periods of time. This project: 1) provides the means to rapidly and automatically acquire a broad array of METOC data using both off-board and on-board sensors; 2) provides an on-scene assessment capability for the tactical commander; 3) provides the tactical commander with real-time METOC data and products for operational use; 4) demonstrates and validates the use of tactical workstations and desktop computers for processing and display of METOC data and products; 5) demonstrates and validates techniques which employ data compression, connectivity and interface technologies to obtain, store, process, distribute and display these METOC data and products; 6) develops new charting and bathymetric survey techniques necessary to reduce the existing shortfall in coastal hydrographic survey requirements; 7) develops an expanded database for predictive METOC models in areas of interest; and 8) supports the development of radar weather using through-the-sensor techniques.

Major emphasis areas include the METOC Future Mission Capabilities (FMC) and the Tactical Oceanographic Capabilities project.

FY 2016 request provides for continued advanced development of software and hardware component and prototype efforts associated with acquiring environmental data, and METOC data dissemination, storage, delivery, design, development efforts, and develop METOC network integration capability.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC) | 5.794 | 2.219 | 3.462 | - | 3.462 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2341 / *METOC Data Acquisition* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continued advanced component and prototype development efforts associated with acquiring environmental data and develop advanced techniques for data measurement and survey techniques that capture measurement uncertainties in order to provide warfare commanders with an accurate assessment of uncertainty in sensor performance prediction products and services. Continued to develop technologies that use tactical detection systems where applicable to characterize undersea and atmospheric environment in the battlespace. Developed and demonstrated in-situ sampling techniques to support adaptive and advance measurement technologies. Developed techniques to improve delivery of GI&S within Navy METOC product production centers and throughout the fleet user base. Continued to develop METOC systems engineering plans, requirements, standards, studies, and other documentation supporting integration of these products.<br>***FY 2015 Plans:***<br>Continue advanced component and prototype development efforts associated with acquiring environmental data and develop advanced techniques for data measurement and survey techniques that capture measurement uncertainties in order to provide warfare commanders with an accurate assessment of uncertainty in sensor performance prediction products and services. Continue to develop technologies that use tactical detection systems where applicable to characterize undersea and atmospheric environment in the battlespace. Develop and demonstrate in-situ sampling techniques to support adaptive and advance measurement technologies. Develop tools and techniques to support forecaster's processing, analysis and performance assessment processes.<br>***FY 2016 Base Plans:***<br>Continue advanced component and prototype development efforts associated with acquiring environmental data. Develop advanced techniques for data measurement and survey techniques that capture measurement uncertainties in order to provide warfare commanders with an accurate assessment of uncertainty in sensor performance prediction products and services. Continue to develop technologies to characterize undersea and atmospheric environment in the battlespace. Continue to develop and demonstrate in-situ sampling techniques to support adaptive and advance measurement technologies. Continue to develop tools and techniques to support forecaster's processing, analysis and performance assessment processes. Develop tools to assess reach-back and on scene data fusion to support improved METOC decision support infrastructure.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Tactical Oceanography Capabilities (TOC) / Undersea Warfare (USW) | 0.352 | 0.299 | 0.301 | - | 0.301 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2341 / *METOC Data Acquisition* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Continued to transition models, algorithms and databases that calculate accurate acoustic transmission loss (TL) and characterize environmental parameters that affect TL. Developed TL calculation implementations to be used in the Navy's Anti-Submarine Warfare (ASW) Tactical Decision Aids (TDAs) and sonar trainers. Continued to develop capabilities to rapidly calculate acoustic TL values within tactical timeframes to include environmental uncertainty quantification of those values.<br>***FY 2015 Plans:***<br>Continue to transition models, algorithms and databases used to calculate accurate acoustic TL and characterize environmental parameters that affect TL into U.S. Navy ASW TDAs. Continue to develop capabilities to rapidly calculate acoustic TL values within tactical timeframes to include environmental uncertainty quantification of those values for both active and passive sonar systems.<br>***FY 2016 Base Plans:***<br>Continue to transition models, algorithms and databases used to calculate accurate acoustic TL and characterize environmental parameters that affect TL into U.S. Navy ASW TDAs. Continue to develop capabilities to rapidly calculate acoustic TL values within tactical timeframes to include environmental uncertainty quantification of those values for both active and passive sonar systems with emphasis on developing an active radial province capability.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 6.146 | 2.518 | 3.763 | - | 3.763 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0604218N/2345: *FLEET METOC EQUIPMENT* | 2.542 | 1.224 | 3.379 | - | 3.379 | 0.923 | 1.356 | 1.939 | 1.980 | Continuing | Continuing |
| • RDTEN/0603207N/2342: *METOC DATA ASSIMILATION AND MOD* | 9.942 | 4.937 | 8.168 | - | 8.168 | 9.372 | 9.430 | 10.107 | 10.290 | Continuing | Continuing |
| • RDTEN/0604218N/2346: *METOC SENSOR ENGINEERING* | 1.373 | 0.940 | 1.136 | - | 1.136 | 1.233 | 1.244 | 1.253 | 1.280 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2341 / *METOC Data Acquisition* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

Acquisition, management and contracting strategies are to support the Meteorological and Oceanographic (METOC) Data Acquisition Project to develop, demonstrate, and validate METOC data collection methods and sensors, and to evolve the ability to provide timely and accurate METOC data and products to the Tactical Commander, all with management oversight by the Navy.

**E. Performance Metrics**

Goal: Develop techniques and tools to acquire Meteorological and Oceanographic (METOC) data in order to improve the accuracy of global and regional scale meteorological and oceanographic forecast models. Advanced sensor component, data collection, and meteorological, oceanographic and hydrographic survey technique development tasks are directed by Resource Sponsor, with input from external Systems Commands and/or Type Commanders, in response to validated capability gaps or operational fleet requirements. Wherever applicable, and based on favorable Science & Technology (S&T) assessments, tasks shall leverage or transition existing Small Business Innovative Research and/or RDT&E Budget Activity 6.2 - 6.3 S&T work.
Metric -- Tasks will address no less than 75% of applicable capability gaps and requirements.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2341 / *METOC Data Acquisition* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METOC Future Mission Capabilities | WR | Naval Research Laboartory : Washington, DC | 68.981 | 4.409 | Nov 2013 | 1.669 | Nov 2014 | 2.601 | Nov 2015 | - | | 2.601 | Continuing | Continuing | Continuing |
| METOC Future Mission Capabilities | WR | SSC PAC : California | 22.033 | - | | - | | - | | - | | - | - | 22.033 | - |
| METOC Future Mission Capabilities | Various | Various : Various | 42.421 | - | | - | | - | | - | | - | - | 42.421 | - |
| LBS-G | C/CPIF | Teledyne Brown Eng : Alabama | 6.557 | - | | - | | - | | - | | - | - | 6.557 | - |
| METOC Future Mission Capabilities | WR | NPGS : Monterey, CA | 0.600 | - | | - | | - | | - | | - | - | 0.600 | - |
| METOC Future Mission Capabilities | C/FP | Penn State University : PA | 0.300 | - | | - | | - | | - | | - | - | 0.300 | - |
| Tactical Oceanography Capabilities / Undersea Warfare (TOC USW) | WR | NRL : Washington, DC | 1.400 | - | | - | | - | | - | | - | - | 1.400 | - |
| Littoral Battlespace Sensing - Autonomous Undersea Vehicle | C/FP | Hydroid INC : Pocasset, MA | 1.865 | - | | - | | - | | - | | - | - | 1.865 | - |
| Tactical Oceanography Capabilities / Undersea Warfare (TOC USW) | C/FP | Univ. of Texas : Texas | 1.300 | - | | - | | - | | - | | - | - | 1.300 | - |
| Tactical Oceanography Capabilities / Undersea Warfare (TOC USW) | WR | SSC PAC : California | 2.754 | - | | - | | - | | - | | - | - | 2.754 | - |
| Tactical Oceanography Capabilities / Undersea Warfare (TOC USW) | WR | NSWC : Bethesda, MD | 0.314 | 0.352 | Feb 2014 | 0.299 | Dec 2014 | 0.301 | Dec 2015 | - | | 0.301 | Continuing | Continuing | Continuing |
| Tactical Oceanography Capabilities / Undersea Warfare (TOC USW) | C/FP | SAIC : Virginia | 0.310 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2341 / *METOC Data Acquisition* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METOC Future Mission Capabilities | C/FP | University of Washington : Seattle, WA | 0.190 | - | | - | | - | | - | | - | - | 0.190 | - |
| METOC Future Mission Capabilities | C/FP | Applied Science Associates (ASA) : Rhode Island | 1.570 | 0.435 | Dec 2013 | 0.150 | Dec 2014 | 0.235 | Dec 2015 | - | | 0.235 | Continuing | Continuing | Continuing |
| METOC Future Mission Capabilities | C/FP | SAIC : Virginia | 0.850 | 0.550 | Dec 2013 | 0.200 | Jan 2015 | 0.313 | Dec 2015 | - | | 0.313 | Continuing | Continuing | Continuing |
| METOC Future Mission Capabilities | C/FP | CSC : Virginia | 0.000 | 0.400 | Jan 2014 | 0.200 | Jan 2015 | 0.313 | Dec 2015 | - | | 0.313 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 151.445 | 6.146 | | 2.518 | | 3.763 | | - | | 3.763 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METOC Future Mission Capabilities | C/CPIF | Various : Various | 2.672 | - | | - | | - | | - | | - | - | 2.672 | - |
| Littoral Battlespace Sensing - Autonomous Undersea Vehicle | C/FP | SAIC : Virginia | 0.600 | - | | - | | - | | - | | - | - | 0.600 | - |
| | | **Subtotal** | 3.272 | - | | - | | - | | - | | - | - | 3.272 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METOC Future Mission Capabilities | WR | OPTEVFOR : Virginia | 0.160 | - | | - | | - | | - | | - | - | 0.160 | - |
| METOC Future Mission Capabilities | MIPR | JITC : Arizona | 0.040 | - | | - | | - | | - | | - | - | 0.040 | - |
| | | **Subtotal** | 0.200 | - | | - | | - | | - | | - | - | 0.200 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2341 / *METOC Data Acquisition* | |

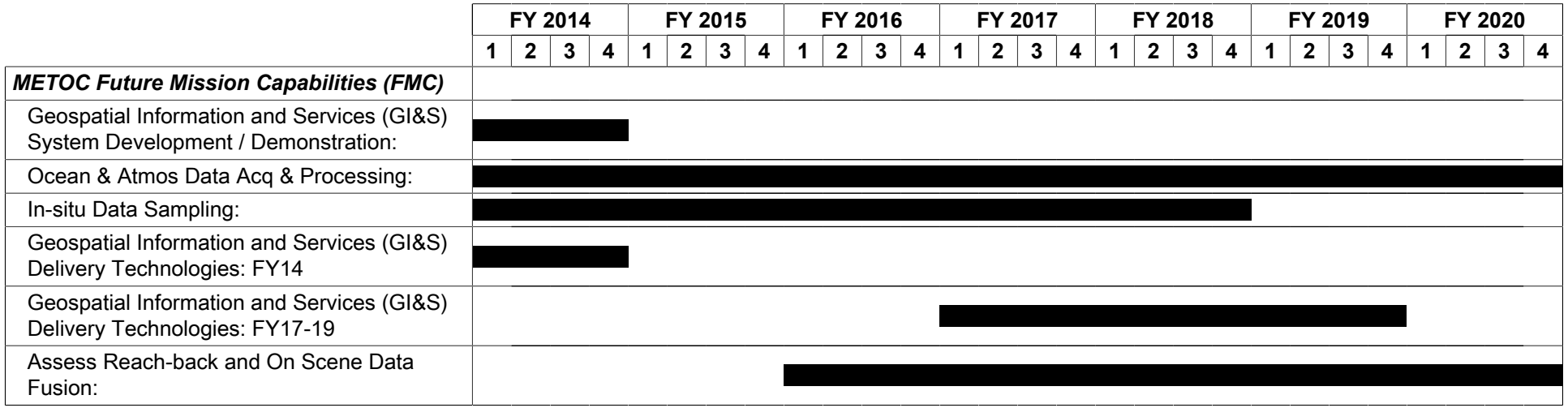
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Workforce | Various | Not Specified : Not Specified | 0.096 | - | | - | | - | | - | | - | - | 0.096 | - |
| METOC Future Mission Capabilities Management Support | C/FP | BAH : Virginia | 0.400 | - | | - | | - | | - | | - | - | 0.400 | - |
| | | **Subtotal** | 0.496 | - | | - | | - | | - | | - | - | 0.496 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 155.413 | 6.146 | | 2.518 | | 3.763 | | - | | 3.763 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2341 / *METOC Data Acquisition* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2341 / *METOC Data Acquisition* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***METOC Future Mission Capabilities (FMC)*** | | | | |
| Geospatial Information and Services (GI&S) System Development / Demonstration: | 1 | 2014 | 4 | 2014 |
| Ocean & Atmos Data Acq & Processing: | 1 | 2014 | 4 | 2020 |
| In-situ Data Sampling: | 1 | 2014 | 4 | 2018 |
| Geospatial Information and Services (GI&S) Delivery Technologies: FY14 | 1 | 2014 | 4 | 2014 |
| Geospatial Information and Services (GI&S) Delivery Technologies: FY17-19 | 1 | 2017 | 4 | 2019 |
| Assess Reach-back and On Scene Data Fusion: | 1 | 2016 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2342. / *METOC Data Assimilation and Mod* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2342.: *METOC Data Assimilation and Mod* | 187.327 | 14.733 | 12.582 | 16.360 | - | 16.360 | 19.869 | 20.121 | 21.011 | 21.419 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Meteorological and Oceanographic (METOC) Data Assimilation Project is a multi-faceted project that provides future mission capabilities for warfighters to characterize the physical environment within their battlespace. This project includes: 1) development, demonstration and validation of software associated with atmospheric and oceanographic data assimilation forecast models and database management systems for use in both mainframe and tactical scale computers. Included are numerical oceanographic and atmospheric models for the Large Scale Computers at the Navy Fleet Numerical Meteorology and Oceanography Center (FNMOC), Monterey, CA and the Naval Oceanographic Office (NAVO), Stennis Space Center, MS. These models, combined with a global communications network for data acquisition and distribution, form a prediction system which provides METOC data and products necessary to support naval operations worldwide in virtually every mission area; 2) other software models, which focus on ocean thermal structure and circulation, and surf and tide prediction; 3) software to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder; 4) future METOC and environmental satellite data readiness and risk reduction preparations to develop hardware and software that will allow ground stations to receive, ingest and exploit satellite data including payload sensor data from the National Polar Orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP), the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) Polar Systems' Meteorological Operational satellites A & B (METOP-A & B), Joint Polar Satellite System (JPSS), and Defense Meteorological Satellite Program (DMSP). This software allows for the integration and tactical application of significant oceanographic and atmospheric data derived from satellite-borne sensors. Satellite and unmanned sensor data, combined with manned platform data are foundational to a robust numerical weather and oceanographic modeling capability that predicts battlespace conditions impacting fleet and adversary weapon and sensor performance. Included are software and algorithms for the processing of sensor measurements, conversion of raw signal data to geophysical information, analysis schemes encompassing Artificial Intelligence and Expert Systems, and other satellite data applications and field validation of end products; and, 5) a family of acoustic system performance models beginning with active system models and databases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products. As weapons and sensors become more sophisticated and complex, the marine environment has an increasingly significant impact on system performance. Operational limitations induced by the ocean and atmosphere must be understood, and the resulting constraints on mission effectiveness and system employment minimized. Hence, the operating forces require more accurate worldwide forecasts of METOC conditions with increased temporal and spatial resolution. An additional challenge is posed by the emergence of new satellite sensor data. In order to fully exploit this dynamic and massive volume of data, modern Data Base Management Systems are required, and must be tailored for individual computer configurations at both FNMOC and NAVO. Improved representation of smaller-scale phenomena, particularly in the littoral, is also an important consideration. Intelligence Preparation of the Environment Sensor R&D to meet Chief of Naval Operations and Commander, Fleet Forces Command requirements for remote autonomous, clandestine, littoral battlespace sensing in near shore areas in support of Sea Shield & Sea Basing.

Major emphasis areas include the METOC Future Mission Capabilities (FMC), the METOC Space-Based Sensing Capabilities, and the Tactical Oceanographic Capabilities / Under Sea Warfare projects (TOC/USW).

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

FY 2016 request provides for continued advanced software component development and prototype efforts associated with advanced data assimilation into environmental prediction systems (to include development of tactical decision aids and asset allocation tools software), the continued development of advanced oceanographic and atmospheric prediction systems software and architectures to provide improved forecasts and estimates of product accuracies, continued development of improved data fusion techniques, data quality control technologies and accelerate the automation prediction processes, and the development of data assimilation and fusion software technologies for tactical radars, remote sensing and undersea sensor systems. Begin research and development of data processing and data assimilation algorithms for the Joint Polar Satellite System-1 (JPSS-1), Free-Flyer, GOES-S, EarthCARE, and OceanSat launch. Continue to Develop Meteorological and Oceanographic (METOC) Decision Support & Prediction Tools to improve Electromagnetic and Electro-optical (EM/EO) system performance. The Navy Earth System Prediction Capability (ESPC) program will provide a more accurate, longer range, global ocean and atmospheric forecast system for decision support to DoD Maritime Operations through the development of an integrated, coupled atmosphere, ocean, sea ice, land and near-space prediction system with improved deterministic and probabilistic skill over the current operational modeling suite. It will result in increased accuracy for lead times of 1-30 days as well as a new capability for accurate forecasts in the Arctic at all lead times. Additionally it will seek to develop more computationally efficient environmental prediction for emerging architectures and provide Navy R&D support to the National ESPC.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC) | 3.891 | 2.521 | 3.872 | - | 3.872 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued development of advanced oceanographic and atmospheric prediction systems and architectures to provide improved forecasts and estimates of product accuracies. Continued development of improved data fusion and assimilation techniques, data quality control technologies and accelerate the automation of prediction processes using data from tactical sensors, remote sensing and undersea sensor systems. Continued to develop METOC and GI&S fusion algorithms and demonstrate reach-back capability. | | | | | |
| ***FY 2015 Plans:***<br>Continue development of advanced METOC prediction systems and architectures to provide improved forecasts and estimates of product accuracies. Continue development of improved data fusion and assimilation techniques, data quality control technologies and accelerate the automation of prediction processes using data from tactical sensors, remote sensing and undersea sensor systems. Continue to develop METOC and GI&S fusion algorithms and demonstrate capabilities. Develop METOC Decision Support & Prediction Tools to improve Electromagnetic and Electro-optical (EM/EO) systems performance. | | | | | |
| ***FY 2016 Base Plans:***<br>Continue development of advanced METOC prediction systems and architectures to provide improved forecasts and estimates of product accuracies. Continue development of improved data fusion and assimilation | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| techniques, data quality control technologies and accelerate the automation of prediction processes using data from tactical sensors, remote sensing and undersea sensor systems. Continue to develop METOC fusion algorithms and demonstrate capabilities. Continue to develop METOC Decision Support & Prediction Tools to improve EM/EO system performance. Accelerate the development of the higher resolution global and small scale ocean forecasting systems with 4 dimensional variational data assimilation.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Meteorological and Oceanographic (METOC) Space-Based Sensing Capabilities | 2.170 | 0.642 | 2.278 | - | 2.278 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued research and development of data processing and data assimilation algorithms utilizing National Polar-orbiting Operational Environmental Satellite System Preparatory Project (NPP), Meteorological Operational satellite program (MetOp), and DMSP satellite data. Continued assimilation of Meteorological satellite data from other Federal non-DOD, commercial, and foreign earth observing satellite systems. Continued preparation to ingest data from Joint Polar Satellite System (JPSS) program satellites. Began research and development of data processing and data assimilation algorithms for the Geostationary Operational Environmental Satellite (GOES) program.<br>***FY 2015 Plans:***<br>Preparation to ingest data from earth observing satellite systems, specifically Sentinel launches. Begin research and development of data processing and data assimilation algorithms for the GOES-R launch.<br>***FY 2016 Base Plans:***<br>Preparation to ingest data from earth observing satellite systems, Geostationary Operational Environmental Satellite R-Series (GOES-R), and Global Change Observation Mission (GCOM) W-2 sensors. Begin research and development of data processing and data assimilation algorithms for the Joint Polar Satellite System-1 (JPSS-1), Free-Flyer, GOES-S, Earthcare, and OceanSat-3 launches scheduled in FY17.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW) | 3.881 | 1.774 | 2.018 | - | 2.018 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Continued to develop the underlying acoustic and environmental software components of Navy decision tools that assist Undersea Warfare (USW) warfighters to optimally deploy assets equipped with acoustic sensors and to take advantage of prevailing environmental conditions. Verified, validated and transitioned this software technology through the Oceanographic and Atmospheric Master Library (OAML). Continued to refine and validate USW-related performance surface and decision support software applications for use afloat and at ASW RBCs to determine appropriate tactical Courses of Action (COAs) in ASW. Continued population/upgrade of oceanographic, acoustic and geoacoustic databases in COCOM areas of interest. Began developing Maritime Patrol & Reconnaissance Aircraft (MPRA) and submarine-based Through-the-Sensor (TTS) technologies to collect and transmit environmental data for use by Naval Oceanographic Office (NAVOCEANO) to predict Anti-Submarine Warfare (ASW) sensor performance. Transitioned software algorithms that capture and communicate variability and uncertainty contained in the output of underlying model and database components of ASW Tactical Decision Aids (TDAs). Expanded capabilities and increased access speed of acoustic surface scattering and loss modules. Continued development of software-based methodologies that characterize and forecast bioacoustic volume attenuation and scatter functions as observed by the Navy's active hull-mounted sonar systems. Continued to develop and transition the environmental software components of Mine Warfare (MIW) TDAs in use by the U.S. Navy's MIW Forces and Naval Oceanography enterprise (NOe) personnel supporting them. Provided technical support to the NAVOCEANO in updating geoacoustic bottom loss & scatter data bases for sonar performance predictions. Began to design, develop, demonstrate and transition a geospatially-enabled global ocean observing system database through the Ocean Observing System (OOS) designed to characterize national and international ocean observatories locations, sensor grid capabilities and mitigations to address potential U.S. submarine security vulnerabilities. Conducted proof-of-concept at-sea demonstrations of emerging Unmanned Undersea Vehicle (UUV) and Unmanned Surface Vehicle (USV) technologies designed to collect environmental data. | | | | | |
| ***FY 2015 Plans:***<br>Continue to develop the underlying acoustic and environmental software components of Navy decision tools that assist Undersea Warfare (USW) warfighters to optimally deploy assets equipped with acoustic sensors and to take advantage of prevailing environmental conditions. Verify, validate and transition this software technology through the Oceanographic and Atmospheric Master Library (OAML). Continue population/upgrade of oceanographic, acoustic and geoacoustic databases in Combatant Commanders' (COCOM) areas of interest. Continue developing Maritime Patrol Aircraft and submarine-based TTS technologies to collect and transmit environmental data for use by NAVOCEANO to predict ASW sensor performance. Transition software algorithms | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| that capture and communicate variability and uncertainty contained in the output of underlying model and data base components of ASW TDAs. Continue to develop and transition the environmental software components of MIW TDAs in use by the U.S. Navy's MIW Forces and Naval NOe personnel supporting them. Provide technical support to the NAVOCEANO in updating geoacoustic bottom loss & scatter data bases for sonar performance predictions. Continue to design, develop, demonstrate and transition a geospatially-enabled global ocean observing system database through the Ocean Observing System (OOS) designed to characterize national and international ocean observatories locations, sensor grid capabilities and mitigations to address potential U.S. submarine security vulnerabilities.<br>***FY 2016 Base Plans:***<br>Continue to develop the underlying acoustic and environmental software components of Navy decision tools that assist Undersea Warfare (USW) warfighters to optimally deploy assets equipped with acoustic sensors and to take advantage of prevailing environmental conditions. Verify, validate and transition this software technology through the Oceanographic and Atmospheric Master Library (OAML). Continue population/upgrade of oceanographic, acoustic and geoacoustic databases in COCOM areas of interest. Complete development of Maritime Patrol & Reconnaissance Aircraft (MPRA) and submarine-based Through-the-Sensor (TTS) technologies to collect and transmit environmental data for use by Naval Oceanographic Office (NAVOCEANO) to predict Anti-Submarine Warfare (ASW) sensor performance. Transition software algorithms that capture and communicate variability and uncertainty contained in the output of underlying model and data base components of ASW Tactical Decision Aids (TDAs). Restart efforts to increase access speed of acoustic surface scattering and loss modules for ASW applications. Continue to develop and transition the environmental software components of Mine Warfare (MIW) TDAs in use by the U.S. Navy's MIW Forces and Naval Oceanography enterprise (NOe) personnel supporting them. Conduct additional proof-of-concept at-sea demonstrations of emerging Unmanned Undersea Vehicle (UUV) and Unmanned Surface Vehicle (USV) technologies designed to collect environmental data based on feedback received on FY14 at-sea demonstration results.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Earth System Prediction Capability (ESPC) | 4.791 | 7.645 | 8.192 | - | 8.192 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funding increased from FY 2014 to FY 2015 due to an increased effort to fully develop the prototype system based on initial progress in 2013-2014. This increase will be applied to full system testing and operational cycling for future capability to predict the coupled global air-ocean-wave-land-sea ice system to 30 | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| day lead times at eddy-resolving spatial scales in a computationally efficient, massively parallel architecture towards real-time operational environmental prediction.<br><br>***FY 2014 Accomplishments:***<br>- Continue to develop a National common environmental computing architecture to improve cross-Agency collaboration, and a greatly more efficient computational architecture to allow for real-time operational prediction.<br>- Continue common environmental model architecture and standards, and prediction demonstration plans and science workshops, and initiate benchmark testing.<br>- Continue efforts towards advanced skillful environmental forecasts and decision guidance (relative to averaged climatology) to improve from the operational capability, currently 7-10 days, to 30 days and longer.<br>- Continue the Navy component to the National R&D initiative for Environmental Prediction across the major U.S. National Operational Prediction Centers at Navy, NOAA, NASA, and DOE.<br>***FY 2015 Plans:***<br>- Continue all efforts from FY2014, less those noted as complete.<br>- Complete a National common environmental computing architecture to improve cross-Agency collaboration.<br>- Continue to develop a greatly more efficient computational architecture to allow for real-time operational prediction.<br>- Complete common environmental model architecture and standards and prediction demonstration plans.<br>- Continue science workshops and benchmark testing.<br>- Continue efforts towards advanced skillful environmental forecasts and decision guidance (relative to averaged climatology) to improve from the operational capability, currently 7-10 days, to 30 days and longer.<br>- Continue the Navy component to the National R&D initiative for Environmental Prediction across the major U.S. National Operational Prediction Centers at Navy, NOAA, NASA, and DOE.<br>- Initiate improved scalability and computational performance of a fully coupled global atmosphere / wave / ocean / land / ice prediction system providing daily predictions out to 10 days and weekly predictions out to 30 days.<br>- Initiate improved DoD decision support for 30-180 Day lead times.<br>***FY 2016 Base Plans:***<br>- Continue all efforts from FY2015, less those noted as complete.<br>- Complete development of a greatly more efficient computational architecture to allow for real-time operational prediction.<br>- Continue science workshops and benchmark testing. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Continue efforts towards advanced skillful environmental forecasts and decision guidance (relative to averaged climatology) to improve from the operational capability, currently 7-10 days, to 30 days and longer.<br>- Continue the Navy component to the National R&D initiative for Environmental Prediction across the major U.S. National<br>Operational Prediction Centers at Navy, NOAA, NASA, NSF and DOE.<br>- Continue improved scalability and computational performance of a fully coupled global atmosphere / wave / ocean / land / sea ice prediction system providing daily predictions out to 16 days and weekly predictions out to 30-90 days.<br>- Continue improved DoD decision support for 30-180 Day lead times.<br>- Initiate high resolution and high fidelity Regional Arctic Prediction System development for improved decision support to maritime operations for 0-7 days as well as monthly and seasonal outlooks<br>- Initiate improvements to automated ship routing guidance for safety and energy efficiency at 0-7 day lead times.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 14.733 | 12.582 | 16.360 | - | 16.360 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4226: *METEOROLOGICAL EQUIPMENT* | 19.118 | 12.825 | 15.090 | - | 15.090 | 13.397 | 12.992 | 13.342 | 13.132 | Continuing | Continuing |
| • RDTEN/0604218N/2345: *FLEET METOC EQUIPMENT* | 2.542 | 1.224 | 3.379 | - | 3.379 | 0.923 | 1.356 | 1.939 | 1.980 | Continuing | Continuing |
| • RDTEN/0603207N/2341: *METOC DATA ACQUISITION* | 6.146 | 2.518 | 3.763 | - | 3.763 | 4.797 | 5.321 | 5.211 | 5.315 | Continuing | Continuing |
| • RDTEN/0604218N/2346: *METOC SENSOR ENGINEERING* | 1.373 | 0.940 | 1.136 | - | 1.136 | 1.233 | 1.244 | 1.253 | 1.280 | Continuing | Continuing |
| • RDTEN/0305160N/0524: *NAVY METOC SUPPORT (SPACE)* | 0.726 | 0.359 | 0.599 | - | 0.599 | 0.670 | 0.680 | 0.677 | 0.691 | Continuing | Continuing |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

**D. Acquisition Strategy**

Acquisition, management and contracting strategies to support the Meteorological & Oceanography (METOC) Data Assimilation Project which is a multi-faceted program which includes: 1) development, demonstration and validation of software associated with atmospheric and oceanographic data assimilation forecast models and database management systems for use in both mainframe and tactical scale computers; 2) other software models, which focus on ocean thermal structure and circulation, and surf and tide prediction; 3) software to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder; and, 4) a family of acoustic system performance models beginning with active system models and databases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products.

Acquisition, management and contracting strategies to support the Navy Earth System Prediction Capability Project, a multi-faceted program which includes: 1) development, demonstration and validation of atmospheric, sea ice and oceanographic data assimilation techniques, forecast models, database management systems, and associated software for use in teraflop to petaflop scale computers; 2) other models, which focus on decision products and quantifying thresholds, forecast uncertainty, and risk for Navy and DoD resource and mission planning using non-Navy models as input; 3) techniques to improve computational and data dissemination efficiency for environmental information dominance.

**E. Performance Metrics**

Goal: Develop techniques and tools to assimilate Meteorological and Oceanographic (METOC) data in order to improve the accuracy of global and regional scale meteorological and oceanographic forecast models. Data assimilation is expanded to include new in-situ and remotely-sensed data types, based on operational need. Tasks are directed toward advanced software enabling assimilation of disparate sources on non-synoptic time scales. Acoustic, atmospheric, and oceanographic model development, prototyping and transition is focused on improved model physics, increased resolution, and computational efficiency.

Metric: Tasks will address no less than 75% of applicable capability gaps and requirements.

Goal (ESPC): Develop a more accurate global ocean, atmosphere, wave and sea ice forecast system with longer skillful forecast times from weeks to seasons through integrating and coupling atmosphere, ocean, ice, land and near-space forecast models into a seamless deterministic and ensemble prediction system that significantly improves skill over the current modeling suite. Additionally develop a common modeling architecture to improve cross-Agency collaboration, and greatly more efficient environmental modelling and computational architectures to allow for real-time operational prediction at skill levels comparable to any international peer competitor for 0-30 day global operational planning.

Metrics: Long term trends show a globally averaged gain of skill of 1 day per decade of RDT&E investment, i.e. today's 5-day forecast is as accurate as the 3-day forecast available in the early 1990's. This program will implement new technological approaches to improve 7-14 day predictions to the level of current 5-7 day forecasts and will seek to provide quantifiable skill above long term seasonal averages for 14-90 day lead times for mission planning.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METOC Future Mission Capabilities | WR | NRL : Washington DC | 115.891 | 3.216 | Nov 2013 | 2.046 | Nov 2014 | 3.143 | Nov 2015 | - | | 3.143 | Continuing | Continuing | Continuing |
| METOC Future Mission Capabilities | WR | SSCs : California, South Carolina | 2.272 | - | | - | | - | | - | | - | - | 2.272 | - |
| METOC Future Mission Capabilities | Various | Various : Various | 41.183 | - | | - | | - | | - | | - | - | 41.183 | - |
| METOC Future Mission Capabilities | C/FP | Univ. S. Miss. : Mississippi | 2.413 | - | | - | | - | | - | | - | - | 2.413 | - |
| METOC Space-Based Sensing Capabilities | WR | NRL : Washington, DC | 9.757 | 1.870 | Nov 2013 | 0.542 | Nov 2014 | 1.923 | Nov 2015 | - | | 1.923 | Continuing | Continuing | Continuing |
| Tactical Oceanography Capabilities / Undersea Warfare | WR | NRL : Washington, DC | 5.222 | 2.066 | Nov 2013 | 0.809 | Nov 2014 | 0.920 | Nov 2015 | - | | 0.920 | Continuing | Continuing | Continuing |
| Tactical Oceanography Capabilities / Undersea Warfare | C/FP | University of Texas : TX | 0.800 | - | | - | | - | | - | | - | - | 0.800 | - |
| Tactical Oceanography Capabilities / Undersea Warfare | WR | NSWC Carderock : West Bethesda, MD | 0.950 | 0.685 | Feb 2014 | 0.365 | Nov 2014 | 0.415 | Nov 2015 | - | | 0.415 | Continuing | Continuing | Continuing |
| Tactical Oceanography Capabilities / Undersea Warfare | WR | NAVOCEANO : Mississippi | 0.549 | - | | - | | - | | - | | - | - | 0.549 | - |
| Tactical Oceanography Capabilities / Undersea Warfare | C/FP | University of Washington : Seattle, WA | 0.450 | 0.180 | Feb 2014 | 0.095 | Dec 2014 | 0.108 | Dec 2015 | - | | 0.108 | Continuing | Continuing | Continuing |
| Tactical Oceanography Capabilities / Undersea Warfare | C/FP | Johns Hopkins University : MD | 0.160 | 0.150 | Dec 2013 | 0.080 | Dec 2014 | 0.091 | Dec 2015 | - | | 0.091 | Continuing | Continuing | Continuing |
| Tactical Oceanography Capabilities / Undersea Warfare | C/FP | SAIC/QNA : Various | 0.975 | 0.515 | Nov 2013 | 0.275 | Jan 2015 | 0.313 | Nov 2015 | - | | 0.313 | Continuing | Continuing | Continuing |
| METOC Future Mission Capabilities | C/FP | SAIC/QNA : Various | 1.000 | 0.575 | Dec 2013 | 0.400 | Feb 2015 | 0.614 | Dec 2015 | - | | 0.614 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2342. / *METOC Data Assimilation and Mod* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METOC Future Mission Capabilities | C/FP | Johns Hopkins University : MD | 0.200 | - | | - | | - | | - | | - | - | 0.200 | - |
| Earth Systems Prediction Capability (ONR) | WR | NRL : Washington DC | 2.048 | 3.835 | Oct 2013 | 5.000 | Oct 2014 | 5.000 | Oct 2015 | - | | 5.000 | Continuing | Continuing | Continuing |
| ESPC | Various | Various : Various | 0.609 | 0.756 | Oct 2013 | 2.195 | Oct 2014 | 2.692 | Oct 2015 | - | | 2.692 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 184.479 | 13.848 | | 11.807 | | 15.219 | | - | | 15.219 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METOC Future Mission Capabilities | C/CPIF | SSA/CSC : MISC | 0.295 | - | | - | | - | | - | | - | - | 0.295 | - |
| Littoral Battlespace Sensing - Autonomous Undersea Vehicle | C/FP | SAIC : Virginia | 0.473 | - | | - | | - | | - | | - | - | 0.473 | - |
| METOC Future Mission Capabilities | C/FP | SAIC : Virginia | 0.400 | 0.100 | Nov 2013 | 0.075 | Nov 2014 | 0.115 | Nov 2015 | - | | 0.115 | Continuing | Continuing | Continuing |
| Program Support and Subject Matter Expertise | Various | UW-APL : Seattle, WA | 0.000 | 0.200 | Oct 2013 | 0.450 | Oct 2014 | 0.500 | Oct 2015 | - | | 0.500 | - | 1.150 | - |
| | | **Subtotal** | 1.168 | 0.300 | | 0.525 | | 0.615 | | - | | 0.615 | - | - | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Workforce | Various | Not Specified : Not Specified | 0.090 | - | | - | | - | | - | | - | - | 0.090 | - |
| METOC Space-Based Sensing Capabilities | C/FP | BAH : Virginia | 0.850 | 0.125 | Nov 2013 | 0.040 | Nov 2014 | 0.142 | Nov 2015 | - | | 0.142 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2342. / *METOC Data Assimilation and Mod* | |

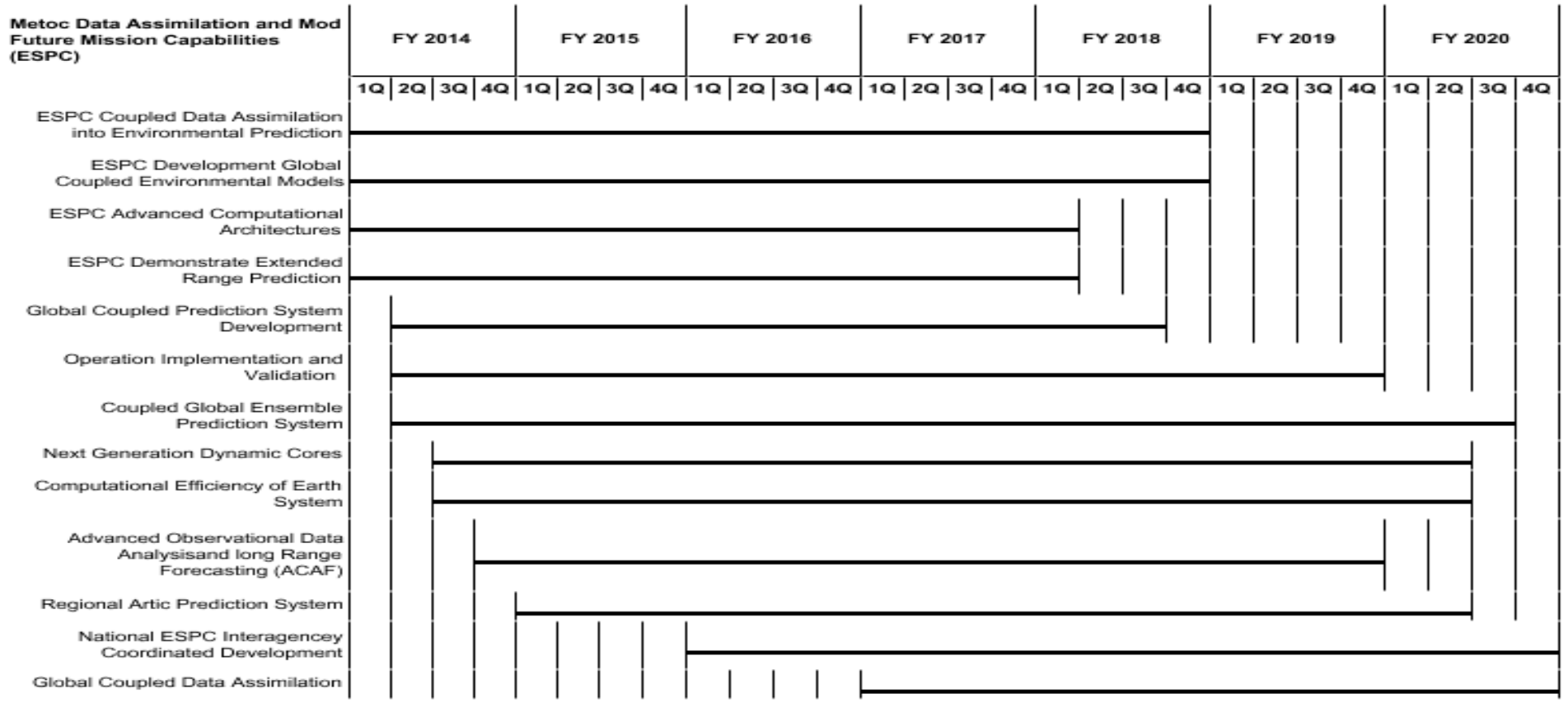
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tactical Oceanography Capabilities / Undersea Warfare | WR | SSC PAC : San Diego, CA | 0.540 | 0.285 | Nov 2013 | 0.150 | Nov 2014 | 0.171 | Nov 2015 | - | | 0.171 | Continuing | Continuing | Continuing |
| METOC Space-Based Sensing Capabilities | WR | SSC PAC : San Diego, CA | 0.200 | 0.175 | Nov 2013 | 0.060 | Nov 2014 | 0.213 | Nov 2015 | - | | 0.213 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.680 | 0.585 | | 0.250 | | 0.526 | | - | | 0.526 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 187.327 | 14.733 | | 12.582 | | 16.360 | | - | | 16.360 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |




*2016DON - 0603207N - 2342.S14*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***METOC Future Mission Capabilities (FMC)*** | | | | |
| METOC FMC: Data Assimilation Into Coupled Prediction Systems: | 1 | 2014 | 4 | 2020 |
| METOC FMC: Develop Oceanographic and Atmospheric Forecast Models: | 1 | 2014 | 4 | 2020 |
| METOC FMC: Oceanographic and Atmospheric Forecast Model Data Assimilation: | 1 | 2014 | 4 | 2017 |
| METOC FMC: Decision Support & Performance Prediction Tools: | 1 | 2015 | 4 | 2020 |
| METOC FMC: Accelerate Development of Ocean Forecast Systems: | 1 | 2016 | 4 | 2018 |
| ***METOC Space-Based Sensing Capabilities*** | | | | |
| NPP/JPSS: Dev. NPP/JPSS Data Algorithims: FY14 | 1 | 2014 | 4 | 2014 |
| NPP/JPSS: Dev. NPP/JPSS Data Algorithims: FY16-FY20 | 1 | 2016 | 4 | 2020 |
| NPP/JPSS: Dev. NPP/JPSS Data Algorithims: JPSS-1 Launch | 3 | 2017 | 3 | 2017 |
| METOP: Dev. METOP Data Algorithims: FY14 | 1 | 2014 | 4 | 2014 |
| METOP: Dev. METOP Data Algorithims: FY16-FY20 | 1 | 2016 | 4 | 2020 |
| METOP: Dev. METOP Data Algorithims: METOP-C Launch | 3 | 2018 | 3 | 2018 |
| METEOSAT: Dev. METEOSAT Data Algorithims: FY14 | 1 | 2014 | 4 | 2014 |
| METEOSAT: Dev. METEOSAT Data Algorithims: FY16-FY20 | 1 | 2016 | 4 | 2020 |
| METEOSAT: Dev. METEOSAT Data Algorithims: MTG-I1 Launch | 3 | 2019 | 3 | 2019 |
| GOES: Dev. GOES Algorithims: | 1 | 2014 | 4 | 2020 |
| GOES: Dev. GOES Algorithims: GOES-R Launch | 1 | 2016 | 1 | 2016 |
| GOES: Dev. GOES Algorithims: GOES-S Launch | 2 | 2017 | 2 | 2017 |
| GOES: Dev. GOES Algorithims: GOES-T Launch | 2 | 2019 | 2 | 2019 |
| GCOM: Dev. GCOM: FY14 | 1 | 2014 | 4 | 2014 |
| GCOM: Dev. GCOM: FY16-FY20 | 1 | 2016 | 4 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| GCOM: Dev. GCOM: GCOM-W2 Launch | 3 | 2016 | 3 | 2016 |
| GCOM: Dev. GCOM: GCOM-W3 Launch | 3 | 2020 | 3 | 2020 |
| Jason: Dev. Jason Algorithims: FY14 | 1 | 2014 | 4 | 2014 |
| Jason: Dev. Jason Algorithims: FY16-FY20 | 1 | 2016 | 4 | 2020 |
| Jason: Dev. Jason Algorithims: JASON-CS-A Launch | 1 | 2018 | 1 | 2018 |
| Sentinel: Dev. Sentinel Data Algorithims: | 1 | 2014 | 4 | 2020 |
| Sentinel: Dev. Sentinel Data Algorithims: Sentinel 3A Launch | 3 | 2015 | 3 | 2015 |
| Sentinel: Dev. Sentinel Data Algorithims: Sentinal 3B Launch | 3 | 2015 | 3 | 2015 |
| EarthCare: Dev. EarthCARE Data Algorithms: | 1 | 2017 | 4 | 2020 |
| EarthCare: Dev. EarthCARE Data Algorithms: EarthCARE Launch | 3 | 2017 | 3 | 2017 |
| Cosmic: Dev. Cosmic Data Algorithms: | 1 | 2016 | 4 | 2020 |
| Cosmic: Dev. Cosmic Data Algorithms: COSMIC-2 (7-12) Launch | 3 | 2018 | 3 | 2018 |
| OceanSat: Dev. OceanSat Data Algorithms: | 1 | 2016 | 4 | 2020 |
| OceanSat: Dev. OceanSat Data Algorithms: OceanSat-3 Launch | 3 | 2017 | 3 | 2017 |
| INSAT: DEV. INSAT Data Algorithms: FY16-FY20 | 1 | 2016 | 4 | 2020 |
| GEO-KOMPSA: Dev. GEO-KOMPSAT Data Algorithms: | 1 | 2016 | 4 | 2020 |
| GEO-KOMPSA: Dev. GEO-KOMPSAT Data Algorithms: GEO-KOMSAT-2A Launch | 1 | 2018 | 1 | 2018 |
| GEO-KOMPSA: Dev. GEO-KOMPSAT Data Algorithms: GEO-KOMSAT-2B Launch | 4 | 2018 | 4 | 2018 |
| DMSP: Dev. DMSP Data Algorithms: FY14 | 1 | 2014 | 4 | 2014 |
| DMSP: Dev. DMSP Data Algorithms: FY6-FY20 | 1 | 2016 | 4 | 2020 |
| DMSP: Dev. DMSP Data Algorithms: DMSP-19 Launch | 2 | 2014 | 2 | 2014 |
| DMSP: Dev. DMSP Data Algorithms: DMSP-20 Launch | 1 | 2020 | 1 | 2020 |
| ***Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW)*** | | | | |
| Asset Allocation & Mission Planning: FY14 | 1 | 2014 | 4 | 2014 |
| Asset Allocation & Mission Planning: FY16-18 | 1 | 2016 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Asset Allocation & Mission Planning: ASW TDA Delivery: ASW TDA Delivery | 4 | 2014 | 4 | 2014 |
| Asset Allocation & Mission Planning: ASW RBC Delivery: ASW RBC Delivery 1 | 4 | 2016 | 4 | 2016 |
| Asset Allocation & Mission Planning: ASW RBC Delivery: ASW RBC Delivery 2 | 4 | 2017 | 4 | 2017 |
| Asset Allocation & Mission Planning: ASW RBC Delivery: ASW RBC Delivery 3 | 4 | 2018 | 4 | 2018 |
| Acoustic Performance Surface Toolset: | 1 | 2014 | 4 | 2014 |
| Acoustic Performance Surface Toolset: NEXGEN Stochastic Bond Tier II/III Acoustic Toolsets: NEXGEN Stochastic Bond Tier II/III Acoustic Toolset 1 | 4 | 2014 | 4 | 2014 |
| Acoustic Model Upgrades: | 1 | 2014 | 4 | 2020 |
| Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 1 | 3 | 2014 | 3 | 2014 |
| Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 2 | 1 | 2016 | 1 | 2016 |
| Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 3 | 4 | 2017 | 4 | 2017 |
| Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 4 | 4 | 2018 | 4 | 2018 |
| Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 5 | 4 | 2019 | 4 | 2019 |
| Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 6 | 4 | 2020 | 4 | 2020 |
| Descriptive Dynamic Oceanography Assessment Tool: | 1 | 2014 | 4 | 2020 |
| Descriptive Dynamic Oceanography Assessment Tool: NEXGEn ASW RBC GIS Toolset | 1 | 2017 | 1 | 2017 |
| Descriptive Dynamic Oceanography Assessment Tool: Schedule Detail | 4 | 2018 | 4 | 2018 |
| Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS TOOLSET: NEXGEN ASW RBC GIS TOOLSET 1 | 2 | 2017 | 2 | 2017 |
| Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS TOOLSET: NEXGEN ASW RBC GIS TOOLSET 2 | 4 | 2018 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS TOOLSET: NEXGEN ASW RBC GIS TOOLSET 3 | 4 | 2020 | 4 | 2020 |
| STAPLE Upgrades: | 1 | 2014 | 4 | 2020 |
| STAPLE Upgrades: STAPLE Delivery 8 | 4 | 2014 | 4 | 2014 |
| STAPLE Upgrades: STAPLE Delivery 9 | 4 | 2015 | 4 | 2015 |
| STAPLE Upgrades: STAPLE Delivery 10 | 4 | 2016 | 4 | 2016 |
| STAPLE Upgrades: STAPLE Delivery 11 | 4 | 2017 | 4 | 2017 |
| STAPLE Upgrades: STAPLE Delivery 12 | 4 | 2018 | 4 | 2018 |
| STAPLE Upgrades: STAPLE Delivery 13 | 4 | 2019 | 4 | 2019 |
| STAPLE Upgrades: STAPLE Delivery 14 | 4 | 2020 | 4 | 2020 |
| Boundary Interaction Algorithims: FY14 | 1 | 2014 | 4 | 2014 |
| Boundary Interaction Algorithims: FY16-18 | 1 | 2016 | 1 | 2018 |
| Boundary Interaction Algorithims: TOTLOSS/SCATTER Algorithm Delivery | 4 | 2014 | 4 | 2014 |
| Boundary Interaction Algorithims: TOTLOSS/SCATTER Algorithm Delivery 2 | 2 | 2016 | 2 | 2016 |
| Boundary Interaction Algorithims: TOTLOSS/SCATTER Algorithm Delivery 3 | 4 | 2018 | 4 | 2018 |
| Boundary Interaction Algorithims: TOTLOSS Algorithm | 4 | 2014 | 4 | 2014 |
| Boundary Interaction Algorithims: TOTLOSS Algorithm 2 | 2 | 2016 | 2 | 2016 |
| Boundary Interaction Algorithims: TOTLOSS Algorithm 3 | 4 | 2018 | 4 | 2018 |
| Boundary Interaction Algorithims: SESSS Algorithm Upgrade | 2 | 2014 | 2 | 2014 |
| Boundary Interaction Algorithims: Bioacoustic Volume Attenuation and Scatter Efforts: | 1 | 2014 | 4 | 2014 |
| Boundary Interaction Algorithims: Bioacoustic Volume Attenuation and Scatter Efforts: Documentation Delivery | 2 | 2014 | 2 | 2014 |
| Boundary Interaction Algorithims: Bioacoustic Volume Attenuation and Scatter Efforts: VSS Database Upgrade | 4 | 2014 | 4 | 2014 |
| SME Support to NAVOCEANO Bottom Loss Database Upgrades: | 1 | 2014 | 4 | 2015 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| SME Support to NAVOCEANO Bottom Loss Database Upgrades: HFBL Horizontal Variability | 1 | 2015 | 1 | 2015 |
| SME Support to NAVOCEANO Bottom Loss Database Upgrades: SUS Replacement Technology | 3 | 2015 | 3 | 2015 |
| MIW TDA Support: | 1 | 2014 | 4 | 2019 |
| MIW TDA Support: EPMA Build 6 | 4 | 2014 | 4 | 2014 |
| MIW TDA Support: EPMA-NSMA Integration 1 | 4 | 2016 | 4 | 2016 |
| MIW TDA Support: EPMA-NSMA Integration 2 | 4 | 2018 | 4 | 2018 |
| MIW TDA Support: EPMA-NSMA Integration 3 | 4 | 2019 | 4 | 2019 |
| MIW TDA Support: TODS Components 2 | 4 | 2014 | 4 | 2014 |
| MIW TDA Support: TODS Components 3 | 4 | 2015 | 4 | 2015 |
| MIW TDA Support: NEXGEN MIW Environmental Application | 4 | 2015 | 4 | 2015 |
| Ocean Observing System Security Group Database: | 1 | 2014 | 4 | 2015 |
| Ocean Observing System Security Group Database: OOSSG Database Delivery #1 | 4 | 2015 | 4 | 2015 |
| Active & Passive Model-Data V&V: | 1 | 2014 | 4 | 2020 |
| Active & Passive Model-Data V&V: Active ASW R&A 1 | 4 | 2014 | 4 | 2014 |
| Active & Passive Model-Data V&V: Active ASW R&A 2 | 4 | 2015 | 4 | 2015 |
| Active & Passive Model-Data V&V: Active ASW R&A 3 | 4 | 2016 | 4 | 2016 |
| Active & Passive Model-Data V&V: Active ASW R&A 4 | 4 | 2017 | 4 | 2017 |
| Active & Passive Model-Data V&V: Active ASW R&A 5 | 4 | 2018 | 4 | 2018 |
| Active & Passive Model-Data V&V: Active ASW R&A 6 | 4 | 2019 | 4 | 2019 |
| Active & Passive Model-Data V&V: Active ASW R&A 7 | 4 | 2020 | 4 | 2020 |
| Through-the-Sensor Data Collection: | 1 | 2014 | 4 | 2020 |
| Through-the-Sensor Data Collection: P-8A Poseidon Data Collection 1 | 4 | 2014 | 4 | 2014 |
| Through-the-Sensor Data Collection: P-8A Poseidon Data Collection 2 | 3 | 2015 | 3 | 2015 |
| Through-the-Sensor Data Collection: P-8A Poseidon Data Collection 3 | 4 | 2016 | 4 | 2016 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Through-the-Sensor Data Collection: SSN Data Collection 1 | 3 | 2014 | 3 | 2014 |
| Through-the-Sensor Data Collection: SSN Data Collection 2 | 4 | 2015 | 4 | 2015 |
| Through-the-Sensor Data Collection: SSN Data Collection 3 | 3 | 2016 | 3 | 2016 |
| Through-the-Sensor Data Collection: SSN Data Collection 4 | 4 | 2017 | 4 | 2017 |
| Through-the-Sensor Data Collection: SSN Data Collection 5 | 4 | 2018 | 4 | 2018 |
| Through-the-Sensor Data Collection: SSN Data Collection 6 | 4 | 2019 | 4 | 2019 |
| Through-the-Sensor Data Collection: SSN Data Collection 7 | 4 | 2020 | 4 | 2020 |
| UUV-USV At-Sea Experimentation: FY14 | 1 | 2014 | 4 | 2014 |
| UUV-USV At-Sea Experimentation: FY16-17 | 1 | 2016 | 4 | 2017 |
| UUV-USV At-Sea Experimentation: Sea Test 1 | 3 | 2014 | 3 | 2014 |
| UUV-USV At-Sea Experimentation: Sea Test 2 | 3 | 2016 | 3 | 2016 |
| UUV-USV At-Sea Experimentation: Sea Test 3 | 4 | 2017 | 4 | 2017 |
| ***Metoc Data Assimilation and Mod Future Mission Capabilities (ESPC)*** | | | | |
| ESPC Coupled Data Assimilation into Environmental Prediction: | 1 | 2014 | 4 | 2018 |
| ESPC Development Global Coupled Environmental Models: | 1 | 2014 | 4 | 2018 |
| ESPC Advanced Computational Architectures: Schedule Detail | 1 | 2014 | 1 | 2018 |
| ESPC Demonstrate Extended Range Prediction: Schedule Detail | 1 | 2014 | 1 | 2018 |
| Global Coupled Prediction System Development: Schedule Detail | 2 | 2014 | 3 | 2018 |
| Operation Implementation and Validation: Schedule Detail | 2 | 2014 | 4 | 2019 |
| Coupled Global Ensemble Prediction System: Schedule Detail | 2 | 2014 | 3 | 2020 |
| Next Generation Dynamic Cores: Schedule Detail | 3 | 2014 | 2 | 2020 |
| Computational Efficiency of Earth System: Schedule Detail | 3 | 2014 | 2 | 2020 |
| Advanced Observational Data Analysisand long Range Forecasting (ACAF): Schedule Detail | 4 | 2014 | 4 | 2019 |
| Regional Artic Prediction System: Schedule Detail | 1 | 2015 | 2 | 2020 |
| National ESPC Interagencey Coordinated Development: Schedule Detail | 1 | 2016 | 4 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2342. / *METOC Data Assimilation and Mod* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Global Coupled Data Assimilation: Schedule Detail | 1 | 2017 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2343 / *Tactical METOC Applications* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2343: *Tactical METOC Applications* | 126.540 | 8.908 | 9.124 | 13.260 | - | 13.260 | 14.642 | 15.517 | 15.400 | 15.715 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Tactical Meteorology and Oceanography (METOC) Applications Project provides future operational effects decision aid capabilities for Navy and Marine Corps warfighters in the context of Joint Operations in a net-centric environment. This project identifies and transitions state-of-the-art decision support software technologies from the government's 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, Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare (AAW), Strike Warfare (STW), and Naval Special Warfare (NSW). Performance assessments leading to improvements in operational and tactical control are conducted through a two-tiered approach: 1) METOC Decision Aids (MDAs) and, 2) Operational Effects Decision Aids (OEDAs). MDAs 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 then use the MDA 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, AMW ingress and egress points, and for other warfare considerations. MDAs and OEDAs typically use data derived from sensors developed in Project 2341 (METOC Data Acquisition) and assimilated by software produced by Project 2342 (METOC Data Assimilation and Modeling). MDAs and OEDAs also use data obtained through direct interfaces to Navy combat systems. A current emphasis area of the project is capabilities 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.

The major emphasis of this project is the software development within the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program of record.

FY 2016 request provides for Fleet Capability Release (FCR)-2 test events, finalize documentation and plan/begin the development efforts for FCR-3.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Naval Integrated Tactical Environmental System Next Generation (NITES-Next) | 8.908 | 9.124 | 13.260 | - | 13.260 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Conducted System Integration Tests (SIT) #1 and #2, System Qualification Test (SQT), lab Developmental Test and Evaluation (DT&E), Fielding Technical Review (FTR), and User Assessment (UA) for Fleet Capability Release (FCR)-1. Obtained interim authority to test (IATT) for live network testing. Completed draft and initiated routing of Navy Training System Plan (NTSP). Completed installation and System Operational Verification Test (SOVT) of FCR-1. Completed shipboard DT&E of FCR-1. Planned the FCR-2 development activities. Awarded task order and started development, integration, and testing of FCR-2. Completed Risk Assessment Level of test (RALOT) for FCR-2 and beyond.<br>***FY 2015 Plans:***<br>Conduct Operational Test Readiness Review (OTRR) with the System Engineering Technical Review (SETR) board, and the Milestone Decision Authority (MDA). Conduct Initial Operational Test and Evaluation (IOT&E) in support of FCR-1 Fielding Decision (FD). Complete Independent Logistics Assessment (ILA) for FCR-1. Obtain authority to operate (ATO) for FCR-1. Begin sustainment of FCR-1 software. Conduct FCR-1 FD with the MDA and achieve Initial Operational Capability (IOC). Conduct the SETR Build Technical Review (BTR) in support of FCR-2. Conduct the Build Decision (BD) for FCR-2. Continue developing, integrating, and testing FCR-2 software. Begin documentation, and preparation (including Requirements Definition Package (RDP), Technology Readiness Assessment (TRA) Addendum 2, Cost Analysis Requirements Description (CARD), Acquisition Strategy (AS), and Acquisition Program Baseline (APB)) for FCR-3. Begin planning for contract actions in support of FCR-3. Continue planning contract in support of FCR-3. Plan for SIT and SQT for FCR-2.<br>***FY 2016 Base Plans:***<br>Conduct SIT #1, SIT #2, SQT, UA, and DT&E for FCR-2. Participate in the Consolidated Afloat Network and Enterprise Services (CANES) Application Integration (AI) SIT event. Update the NTSP and ILA for FCR-2. Receive ATO for FCR-2. Finalize documentation (including RDP, TRA Addendum 2, CARD, AS and APB) for FCR-3. Plan the FCR-3 development activities. Award task order and start development of FCR-3. Conduct the BTR for FCR-3 and prepare for the FCR-3 BD. Plan and prepare for integration into the Navy Tactical Cloud Reference Implementation (NTCRI).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 8.908 | 9.124 | 13.260 | - | 13.260 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

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

N/A

**Remarks**

**D. Acquisition Strategy**

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 assessments across open ocean and littoral operating environments, all with management oversight incorporating these into the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program under Joint Capabilities Integration and Development System (JCIDS) by the Department of the Navy (DoN).

**E. Performance Metrics**

Goal: Develop METOC future Operational Effects Decision Aid (OEDA) capabilities for Navy and Marine Corps war fighters in order to facilitate the characterization and prediction of the battlespace.

Metric: Improve the accuracy of METOC tactical decision aids and applications in order to address no less than 75% of applicable capability gaps and requirements.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2343 / *Tactical METOC Applications* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NITES/NITES-Next | WR | NRL : Washington, DC | 3.893 | - | | - | | - | | - | | - | - | 3.893 | - |
| NITES/NITES-Next | WR | SSCs : California, South Carolina | 8.673 | - | | - | | - | | - | | - | - | 8.673 | - |
| NITES/NITES-Next | Various | Various : Various | 5.775 | - | | - | | - | | - | | - | - | 5.775 | - |
| NITES | Various | Various : Various | 61.400 | - | | - | | - | | - | | - | - | 61.400 | - |
| NITES-Next | C/CPIF | GD-IT : Virginia | 25.551 | - | | - | | - | | - | | - | - | 25.551 | - |
| NITES-Next | WR | NAVOCEANO : Mississippi | 0.125 | - | | - | | - | | - | | - | - | 0.125 | - |
| NITES-Next | WR | SSC Pacific : San Diego, CA | 8.442 | 3.767 | Nov 2013 | 4.441 | Nov 2014 | 6.422 | Nov 2015 | - | | 6.422 | Continuing | Continuing | Continuing |
| NITES-Next | C/FP | SAIC : Virginia | 2.580 | 1.406 | Nov 2013 | 1.445 | Jan 2015 | 2.110 | Nov 2015 | - | | 2.110 | Continuing | Continuing | Continuing |
| NITES-Next | C/FP | FSI : San Diego, CA | 5.600 | - | | - | | - | | - | | - | - | 5.600 | - |
| NITES-Next | WR | SSC Atlantic : South Carolina | 0.200 | - | | - | | - | | - | | - | - | 0.200 | - |
| NITES-Next | C/FP | GDIT : Virginia | 0.000 | 3.000 | Aug 2014 | 2.493 | Mar 2015 | 3.640 | Feb 2016 | - | | 3.640 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 122.239 | 8.173 | | 8.379 | | 12.172 | | - | | 12.172 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support Cost | C/CPIF | IPD : Various | 0.595 | - | | - | | - | | - | | - | - | 0.595 | - |
| NITES-Next | C/FP | SAIC : Virginia | 2.400 | 0.335 | Nov 2013 | 0.345 | Jan 2015 | 0.504 | Nov 2015 | - | | 0.504 | Continuing | Continuing | Continuing |
| NITES-Next | C/FP | NAVAIR : Maryland | 0.125 | - | | - | | - | | - | | - | - | 0.125 | - |
| NITES-Next | C/FP | COMOPTEVFOR : Norfolk, VA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 3.120 | 0.335 | | 0.345 | | 0.504 | | - | | 0.504 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2343 / *Tactical METOC Applications* | |

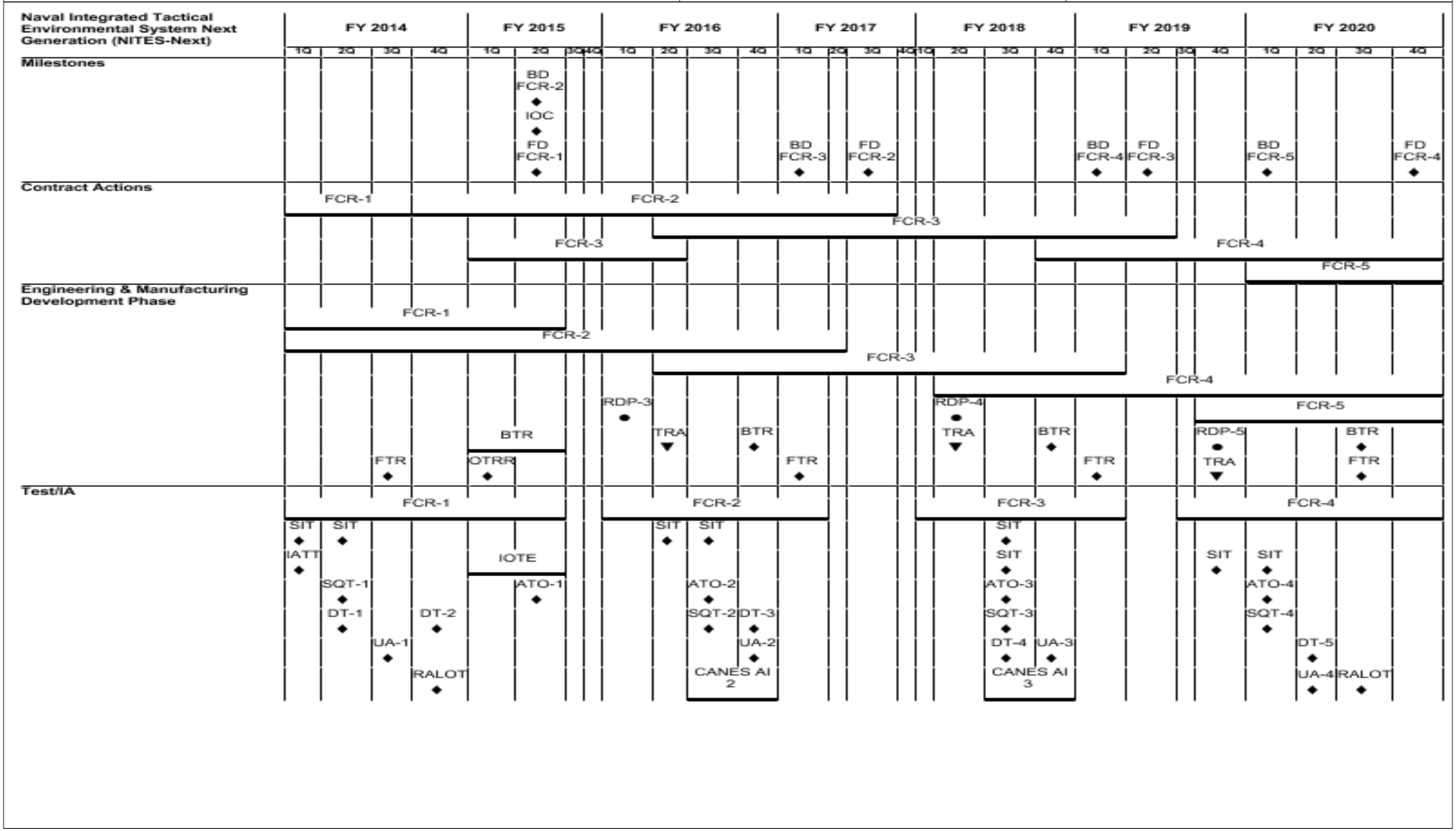
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Workforce | Various | Various : Various | 0.031 | - | | - | | - | | - | | - | - | 0.031 | - |
| NITES-Next | WR | SSC Pacific : San Diego, CA | 0.350 | 0.250 | Nov 2013 | 0.250 | Nov 2014 | 0.365 | Nov 2015 | - | | 0.365 | Continuing | Continuing | Continuing |
| NITES-Next | C/FP | BAH : Virgina | 0.800 | 0.150 | Nov 2013 | 0.150 | Nov 2014 | 0.219 | Nov 2015 | - | | 0.219 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.181 | 0.400 | | 0.400 | | 0.584 | | - | | 0.584 | - | - | - |

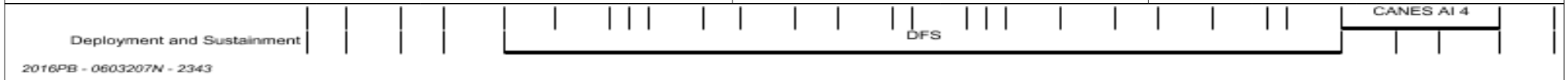
| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 126.540 | 8.908 | | 9.124 | | 13.260 | | - | | 13.260 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **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 Fleet Capability Release - 2 | 1 | 2015 | 2 | 2015 |
| Milestones: Initial Operational Capability | 2 | 2015 | 2 | 2015 |
| Milestones: Fielding Decision Fleet Capability Release - 1 | 2 | 2015 | 2 | 2015 |
| Milestones: Build Decision Fleet Capability Release - 3 | 1 | 2017 | 1 | 2017 |
| Milestones: Fielding Decision Fleet Capability Release - 2 | 3 | 2017 | 3 | 2017 |
| Milestones: Build Decision Fleet Capability Release - 4 | 1 | 2019 | 1 | 2019 |
| Milestones: Fielding Decision Fleet Capability Release - 3 | 2 | 2019 | 2 | 2019 |
| Milestones: Build Decision Fleet Capability Release - 5 | 1 | 2020 | 1 | 2020 |
| Milestones: Fielding Decision Fleet Capability Release - 4 | 4 | 2020 | 4 | 2020 |
| Contract Actions: FCR-1 Task Order | 1 | 2014 | 3 | 2014 |
| Contract Actions: FCR-2 Task Order | 4 | 2014 | 3 | 2017 |
| Contract Actions: FCR-3 Task Order | 2 | 2016 | 2 | 2019 |
| Contract Actions: FCR-3-Beyond Planning | 1 | 2015 | 2 | 2016 |
| Contract Actions: FCR-4 Task Order | 4 | 2018 | 4 | 2020 |
| Contract Actions: FCR-5 Task Order | 1 | 2020 | 4 | 2020 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 1 / Train and Deploy | 1 | 2014 | 2 | 2015 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 2 / Train Deploy | 1 | 2014 | 2 | 2017 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 3 / Train Deploy | 2 | 2016 | 1 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 4 / Train and Deploy | 2 | 2018 | 4 | 2020 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 5 / Train and Deploy | 4 | 2019 | 4 | 2020 |
| Engineering & Manufacturing Development Phase: Requirements Definition Package - 3 | 1 | 2016 | 1 | 2016 |
| Engineering & Manufacturing Development Phase: Requirements Definition Package - 4 | 2 | 2018 | 2 | 2018 |
| Engineering & Manufacturing Development Phase: Requirements Definition Package - 5 | 4 | 2019 | 4 | 2019 |
| Engineering & Manufacturing Development Phase: Build Technical Review FCR-2 | 1 | 2015 | 2 | 2015 |
| Engineering & Manufacturing Development Phase: Build Technical Review FCR-3 | 4 | 2016 | 4 | 2016 |
| Engineering & Manufacturing Development Phase: Build Technical Review FCR-4 | 4 | 2018 | 4 | 2018 |
| Engineering & Manufacturing Development Phase: Build Technical Review FCR-5 | 3 | 2020 | 3 | 2020 |
| Engineering & Manufacturing Development Phase: Technology Readiness Assessment - 3 | 2 | 2016 | 2 | 2016 |
| Engineering & Manufacturing Development Phase: Technology Readiness Assessment - 4 | 2 | 2018 | 2 | 2018 |
| Engineering & Manufacturing Development Phase: Technology Readiness Assessment - 5 | 4 | 2019 | 4 | 2019 |
| Engineering & Manufacturing Development Phase: Field Technical Review FCR-1 | 3 | 2014 | 3 | 2014 |
| Engineering & Manufacturing Development Phase: Field Technical Review FCR-2 | 1 | 2017 | 1 | 2017 |
| Engineering & Manufacturing Development Phase: Field Technical Review FCR-3 | 1 | 2019 | 1 | 2019 |
| Engineering & Manufacturing Development Phase: Field Technical Review FCR-4 | 3 | 2020 | 3 | 2020 |
| Engineering & Manufacturing Development Phase: Operational Test Readiness Review FCR-1 | 1 | 2015 | 1 | 2015 |
| Test/IA: Fleet Capability Release - 1 | 1 | 2014 | 2 | 2015 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test/IA: Fleet Capability Release - 2 | 1 | 2016 | 1 | 2017 |
| Test/IA: Fleet Capability Release - 3 | 1 | 2018 | 1 | 2019 |
| Test/IA: Fleet Capability Release - 4 | 3 | 2019 | 4 | 2020 |
| Test/IA: System Integration Test - 1 (FCR-1) | 1 | 2014 | 1 | 2014 |
| Test/IA: System Integration Test - 2 (FCR-1) | 2 | 2014 | 2 | 2014 |
| Test/IA: System Integration Test - 1 (FCR-2) | 2 | 2016 | 2 | 2016 |
| Test/IA: System Integration Test - 2 (FCR-2) | 3 | 2016 | 3 | 2016 |
| Test/IA: System Integration Test - 1 (FCR-3) | 3 | 2018 | 3 | 2018 |
| Test/IA: System Integration Test - 2 (FCR-3) | 3 | 2018 | 3 | 2018 |
| Test/IA: System Integration Test - 1 (FCR-4) | 4 | 2019 | 4 | 2019 |
| Test/IA: System Integration Test - 2 (FCR4) | 1 | 2020 | 1 | 2020 |
| Test/IA: Interim Authority to Test | 1 | 2014 | 1 | 2014 |
| Test/IA: Initial Operational Test and Evaluation | 1 | 2015 | 2 | 2015 |
| Test/IA: Authority to Operate FCR-1 | 2 | 2015 | 2 | 2015 |
| Test/IA: Authority to Operate FCR-2 | 3 | 2016 | 3 | 2016 |
| Test/IA: Authority to Operate FCR-3 | 3 | 2018 | 3 | 2018 |
| Test/IA: Authority to Operate FCR-4 | 1 | 2020 | 1 | 2020 |
| Test/IA: System Qualification Test FCR-1 | 2 | 2014 | 2 | 2014 |
| Test/IA: System Qualification Test FCR-2 | 3 | 2016 | 3 | 2016 |
| Test/IA: System Qualification Test FCR-3 | 3 | 2018 | 3 | 2018 |
| Test/IA: System Qualification Test FCR-4 | 1 | 2020 | 1 | 2020 |
| Test/IA: Developmental Test Fleet Capability Release (LAB) - FCR-1 | 2 | 2014 | 2 | 2014 |
| Test/IA: Developmental Test Fleet Capability Release (Shipboard) FCR-1 | 4 | 2014 | 4 | 2014 |
| Test/IA: Developmental Test Fleet Capability Release - FCR-2 | 4 | 2016 | 4 | 2016 |
| Test/IA: Developmental Test Fleet Capability Release - FCR-3 | 3 | 2018 | 3 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test/IA: Developmental Test Fleet Capability Release - FCR-4 | 2 | 2020 | 2 | 2020 |
| Test/IA: User Assessment FCR-1 | 3 | 2014 | 3 | 2014 |
| Test/IA: User Assessment FCR-2 | 4 | 2016 | 4 | 2016 |
| Test/IA: User Assessment FCR-3 | 4 | 2018 | 4 | 2018 |
| Test/IA: User Assessment FCR-4 | 2 | 2020 | 2 | 2020 |
| Test/IA: FCR-2 Risk Assessment Level of Test | 4 | 2014 | 4 | 2014 |
| Test/IA: FCR-4 Risk Assessment Level of Test | 3 | 2020 | 3 | 2020 |
| Test/IA: CANES AI SIT FCR-2 | 3 | 2016 | 4 | 2016 |
| Test/IA: CANES AI SIT FCR-3 | 3 | 2018 | 4 | 2018 |
| Test/IA: CANES AI SIT FCR-4 | 1 | 2020 | 3 | 2020 |
| Test/IA: Deployment and Sustainment: Deployment, fielding and Sustainment (OMN) | 1 | 2015 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2344. / *Precise Time and Astrometry* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2344.: *Precise Time and Astrometry* | 2.936 | 8.600 | 8.954 | 4.977 | - | 4.977 | 9.134 | 3.331 | 3.480 | 0.313 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Precise Timing and Astrometry (PTA) project funds research and development of improvements for the U.S. Master Clock (MC) System, the DoD Time Transfer capability, the Earth Orientation System, and the Astrometric Observation System. The MC System and Time Transfer provides precise time for use in modern military and National Technical Means (NTM) navigation, guidance, positioning, and tracking systems. The Earth Orientation System provides precise Earth Orientation Parameters for use by the DoD and the national civilian infrastructure to establish the specific orientation of the Earth and to provide input to the terrestrial reference frame. The Astrometric Observation System provides the basic data needed to generate the celestial reference frame which is the standard for calibrating all inertial navigation systems, satellite orbits, and earth rotation determinations. Improvement to the MC System, Time Transfer, Earth Orientation, and Astrometric Observation Systems are needed to ensure that new and upgraded DoD and NTM capabilities meet their performance requirements. By DoD Directive (CJCSI 6130.01D, encl J, of 13 Apr 2007), the U.S. Naval Observatory (USNO), Washington, D.C., is responsible for coordinating Precise Time and Time Interval (PTTI) requirements and for maintaining a PTTI reference standard (astronomical and atomic) for use by all DoD, Federal agencies, and related scientific laboratories. The Navy is also responsible for providing astronomical data for military and NTM navigation, positioning, and guidance capabilities that are space-based.

The PTA research and development efforts are focused on several areas relating to timing and time transfer: (1) Development of Rubidium Fountain Atomic Clocks and development of improved GPS Timing Receivers in order to meet the precise timing requirements for the GPS III system; (2) Research & development of the capability of distributing timing signals via Optical fiber lines, as an alternative and backup to GPS time distribution; and (3) Research & development into Optical Clock technology, which is expected to be required for future DoD systems. The PTA research and development effort is also focused on the following areas related to Earth Orientation Parameter (EOP) determination: (1) Upgrade of the Very Long Baseline Interferometry (VBLI) data acquisition system / radio telescope at Kokee Park HI; (2) Development of a Software (SW) Correlator for processing of VLBI data, necessary for the generation of Earth Orientation Parameter (EOP) data; (3) Development of the capability for electronic transmission of the VLBI data from remote VLBI sites to the USNO correlator. The new SW Correlator and the eVLBI infrastructure upgrades are necessary in order to support daily updates of EOP data required by GPS III; (4) Development of an automated end-to-end EOP processing system, which combines input from multiple data sets (e.g. VLBI data, GPS orbit data, and laser ranging data, etc.). This process is currently very labor intensive and costly. Automation is necessary to meet future DoD and GPS requirements; and (5) Modifications to the EOP system for compatibility with the new international standard -'VLBI2010'. Starting in FY15, the PTA research and development for astrometry will focus on improvements to the USNO Navy Precision Optical Interferometer (NPOI) at Flagstaff, AZ. It is necessary for maintenance of the Celestial Reference Frame (CRF). Four 1.8m telescopes will be added to the array in order to extend and expand the number of stars in the catalog to fainter stars of 9th magnitude.

The Critical Time Dissemination (CTD) aspect of the PTA program develops enhanced methods of distributing and verifying precise time back to the Master Clock, UTC (USNO). The development aspect of this project has four parts: (1) Development of a mobile time link; (2) Refinement of and modernization of the Hydrogem Maser and

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2344. / *Precise Time and Astrometry* |

Auxilary Offset Generator (AOG); (3) Customize a timing system to develop a Site Verification System; and (4) Produce a fiber link system to transfer the Master Clock down long-haul fiber.

Note: Prior to FY13, the USNO Precise Timing and Astrometry RDTEN funds were administered out of BSO 39 (SPAWAR/PMW120).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Precise Timing and Astronomy | 8.600 | 8.954 | 4.977 | - | 4.977 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** Research and development of improvements for the U.S. Master Clock (MC) System, the DoD Time Transfer capability, the Earth Orientation System, and the Astrometric Observation System.

***FY 2014 Accomplishments:***
* Master Clock and Time Distribution: Two Navy Rb Fountains (NRF6 and NRF7) are now located in the Alternate Master Clock Facility and have demonstrated excellent stability. Initial Operating Capability (IOC) for AMC Rb Fountains anticipated FY14 Q4. Lab demonstration of the fiber optic cable have been successful. Critical Time Dissemination tech refresh activities are proceeding.

* Earth Orientation: Very Long Baseline Interferomtry System (VLBI) Software (SW) correlator is undergoing the final test and evaluation before achieving FOC and becoming the operational VLBI correlator at USNO. The Graphical User Interface (GUI) is now the primary method of interfacing with the SW correlator. The contract for the VLBI2010 antenna was awarded on 30 Sep 2013. Critical Design Review (CDR) for the antenna contract was completed in May 2014. Funding to cover the site preparation has been MIPRed to NASA and work is beginning on the plans for construction at the NASA site. Additional funding for the VLBI2010 signal chain has recently been MIPRed to NASA. One contract for a programmer to work on the EOP Automation was awarded in June 2014; the second contract was awarded 4Q FY14.

***FY 2015 Plans:***
* Final Operating Capability (FOC) for Rb Fountains at USNO Alternate Master Clock facility.
* Continue Optical Fiber timing link activities.
* Continue Critical Time Dissemination Activities.
* PDR for EOP Automation.
* Install Kokee Park radio telescope.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2344. / *Precise Time and Astrometry* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Begin NPOI/1.8m construction activities (relocate roads, install concrete piers, fabricate and install domes and electrical services).<br>***FY 2016 Base Plans:***<br>* Demo Optical Fiber timing link in fiber network.<br>* Lab demonstration of optical clock prototype.<br>* Continue Critical Time Dissemination Activities.<br>* Continue work on EOP Automation.<br>* IOC for Kokee Park radio telescope.<br>* Continue NPOI/1.8m construction activities (relocate roads, install concrete piers, fabricate and install domes and electrical services).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 8.600 | 8.954 | 4.977 | - | 4.977 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/0305112N/LI 8126: *Oceanography (USNO Astrometric Telescope Subsystem funds for purchase of Software Correlator* | - | - | - | - | - | - | - | - | - | - | 1.156 |

**Remarks**

**D. Acquisition Strategy**

The included technology developments are primarily in-house with selected contractor participation. However, the Kokee Park, HI, radio telescope upgrade and the SW Correlator (OPN-funded) contract will involve substantial non-Navy contract support.

**E. Performance Metrics**

(1) The Software Correlator will complete Phase 2 and will achieve Initial Operational Capability (IOC).
(2) Antenna will be installed at Kokee Park, HI.
(3) Rb Fountain System will reach FOC at AMC in FY15.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2344. / *Precise Time and Astrometry* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development (Antenna Procurement) | C/FFP | Intertronics, Inc. : Quebec, Canada | 2.005 | - | | - | | - | | - | | - | - | 2.005 | - |
| Primary Hardware Development (Site Prep) | MIPR | NASA/GSFC : HI | 0.000 | 0.750 | May 2014 | - | | - | | - | | - | - | 0.750 | - |
| Primary Hardware Development (Antenna Receiver Electronics) | MIPR | NASA : GSFC | 0.000 | 1.000 | Jun 2014 | - | | - | | - | | - | - | 1.000 | - |
| Primary Hardware Development for CTD (Critical Mobil Pod) | MIPR | Classified : Not Specified | 0.000 | - | | 1.500 | Oct 2014 | - | | - | | - | - | 1.500 | - |
| Primary Hardware Development for CTD (Develop Site Verification System) | C/FFP | Classified : Not Specified | 0.000 | - | | 0.550 | Dec 2014 | - | | - | | - | - | 0.550 | - |
| Primary Hardware Development for CTD (Fiber Link System) | MIPR | Classified : Not Specified | 0.000 | - | | 2.310 | Mar 2015 | - | | - | | - | - | 2.310 | - |
| Primary Hardware Development (NPOI) 1.8m Telescope Project (1) | SS/FFP | Lowell Observatory : Flagstaff, AZ | 0.000 | - | | 2.669 | Oct 2014 | 0.482 | Mar 2016 | - | | 0.482 | - | 3.151 | - |
| Primary Hardware Development (NPOI) 1.8m Telescope (2) | SS/FFP | AZ Embeded System : Not Specified | 0.000 | - | | - | | 0.200 | Oct 2015 | - | | 0.200 | - | 0.200 | - |
| Ancillary Hardware Development 1 | Various | U.S. Naval Observatory : Washington, DC | 0.210 | 0.057 | Oct 2013 | 0.058 | Oct 2014 | 0.020 | Oct 2015 | - | | 0.020 | - | 0.345 | - |
| Ancillary Hardware Development 2 | Various | U.S. Naval Observatory : Washington, DC | 0.000 | 0.057 | Jan 2014 | 0.058 | Oct 2014 | 0.020 | Jan 2016 | - | | 0.020 | - | 0.135 | - |
| Ancillary Hardware Development 3 | Various | U.S. Naval Observatory : Washington, DC | 0.000 | 0.094 | Apr 2014 | 0.058 | Apr 2015 | 0.021 | Apr 2016 | - | | 0.021 | - | 0.173 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2344. / *Precise Time and Astrometry* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ancillary Hardware Development 4 | Various | U.S. Naval Observatory : Washington, DC | 0.000 | - | | 0.059 | Jul 2015 | 0.021 | Jul 2016 | - | | 0.021 | - | 0.080 | - |
| Primary Hardware Development for CTD (System Integration) | C/FP | Classified : Not Specified | 0.000 | 1.644 | Sep 2014 | - | | 0.600 | Dec 2015 | - | | 0.600 | - | 2.244 | - |
| Primary Hardware Development for CTD (RF Interface) | MIPR | Classified : Not Specified | 0.000 | 1.580 | Sep 2014 | - | | 1.000 | Dec 2015 | - | | 1.000 | - | 2.580 | - |
| Primary Hardware Development for CTD (Line Interface) | MIPR | Classified : Not Specified | 0.000 | 1.775 | Sep 2014 | - | | 0.963 | Dec 2015 | - | | 0.963 | - | 2.738 | - |
| Primary Hardware Development for CTD (Reference Upgrade) | C/FFP | Symmetricom : San Jose, CA | 0.000 | 0.200 | Sep 2014 | - | | 0.100 | Jun 2016 | - | | 0.100 | - | 0.300 | - |
| Two Way Satellite Time Transfer Modernization | TBD | TBD : Not Specified | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 2.215 | 7.157 | | 7.262 | | 3.427 | | - | | 3.427 | - | 20.061 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support (All PTA - Labor) 1 | Allot | U.S. Naval Observatory (Civilian Labor) : Washington, DC | 0.000 | 0.195 | Oct 2013 | 0.195 | Oct 2014 | 0.102 | Oct 2015 | - | | 0.102 | Continuing | Continuing | Continuing |
| Development Support (All PTA - Labor) 2 | Allot | U.S. Naval Observatory (Civilian Labor) : Washington, DC | 0.196 | 0.195 | Jan 2014 | 0.195 | Jan 2015 | 0.102 | Jan 2016 | - | | 0.102 | Continuing | Continuing | Continuing |
| Development Support (All PTA - Labor) 3 | Allot | U.S. Naval Observatory (Civilian | 0.196 | 0.195 | Apr 2014 | 0.195 | Apr 2015 | 0.103 | Apr 2016 | - | | 0.103 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2344. / *Precise Time and Astrometry* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Labor) : Washington, DC | | | | | | | | | | | | | |
| Development Support (All PTA - Labor) 4 | Allot | U.S. Naval Observatory (Civilian Labor) : Washington, DC | 0.196 | 0.195 | Jul 2014 | 0.195 | Jul 2015 | 0.103 | Jul 2016 | - | | 0.103 | Continuing | Continuing | Continuing |
| Software Development (SW Correlator GUI) | SS/FFP | U.S. Naval Observatory (Civilian Labor) : Washington, DC | 0.118 | 0.025 | Jul 2014 | - | | - | | - | | - | - | 0.143 | - |
| Software Development (EOP Automation) | C/FFP | U.S. Naval Observatory (Civilian Labor) : Washington, DC | 0.000 | 0.568 | Jun 2014 | 0.602 | Dec 2014 | 0.440 | Jun 2016 | - | | 0.440 | - | 1.610 | - |
| Travel 1 | Allot | U.S. Naval Observatory (Civilian Travel) : Varies | 0.000 | 0.017 | Oct 2013 | 0.020 | Dec 2014 | 0.005 | Oct 2015 | - | | 0.005 | - | 0.042 | - |
| Travel 2 | Allot | U.S. Naval Observatory (Civilian Travel) : Varies | 0.000 | 0.017 | Jan 2014 | 0.020 | Jan 2015 | 0.005 | Jan 2016 | - | | 0.005 | - | 0.042 | - |
| Travel 3 | Allot | U.S. Naval Observatory (Civilian Travel) : Varies | 0.015 | 0.018 | Apr 2014 | 0.020 | Apr 2015 | 0.005 | Apr 2016 | - | | 0.005 | - | 0.058 | - |
| Travel 4 | Allot | U.S. Naval Observatory (Civilian Travel) : Varies | 0.000 | 0.018 | Jul 2014 | 0.020 | Jul 2015 | 0.005 | Jul 2016 | - | | 0.005 | - | 0.043 | - |
| VLBI2010 Testing and Integration | MIPR | NASA : GSFC | 0.000 | - | | - | | 0.680 | Jan 2016 | - | | 0.680 | - | 0.680 | - |
| | | **Subtotal** | 0.721 | 1.443 | | 1.462 | | 1.550 | | - | | 1.550 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2344. / *Precise Time and Astrometry* |

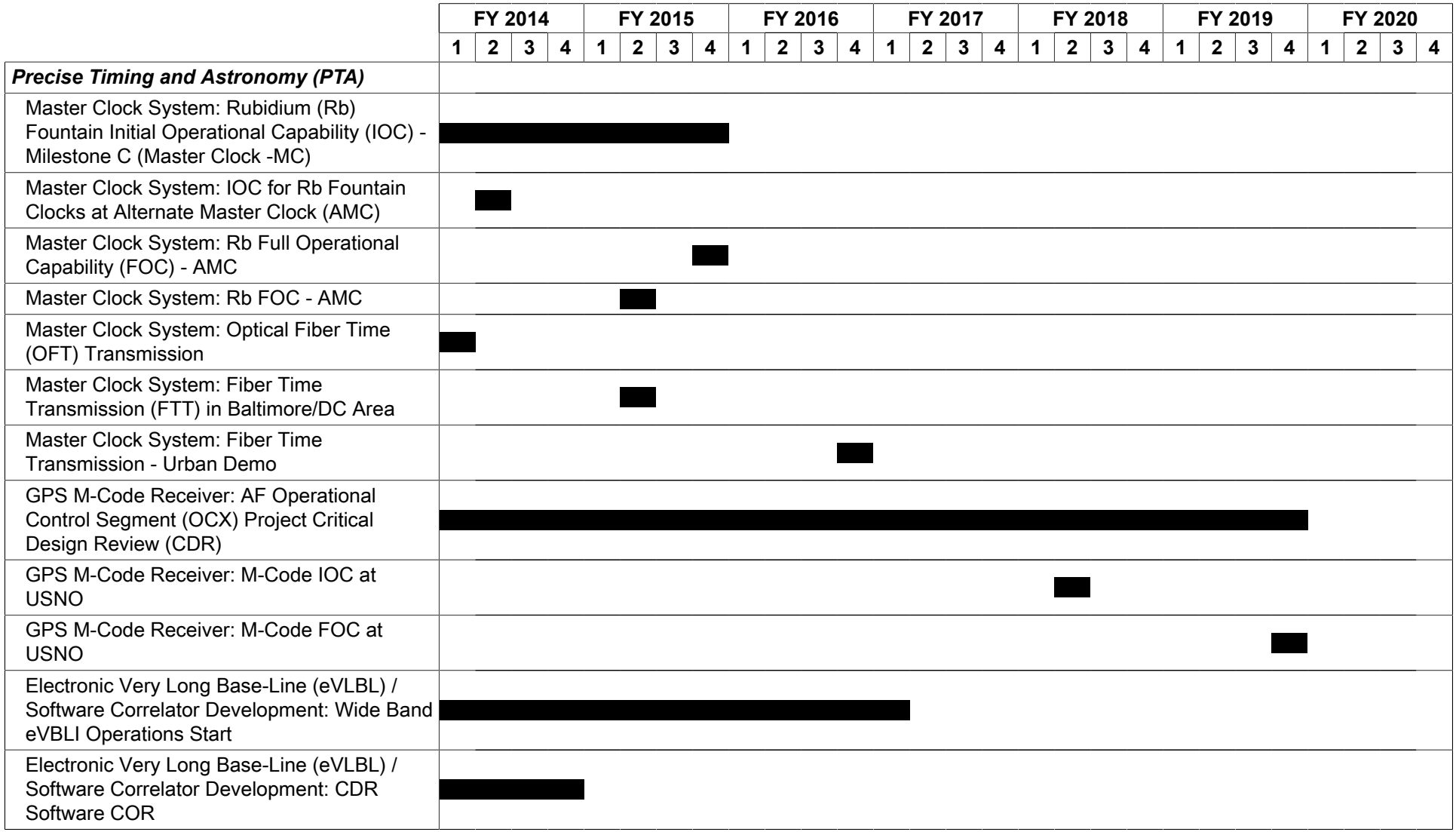
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technical Management Contractor Services for Kokee Park Antenna Project | C/FFP | TBD : TBD | 0.000 | - | | 0.230 | Jul 2015 | - | | - | | - | - | 0.230 | - |
| | | **Subtotal** | 0.000 | - | | 0.230 | | - | | - | | - | - | 0.230 | - |

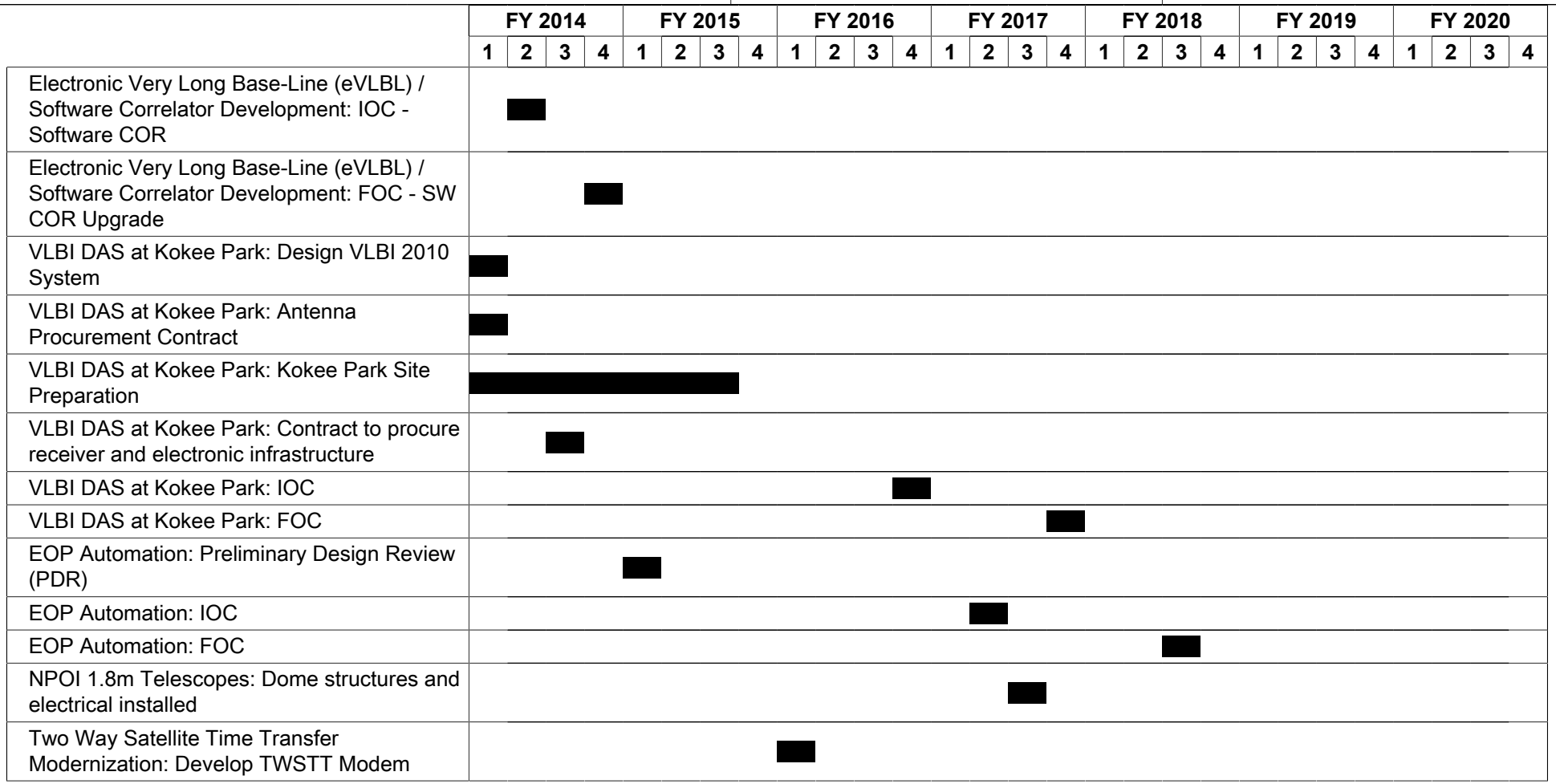
| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 2.936 | 8.600 | | 8.954 | | 4.977 | | - | | 4.977 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2344. / *Precise Time and Astrometry* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2344. / *Precise Time and Astrometry* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2344. / *Precise Time and Astrometry* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Precise Timing and Astronomy (PTA)*** | | | | |
| Master Clock System: Rubidium (Rb) Fountain Initial Operational Capability (IOC) - Milestone C (Master Clock -MC) | 1 | 2014 | 4 | 2015 |
| Master Clock System: IOC for Rb Fountain Clocks at Alternate Master Clock (AMC) | 2 | 2014 | 2 | 2014 |
| Master Clock System: Rb Full Operational Capability (FOC) - AMC | 4 | 2015 | 4 | 2015 |
| Master Clock System: Rb FOC - AMC | 2 | 2015 | 2 | 2015 |
| Master Clock System: Optical Fiber Time (OFT) Transmission | 1 | 2014 | 1 | 2014 |
| Master Clock System: Fiber Time Transmission (FTT) in Baltimore/DC Area | 2 | 2015 | 2 | 2015 |
| Master Clock System: Fiber Time Transmission - Urban Demo | 4 | 2016 | 4 | 2016 |
| GPS M-Code Receiver: AF Operational Control Segment (OCX) Project Critical Design Review (CDR) | 1 | 2014 | 4 | 2019 |
| GPS M-Code Receiver: M-Code IOC at USNO | 2 | 2018 | 2 | 2018 |
| GPS M-Code Receiver: M-Code FOC at USNO | 4 | 2019 | 4 | 2019 |
| Electronic Very Long Base-Line (eVLBL) / Software Correlator Development: Wide Band eVBLI Operations Start | 1 | 2014 | 1 | 2017 |
| Electronic Very Long Base-Line (eVLBL) / Software Correlator Development: CDR Software COR | 1 | 2014 | 4 | 2014 |
| Electronic Very Long Base-Line (eVLBL) / Software Correlator Development: IOC - Software COR | 2 | 2014 | 2 | 2014 |
| Electronic Very Long Base-Line (eVLBL) / Software Correlator Development: FOC - SW COR Upgrade | 4 | 2014 | 4 | 2014 |
| VLBI DAS at Kokee Park: Design VLBI 2010 System | 1 | 2014 | 1 | 2014 |
| VLBI DAS at Kokee Park: Antenna Procurement Contract | 1 | 2014 | 1 | 2014 |
| VLBI DAS at Kokee Park: Kokee Park Site Preparation | 1 | 2014 | 3 | 2015 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2344. / *Precise Time and Astrometry* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| VLBI DAS at Kokee Park: Contract to procure receiver and electronic infrastructure | 3 | 2014 | 3 | 2014 |
| VLBI DAS at Kokee Park: IOC | 4 | 2016 | 4 | 2016 |
| VLBI DAS at Kokee Park: FOC | 4 | 2017 | 4 | 2017 |
| EOP Automation: Preliminary Design Review (PDR) | 1 | 2015 | 1 | 2015 |
| EOP Automation: IOC | 2 | 2017 | 2 | 2017 |
| EOP Automation: FOC | 3 | 2018 | 3 | 2018 |
| NPOI 1.8m Telescopes: Dome structures and electrical installed | 3 | 2017 | 3 | 2017 |
| Two Way Satellite Time Transfer Modernization: Develop TWSTT Modem | 1 | 2016 | 1 | 2016 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2363 / *Remote Sensing Capability Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2363: *Remote Sensing Capability Development* | - | - | 4.988 | 2.479 | - | 2.479 | 0.977 | 0.981 | 0.965 | 0.987 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Remote Sensing Capability Development characterized 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.

FY 2016 request provides for continued target data collection for development of automated algorithms.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Remote Sensing Capability Development | - | 4.988 | 2.479 | - | 2.479 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>Collect remote sensing and ground truth data in various weather and sea states to broaden the range of environmental conditions and reduce uncertainty in environmental prediction.<br>Develop and enhance software algorithms to automatically detect oceanographic phenomena.<br>Integrate algorithms for access over the network. Enhance existing toolsets to provide users robust applications to assist in their daily tasks. Develop training to provide the user community education on using the different tools and applications. | | | | | |
| ***FY 2016 Base 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 to develop new algorithms to detect oceanographic phenomena using various sensor data. Continue software enhancements on algorithms to automatically detect oceanographic phenomena. Continue to integrate algorithms for access over the network. Continue to enhance existing toolsets to provide users robust applications to assist in their daily tasks. Continue evolving training to | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2363 / *Remote Sensing Capability Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| provide the user community education on using the different tools and applications. Coordinate TCPED process amongst inter-agencies to support Navy Missions. Provide Navy leadership status on emerging capabilities.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 4.988 | 2.479 | - | 2.479 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Remote Sensing Capability Development is being managed as a PEO Project leveraging the Rapid Development and Deployment (RDD) construct for rigor and discipline.

**E. Performance Metrics**

Will be developed from the requirements generation phase currently being performed.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | 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 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | TBD | Unknown : Unknown | 0.000 | - | | 3.242 | Feb 2015 | 1.604 | Jan 2016 | - | | 1.604 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 3.242 | | 1.604 | | - | | 1.604 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | TBD | Unknown : Unknown | 0.000 | - | | 1.247 | Feb 2015 | 0.625 | Jan 2016 | - | | 0.625 | - | 1.872 | - |
| | | **Subtotal** | 0.000 | - | | 1.247 | | 0.625 | | - | | 0.625 | - | 1.872 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 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 | - | | 0.250 | Dec 2014 | 0.125 | Oct 2015 | - | | 0.125 | - | 0.375 | - |
| | | **Subtotal** | 0.000 | - | | 0.250 | | 0.125 | | - | | 0.125 | - | 0.375 | - |

**Management Services ($ in Millions)**

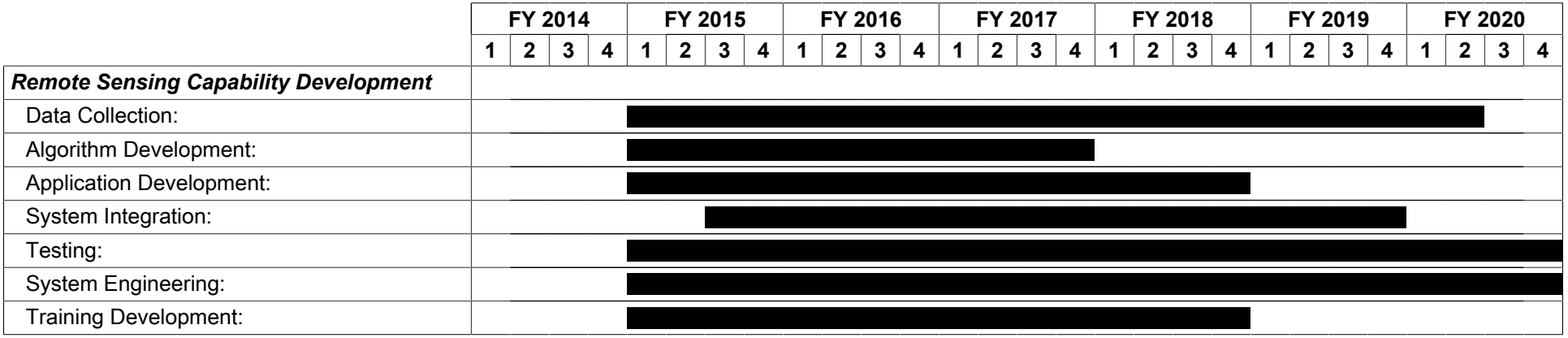
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | C/FP | BAH : Virgina | 0.000 | - | | 0.249 | Feb 2015 | 0.125 | Dec 2015 | - | | 0.125 | - | 0.374 | - |
| | | **Subtotal** | 0.000 | - | | 0.249 | | 0.125 | | - | | 0.125 | - | 0.374 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>2363 / *Remote Sensing Capability Development* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 4.988 | | 2.479 | | - | | 2.479 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>2363 / *Remote Sensing Capability Development* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **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 | 2015 | 2 | 2020 |
| Algorithm Development: | 1 | 2015 | 4 | 2017 |
| Application Development: | 1 | 2015 | 4 | 2018 |
| System Integration: | 3 | 2015 | 4 | 2019 |
| Testing: | 1 | 2015 | 4 | 2020 |
| System Engineering: | 1 | 2015 | 4 | 2020 |
| Training Development: | 1 | 2015 | 4 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>3207 / *Fleet Synthetic Training* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3207: *Fleet Synthetic Training* | 2.559 | 2.750 | 2.263 | 0.993 | - | 0.993 | 1.011 | 1.033 | 1.055 | 1.076 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Fleet Synthetic Training (FST) provides naval forces with an enhanced in-port training capability. Integrating embedded shipboard training devices, aircraft and submarine simulators into an interoperable network with joint, coalition and interagency partners will provide more effective training for our deploying naval forces.

A key factor in achieving this new way of training our naval forces is to ensure that the required training is based on realistic characterizations of the physical environment. This project develops and delivers software that characterizes the ocean and atmospheric environments; adjusts to meet fleet-required training scenarios; allows synthetic training to be conducted in areas of planned and contingency operations; and, provides sufficient detail to simulate the real-world conditions of the physical environment in those areas of interest.

Ballistic Missile Defense (BMD) Fleet Synthetic Training (FST) at sea effort will provide the capability to conduct integrated Live, Virtual and Constructive (LVC) single or multi-ship exercises with ships at sea using the Navy Continuous Training Environment (NCTE). This capability will support BMD mission area Fleet training and mission rehearsal in theater, allow ships to participate in Combatant Command (COCOM) mandated BMD exercises while pierside or underway, as well as enhance BMD training objective accomplishment in current Fleet Requirements Training Plan (FRTP) underway training events such as Composite Training Unit Exercises (COMPTUEX) and Joint Task Force Exercises (JTFEX). The NCTE and FST directly support Fleet training readiness, strike group and BMD platform deployment certifications.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Fleet Synthetic Training | 0.867 | 0.600 | 0.993 | - | 0.993 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop and deliver software that characterizes the ocean and atmospheric environments; adjusts to meet fleet-required training scenarios; allows synthetic training to be conducted in areas of planned and contingency operations; and, provides sufficient detail to simulate the real-world conditions of the physical environment in those areas of interest.<br><br>Accomplishments include development of Meteorological and Oceanographic (METOC) environmental databases for total of 10 of 14 Navy Continuous Training Environment (NCTE) exercise areas. Conducted data and architecture testing between Commander, Navy Information Dominance Forces Command (NAVIDFOR) data and the Environmental Data Cube Support system (EDCSS). Integrated environmental database hosting | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>3207 / *Fleet Synthetic Training* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| at the Naval Oceanographic Office. Developed capability to realistically simulate bathythermograph data collection based on synthetic ocean environment for total of 6 of 14 NCTE areas. Enhanced realism of training environment by providing synthetic satellite/radar imagery based on synthetic enviromental data. Made improvements in generating acoustic performance products used by Anti-Submarine Warfare (ASW) white cell and ASW commander staff. Conducted verification and validation of acoustic performance products.<br><br>United States Fleet Forces and United States Pacific Fleet jointly signed out the Fleet Live, Virtual, and Constructive (LVC) Training Capability Requirement on 31 Jan 2013. The document states that an integrated LVC Training Environment is essential for future force readiness. As such, physical environment efforts are required to be undertaken to meet the desired LVC end state of a seamless training environment that enables robust, realistic, and cost effective training by integrating live, virtual, and constructive training systems to support the effective and efficient generation of maritime forces in support of Combatant Commander requirements.<br><br>Specifically, Live, Virtual, and Constructive simulations each have unique requirements for METOC representation, as well as their Concept of Operations (CONOPS) for its use. The EDCSS is capable of providing a single integrated METOC representation to each simulation in a manner and format uniquely suited to that platform. In addition, EDCSS is source agnostic and can provide such representations from historical reference scenarios or live operational METOC data sources. These capabilities of EDCSS have been previously developed, however their use within LVC federations, most notable NCTE, continues to be defined and as such the final technical approach, deployment and validation must still be accomplished.<br><br>***FY 2014 Accomplishments:***<br>Developed EDCSS production capability at NWDC. Installed hardware, software, commenced integration and began certification and accreditation procedures. Continued assessment of viability to support live virtual and contructive capability. Began work on more realistic depiction of clouds to support Full Motion Video (FMV). Concluded that using Defense Shared Resource Center (DSRC) for Modeling on demand was not a viable option. Developed Modeling on Demand capability resident in new version of Coupled Ocean/Atmosphere Mesoscale Prediction System On Scene (COAMPS-OS).<br><br>***FY 2015 Plans:***<br>* Complete full integration of EDCSS production capability at NWDC.<br>* Complete COAMPS-OS Modeling on Demand. IOC estimated in Q2 FY15. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>3207 / *Fleet Synthetic Training* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Continue work on FMV support.<br>* Convert 17 year HYbrid Coordinate Ocean Model (HYCOM) database to a mineable format.<br>***FY 2016 Base Plans:***<br>* Research/implement live virtual constructive capability.<br>* Develop support for Electromagnetic Spectrum Maneuver Warfare (EMMW) and FMV.<br>* Develop Machine-to-Machine (M2M) capability for EDCSS interface in support of environmental product generation.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Ballistic Missile Defense (BMD) Fleet Synthetic Training (FST) at Sea | 1.883 | 1.663 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop a distributed training capability to provide simulation data via a satellite network to the ship underway to stimulate the combat systems and operators. Coordinate efforts with NAVSEA, SPAWAR, and NAVAIR.<br>***FY 2014 Accomplishments:***<br>* Develop a distributed training capability to provide simulation data via a satellite network to the ship underway to<br>stimulate the combat systems and operators.<br>* Coordinate efforts with Naval Air Warfare Center Training System Division (NAWC TSD) and Naval Surface Warfare Center (NSWC). Develop BMD FST at Sea capability to support BMD Mission Area training and Mission Rehearsal in Theater.<br>***FY 2015 Plans:***<br>* Finalize development, test, certification and demonstration of the capability.<br>* Test and certification of the capability will be conducted FY 2015.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.750 | 2.263 | 0.993 | - | 0.993 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>3207 / *Fleet Synthetic Training* |

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

N/A

**Remarks**

**D. Acquisition Strategy**

The included technology developments are primarily in-house with contractor participation through existing vehicles.

**E. Performance Metrics**

1) NAVIDFOR will produce meteorological and oceanographic environmental databases for all Navy Continuous Training Environment (NCTE) exercise areas. Will implement, test, and integrate with JSAF and other federates in accordance with requirements.

2) NAVIDFOR will complete data and architecture integration, including information assurance compliance for provision of synthetic Meteorological and Oceanographic Command (METOC) data to the NCTE. Data and products will be available via NEP-Oc, DVD and/or Machine-to-Machine (M2M) during planning and execution of FST events.

3) NAVIDFOR will produce products based on synthetic ocean environment and synthetic satellite/radar imagery based on meteorological environmental data for all NCTE exercise areas. Products are utilized in planning and execution of FST events.

4) NWDC, in FY14 will develop prototype capability to provide simulation data to the ship underway to stimulate combat systems and operators.

5) NWDC, in FY15 will finalize development, test, certify, and demonstrate capability for BMD FST at sea.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>3207 / *Fleet Synthetic Training* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | NAWC TSD : Orlando, FL | 0.248 | - | | - | | - | | - | | - | 0.248 | 0.496 | - |
| | | **Subtotal** | 0.248 | - | | - | | - | | - | | - | 0.248 | 0.496 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | WR | NRL / AER : MS / CA / VA | 0.839 | 0.230 | Nov 2013 | 0.600 | Nov 2014 | 0.507 | Nov 2015 | - | | 0.507 | Continuing | Continuing | Continuing |
| Software Development | SS/CPFF | AER / GEOCENT : VA / MS | 0.864 | 0.640 | Jan 2014 | - | | 0.200 | Jan 2016 | - | | 0.200 | Continuing | Continuing | Continuing |
| Configuration Management | WR | AER / GEOCENT : VA / MS | 0.382 | 0.064 | Mar 2014 | - | | 0.201 | Mar 2016 | - | | 0.201 | - | 0.647 | - |
| Studies and Analysis | Various | Various : Various | 0.226 | - | | - | | - | | - | | - | - | 0.226 | - |
| TCSS Development | WR | NAWC TSD : Orlando, FL | 0.000 | 0.350 | Nov 2013 | 0.150 | Nov 2014 | - | | - | | - | - | 0.500 | - |
| TechnologyDevelopment | C/CPFF | Alion Science & Technology : Norfolk, VA | 0.000 | 1.216 | Dec 2013 | 1.513 | Dec 2014 | - | | - | | - | - | 2.729 | - |
| Testing/Certification | WR | NSWC : Dahlgren, VA | 0.000 | 0.250 | Mar 2014 | - | | - | | - | | - | - | 0.250 | - |
| | | **Subtotal** | 2.311 | 2.750 | | 2.263 | | 0.908 | | - | | 0.908 | - | - | - |

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

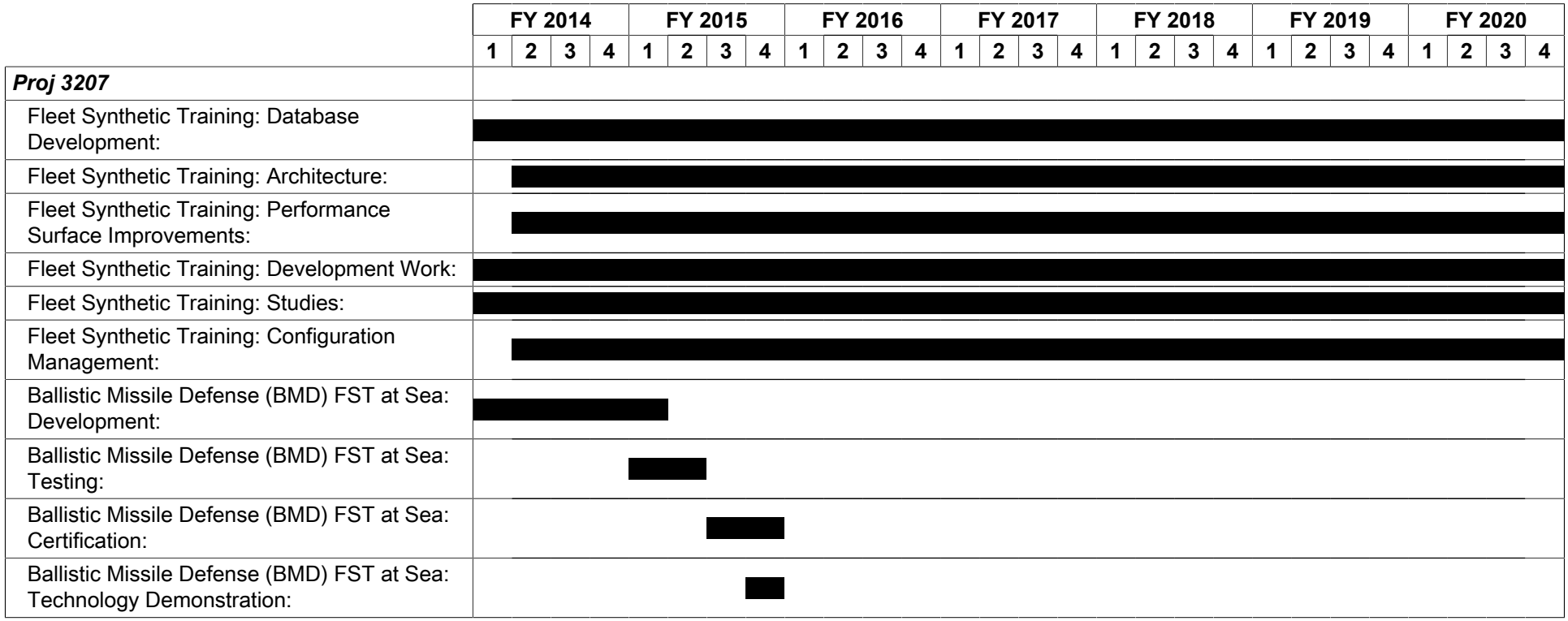
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test and Evaluation | WR | NRL : Monterey, CA | 0.000 | - | | - | | 0.085 | Nov 2015 | - | | 0.085 | - | 0.085 | - |
| | | **Subtotal** | 0.000 | - | | - | | 0.085 | | - | | 0.085 | - | 0.085 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603207N / *Air/Ocean Tactical Applications* | Project (Number/Name)<br>3207 / *Fleet Synthetic Training* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 2.559 | 2.750 | | 2.263 | | 0.993 | | - | | 0.993 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>3207 / *Fleet Synthetic Training* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603207N / *Air/Ocean Tactical Applications* | **Project (Number/Name)**<br>3207 / *Fleet Synthetic Training* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3207*** | | | | |
| Fleet Synthetic Training: Database Development: | 1 | 2014 | 4 | 2020 |
| Fleet Synthetic Training: Architecture: | 2 | 2014 | 4 | 2020 |
| Fleet Synthetic Training: Performance Surface Improvements: | 2 | 2014 | 4 | 2020 |
| Fleet Synthetic Training: Development Work: | 1 | 2014 | 4 | 2020 |
| Fleet Synthetic Training: Studies: | 1 | 2014 | 4 | 2020 |
| Fleet Synthetic Training: Configuration Management: | 2 | 2014 | 4 | 2020 |
| Ballistic Missile Defense (BMD) FST at Sea: Development: | 1 | 2014 | 1 | 2015 |
| Ballistic Missile Defense (BMD) FST at Sea: Testing: | 1 | 2015 | 2 | 2015 |
| Ballistic Missile Defense (BMD) FST at Sea: Certification: | 3 | 2015 | 4 | 2015 |
| Ballistic Missile Defense (BMD) FST at Sea: Technology Demonstration: | 4 | 2015 | 4 | 2015 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603216N *I Aviation Survivability* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 166.963 | 6.637 | 4.325 | 5.404 | - | 5.404 | 6.113 | 6.106 | 6.118 | 6.213 | Continuing | Continuing |
| 0584: *Acft Protective Clothing* | 92.164 | 3.529 | 1.388 | 2.306 | - | 2.306 | 2.838 | 2.814 | 2.758 | 2.799 | Continuing | Continuing |
| 0591: *Acft Survivability, Vulnerability & Safety* | 41.047 | 1.434 | 1.359 | 1.476 | - | 1.476 | 1.538 | 1.549 | 1.582 | 1.601 | Continuing | Continuing |
| 0592: *Acft & Ordnance Safety* | 32.321 | 1.068 | 1.045 | 1.043 | - | 1.043 | 1.129 | 1.131 | 1.154 | 1.177 | Continuing | Continuing |
| 1819: *CV Acft Fire Suppress System* | 1.431 | 0.606 | 0.533 | 0.579 | - | 0.579 | 0.608 | 0.612 | 0.624 | 0.636 | Continuing | Continuing |

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

Aviation Survivability addresses the issues of aircrew and platform survivability, focusing on enhancing overall opportunity for aircrew and platform protection and enhanced performance. The capabilities addressed under this program element counter emerging threats of next generation operational weapons systems and enhance combat effectiveness in future operational mission scenarios.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

The FY 2016 funding request was reduced by $279 thousand to account for the availability of prior year execution balances.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 5.591 | 4.325 | 5.728 | - | 5.728 |
| Current President's Budget | 6.637 | 4.325 | 5.404 | - | 5.404 |
| Total Adjustments | 1.046 | - | -0.324 | - | -0.324 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 1.100 | - | | | |
| • SBIR/STTR Transfer | -0.054 | - | | | |
| • Rate/Misc Adjustments | - | - | -0.324 | - | -0.324 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603216N *I Aviation Survivability* |

**Change Summary Explanation**

Technical: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603216N / *Aviation Survivability* | | | | Project (Number/Name)<br>0584 / *Acft Protective Clothing* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 0584: *Acft Protective Clothing* | 92.164 | 3.529 | 1.388 | 2.306 | - | 2.306 | 2.838 | 2.814 | 2.758 | 2.799 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Project 0584 develops, demonstrates, and validates technologies designed to enhance warfighter performance, protection, mission effectiveness, and survivability. The project addresses life support equipment, advanced helmet vision systems, escape systems technology, crew centered cockpit design, and control stations. Integrate and use alternative and new technologies for the Pilot Vehicle Integration, optimization of Intelligence Surveillance and Reconnaissance (ISR), and Forward Air Control-Air mission areas. Demonstrate innovative tools / approaches to improve situational awareness, new ISR technologies, and Graphical User Interfaces (new symbology and optimized logic for system employment). It responds to a number of operational requirements documents, including OR# 210-05-88 for Chemical and Biological protection, OR# 099-05-087 for Laser Eye Protection, and the joint Air Force/Navy (CAF-208-93) for an Aerospace Control Helmet Mounted Cueing System.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
|---|---|---|---|---|---|
| ***Title:*** Advanced Technology Crew Station | 2.643 | 0.831 | 1.272 | - | 1.272 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continue high resolution and micro display development. Explore development of integrated short wave infrared and near infrared cameras. | | | | | |
| ***FY 2015 Plans:***<br>Continue development and testing of 4+ megapixel cameras and displays. Begin integration into fully digital night vision goggle. Integrate head/neck injury model into protection flight equipment testing. | | | | | |
| ***FY 2016 Base Plans:***<br>Complete integration and development of 4 megapixel sensor, display, and electronics into a new variant of a night vision goggle. Integrated units will be used for environmental and other required testing to ready the capability for transition into safety of flight testing. Begin work on ultra-high resolution displays (20/15 acuity at overcast starlight) and solid state low light sensors. Begin verification and validation of head, neck and spine model for helmet mounted displays and the model's predictive validity of head mounted systems during crash events. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Advanced Integrated Life Support System | 0.886 | 0.557 | 1.034 | - | 1.034 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0584 / *Acft Protective Clothing* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Develop test methodology to assess optical performance of multiple stacked optical elements (e.g., spectacle behind visor on Helmet Mounted Display). Begin integrating anthropometric software and models into modeling for design of optimized protective equipment. Continue working with the Army to document and define methodologies to mitigate head/neck injury.<br>***FY 2015 Plans:***<br>Continue integrating anthropometric software and models into modeling for design of optimized protective equipment. Continue working with the Army to document and define methodologies to mitigate head/neck injury.<br>***FY 2016 Base Plans:***<br>Integrate recently patented stacked optical filter test methodology/device and determine true optical power and limits for helmet mounted systems. Complete and validate indicator of solar degradation on protective eyewear and equipment. Continue development of in-house expertise in digital human modeling and 3D scanning capabilities.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.529 | 1.388 | 2.306 | - | 2.306 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN 4268: *Aviation Support Equipment* | - | 45.705 | 49.773 | - | 49.773 | 48.277 | 48.795 | 49.889 | 64.217 | - | 306.656 |

**Remarks**

**D. Acquisition Strategy**

Primary Hardware Development for the Navy Advanced Technology Crew Station efforts will be performed under a Cost Plus Fixed Fee Indefinite Delivery Indefinite Quantity contract.

**E. Performance Metrics**

Complete development of advanced crashworthy system level models, investigate improved visual search methodologies, and improve the ability to assess cockpit compatibility through new analytic approaches to anthropometry.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0584 / *Acft Protective Clothing* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWCAD : Pax River MD | 32.149 | 0.501 | Dec 2013 | 0.298 | Dec 2014 | 0.539 | Dec 2015 | - | | 0.539 | Continuing | Continuing | Continuing |
| Licenses | WR | NAWCAD : Pax River MD | 1.507 | 0.100 | Dec 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Primary Hardware Development | C/CPFF | Intevac : San Jose CA | 2.990 | 1.628 | Jun 2014 | 0.590 | Jun 2015 | 0.729 | Jun 2016 | - | | 0.729 | - | 5.937 | 5.937 |
| Primary Hardware Development | MIPR | US Army CERDEC : Ft. Belvoir VA | 3.025 | 0.470 | Mar 2014 | 0.140 | Jun 2015 | 0.221 | Jun 2016 | - | | 0.221 | - | 3.856 | 3.856 |
| Prior Year Prod Dev no Longer Funded in Budget Year or Outyears | Various | Various : Various | 21.733 | - | | - | | - | | - | | - | - | 21.733 | - |
| | | **Subtotal** | 61.404 | 2.699 | | 1.028 | | 1.489 | | - | | 1.489 | - | - | - |

**Remarks**

Increase to Primary Hardware Development Intevac contract in FY14 due to BTR in the amount of $1,100 to fund high resolution effort.
Prior year increase to Primary Hardware Development due to FY13 BTR received May 2014 to fund Intevac contract high resolution effort.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Configuration Management | WR | NAWCAD : Pax River MD | 1.934 | 0.110 | Dec 2013 | 0.050 | Dec 2014 | 0.130 | Dec 2015 | - | | 0.130 | Continuing | Continuing | Continuing |
| Prior Year Support no Longer Funded in Budget Year or Outyears | Various | Various : Various | 3.232 | - | | - | | - | | - | | - | - | 3.232 | - |
| | | **Subtotal** | 5.166 | 0.110 | | 0.050 | | 0.130 | | - | | 0.130 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603216N / *Aviation Survivability* | Project (Number/Name)<br>0584 / *Acft Protective Clothing* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWCAD : Pax River MD | 3.830 | 0.387 | Dec 2013 | 0.170 | Dec 2014 | 0.400 | Dec 2015 | - | | 0.400 | Continuing | Continuing | Continuing |
| Prior Year T&E no Longer Funded in Budget Year or Outyears | Various | Various : Various | 18.240 | - | | - | | - | | - | | - | - | 18.240 | - |
| | | **Subtotal** | 22.070 | 0.387 | | 0.170 | | 0.400 | | - | | 0.400 | - | - | - |

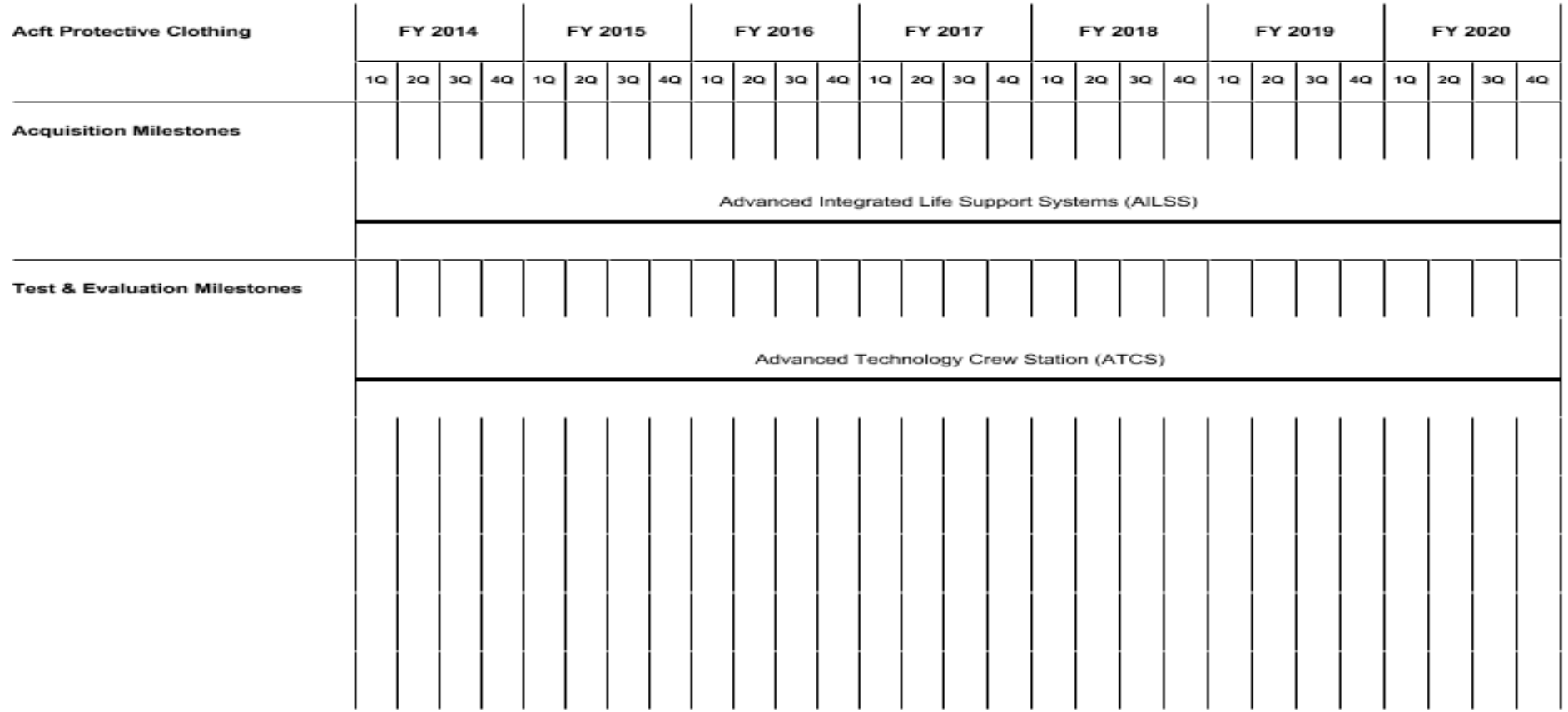
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Pax River MD | 3.108 | 0.303 | Dec 2013 | 0.135 | Dec 2014 | 0.272 | Dec 2015 | - | | 0.272 | Continuing | Continuing | Continuing |
| Travel | PO | NAVAIR : Pax River MD | 0.406 | 0.030 | Oct 2013 | 0.005 | Oct 2014 | 0.015 | Oct 2015 | - | | 0.015 | Continuing | Continuing | Continuing |
| Prior Year Mgmt Svcs no Longer Funded in Budget Year or Outyears | Various | Various : Various | 0.010 | - | | - | | - | | - | | - | - | 0.010 | - |
| | | **Subtotal** | 3.524 | 0.333 | | 0.140 | | 0.287 | | - | | 0.287 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 92.164 | 3.529 | | 1.388 | | 2.306 | | - | | 2.306 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0584 / *Acft Protective Clothing* |




*2016PB - 0603216N - 0584*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0584 / *Acft Protective Clothing* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Acft Protective Clothing*** | | | | |
| Acquisition Milestones: Advanced Integrated Life Support Systems (AILSS) | 1 | 2014 | 4 | 2020 |
| Test & Evaluation Milestones: Advanced Technology Crew Station | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603216N / *Aviation Survivability* | Project (Number/Name)<br>0591 / *Acft Survivability, Vulnerability & Safety* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0591: *Acft Survivability, Vulnerability & Safety* | 41.047 | 1.434 | 1.359 | 1.476 | - | 1.476 | 1.538 | 1.549 | 1.582 | 1.601 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Aircraft Survivability, Vulnerability and Safety. This project develops prototype hardware to improve the survivability of Navy and Marine Corps aircraft. This project addresses the likelihood of an aircraft being hit (susceptibility) and the probability of a kill if the aircraft is hit (vulnerability). Types of programs funded under this project include signature reduction efforts, subsystem and component hardening and development of fire and explosion suppression techniques for fuel systems.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Technology Requirements | 0.111 | 0.194 | 0.090 | - | 0.090 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Planned trade studies include acoustic and infrared signature reduction, rotary wing survivability requirements, threat systems analysis, and biofuels impacts to survivability systems.<br>***FY 2015 Plans:***<br>Planned trade studies include acoustic and infrared signature reduction, rotary wing survivability requirements, threat systems analysis, and updates to the Survivability Master Plan.<br>***FY 2016 Base Plans:***<br>Planned trade studies include threats assessments, rotary wing survivability requirements, and vulnerability assessment of both fixed wing and rotary wing aircraft platforms.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Technology Design & Development | 1.323 | 1.165 | 0.990 | - | 0.990 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Assess technologies to address acoustic and infrared signature reduction of operational platforms. Assess low gloss paint scheme impacts to signature reduction of aircraft. Assess nuclear, biological, and chemical decontamination materials to enhance crew survivability. Develop polymer applications for self-sealing fuel | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0591 / *Acft Survivability, Vulnerability & Safety* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| systems applications that are biofuels-compatible. Assess advancements in lightweight armor technologies for integration onto operational platforms.<br>***FY 2015 Plans:***<br>Assess technologies to address shortfalls identified as part of the OPNAV Aircraft Survivability Investment Strategy project, with emphasis on acoustic and infrared signature reduction of operational platforms. Develop polymer applications for self-sealing fuel and lubricant systems to meet stated operational requirements. Conduct asymmetric threats modeling and analyses based on accumulated combat field assessments.<br>***FY 2016 Base Plans:***<br>Assess technologies to address shortfalls identified as part of the OPNAV Aircraft Survivability Investment Strategy project. Establish an architecture to integrate Aviation Survivability Equipment (ASE) between USN/ USMC aircraft platforms.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Technology Test & Evaluation | - | - | 0.396 | - | 0.396 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Perform live fire testing on polymer-coated hardware. Perform live fire testing on lightweight armor coupon samples. Perform biofuels compatibility testing of polymer samples. Perform testing on signature reduction technologies.<br>***FY 2015 Plans:***<br>Perform testing on candidate signature reduction materials/hardware. Perform testing to validate asymmetric threats modeling results.<br>***FY 2016 Base Plans:***<br>Integration, laboratory and flight testing of prototype hardware in support of the iASE architecture development. Ballistic testing representative sample material against identified threats for incorporation into OASIS models.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.434 | 1.359 | 1.476 | - | 1.476 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0591 / *Acft Survivability, Vulnerability & Safety* |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Primary Hardware Development will be performed under either a Cost Plus Fixed Fee or a Firm Fixed Price contract.

**E. Performance Metrics**

Evaluate 100% of deployed/developmental United States Navy/United States Marine Corp aircraft platforms for survivability deficiencies using Navy gap analysis as baseline. Identify prototype hardware solutions to address 25% to 50% of deficiencies, and initiate a minimum of two new demonstration projects per year.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0591 / *Acft Survivability, Vulnerability & Safety* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWCAD : Pax River, MD | 12.198 | 0.360 | Oct 2013 | 0.236 | Oct 2014 | 0.045 | Oct 2015 | - | | 0.045 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCWD : China Lake, CA | 0.146 | 0.050 | Oct 2013 | 0.050 | Oct 2014 | 0.045 | Oct 2015 | - | | 0.045 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | John Hopkins University : Laurel, MD | 0.000 | 0.225 | Apr 2014 | 0.225 | Apr 2015 | 0.225 | Apr 2016 | - | | 0.225 | - | 0.675 | 0.675 |
| Systems Engineering | MIPR | DTIC : Ft. Belvoir, VA | 0.000 | 0.151 | Jan 2014 | - | | - | | - | | - | - | 0.151 | - |
| Systems Engineering | C/CPFF | ManTech Systems : Fairfax, VA | 0.000 | 0.537 | Mar 2014 | 0.654 | Mar 2015 | 0.675 | Mar 2016 | - | | 0.675 | - | 1.866 | 1.866 |
| Prior Year Prod Dev cost no longer funded in FYDP | Various | Various : Various | 16.705 | - | | - | | - | | - | | - | - | 16.705 | - |
| | | **Subtotal** | 29.049 | 1.323 | | 1.165 | | 0.990 | | - | | 0.990 | - | - | - |

**Remarks**

Planned FY14 Technology Design for $100K will not occur/line deleted.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year Support cost no longer funded in FYDP | Various | Various : Various | 4.569 | - | | - | | - | | - | | - | - | 4.569 | - |
| | | **Subtotal** | 4.569 | - | | - | | - | | - | | - | - | 4.569 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWCAD : Patuxent River, MD | 2.414 | - | | - | | 0.400 | Oct 2015 | - | | 0.400 | - | 2.814 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0591 / *Acft Survivability, Vulnerability & Safety* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year T&E cost no longer funded in FYDP | Various | Various : Various | 2.995 | - | | - | | - | | - | | - | - | 2.995 | - |
| | | **Subtotal** | 5.409 | - | | - | | 0.400 | | - | | 0.400 | - | 5.809 | - |

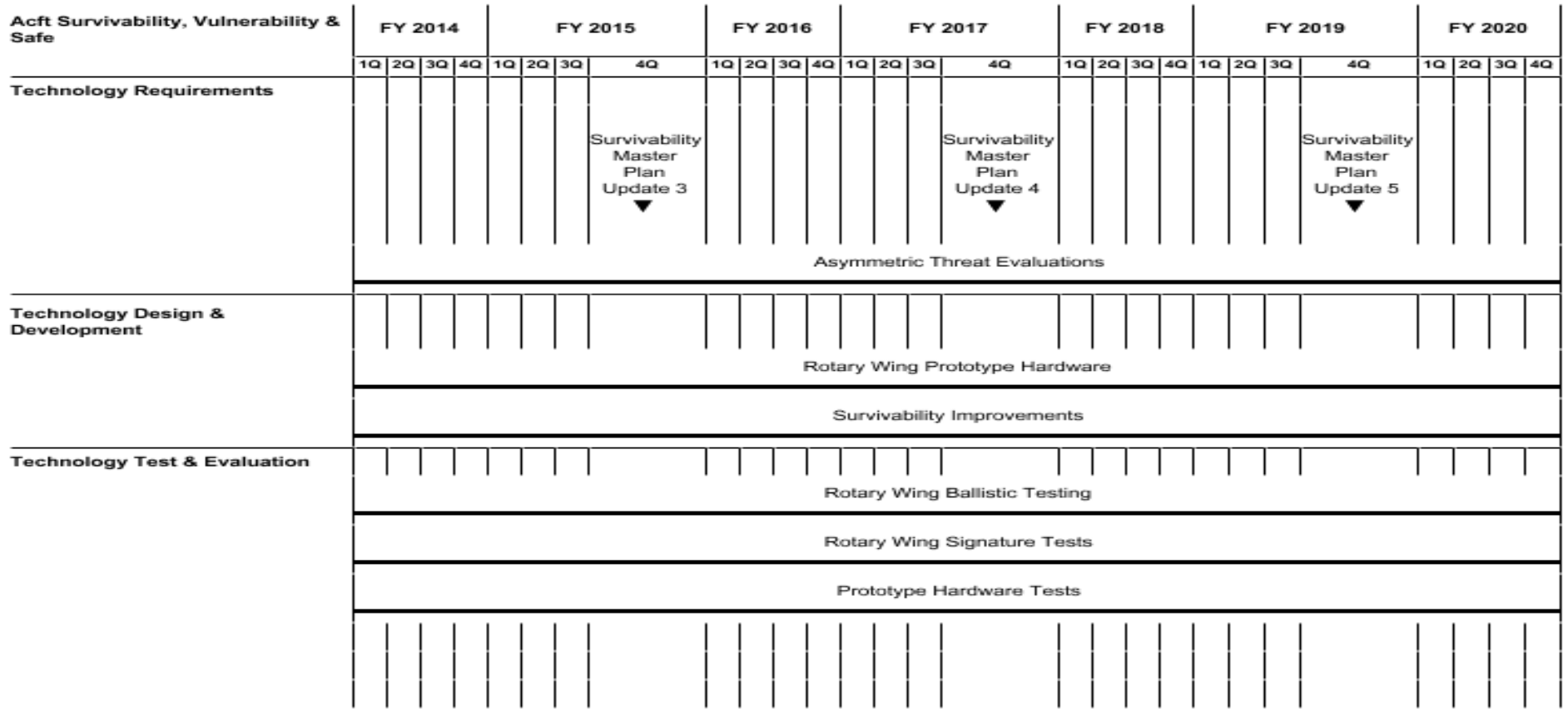
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Pax River, MD | 1.320 | 0.106 | Oct 2013 | 0.189 | Oct 2014 | 0.081 | Oct 2015 | - | | 0.081 | Continuing | Continuing | Continuing |
| Travel | PO | NAVAIR : Patuxent River, MD | 0.360 | 0.005 | Oct 2013 | 0.005 | Oct 2014 | 0.005 | Oct 2015 | - | | 0.005 | Continuing | Continuing | Continuing |
| Prior Year Mgmt cost no longer funded in FYDP | Various | Various : Various | 0.340 | - | | - | | - | | - | | - | - | 0.340 | - |
| | | **Subtotal** | 2.020 | 0.111 | | 0.194 | | 0.086 | | - | | 0.086 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 41.047 | 1.434 | | 1.359 | | 1.476 | | - | | 1.476 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0591 / *Acft Survivability, Vulnerability & Safety* |




*2016PB - 0603216N - 0591*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0591 / *Acft Survivability, Vulnerability & Safety* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Acft Survivability, Vulnerability & Safe*** | | | | |
| Technology Requirements: Survivability Master Plan Update 3 | 4 | 2015 | 4 | 2015 |
| Technology Requirements: Survivability Master Plan Update 4 | 4 | 2017 | 4 | 2017 |
| Technology Requirements: Survivability Master Plan Update 5 | 4 | 2019 | 4 | 2019 |
| Technology Requirements: Asymmetric Threat Evaluations | 1 | 2014 | 4 | 2020 |
| Technology Design & Development: Rotary Wing Prototype Hardware | 1 | 2014 | 4 | 2020 |
| Technology Design & Development: Survivability Improvements | 1 | 2014 | 4 | 2020 |
| Technology Test & Evaluation: Rotary Wing Ballistic Testing | 1 | 2014 | 4 | 2020 |
| Technology Test & Evaluation: Rotary Wing Signature Tests | 1 | 2014 | 4 | 2020 |
| Technology Test & Evaluation: Prototype Hardware Tests | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603216N / *Aviation Survivability* | Project (Number/Name)<br>0592 / *Acft & Ordnance Safety* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0592: *Acft & Ordnance Safety* | 32.321 | 1.068 | 1.045 | 1.043 | - | 1.043 | 1.129 | 1.131 | 1.154 | 1.177 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Aircraft and Ordnance Safety Program transitions innovative munitions safety technology to Navy and Marine Corps air weapons, to comply with the Chief of Naval Operations direction that all munitions carried aboard Navy ships be insensitive to unplanned stimuli (thermal, impact, and shock events). The Aircraft and Ordnance Safety Program also ensures the safety and protection of personnel, aircraft, ships, and operational facilities, through improved precision targeting, fail-safe ordnance, selective effects munitions and shock/blast force protection technologies.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Insensitive Munitions (IM) | 1.068 | 1.045 | 1.043 | - | 1.043 |
| ***Articles:*** | - | - | - | - | - |

***FY 2014 Accomplishments:***

Improve Air-to-Air Demonstration: Continue Sidewinder warhead/rocket motor evaluation in support of PMA 259 FY16 planned transition. Continue IM technology demonstration for metal matrix composite rocket motor IM demonstration.

Improve Air-Launched Weapons: Continue IM technical evaluation/demonstration for Bomb Live Unit (BLU) 110 reactive liner technology with performance enhancement (i.e., cast ductile iron, net explosive transitions from Joint Service IM Technology Program (JIMTP)) in support of current PMA 201 plan of action and milestones in the FY13/14 IM Strategic Plan. Continue minimum smoke propellant demonstration for rockets (transition out of JIMTP).

Advanced Containment/Case/Warhead Materials: Continue Tomahawk Mk 135 hybrid case design/ demonstration with evaluation of baseline propellant and evaluation of new propellant (JIMTP transition) designed to improve slow cook-off and operational performance.

Shock/Blast Barrier Protection Modeling, Demonstration, and Testing: Finalize evaluation of Advanced Anti-Radiation Guided Missiles container and warhead in tactical configuration to establish IM signature, based on current IM test standards, for PMA 242. Initiate evaluation of material structure and design for shape charge jet mitigation.

***FY 2015 Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0592 / *Acft & Ordnance Safety* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Improve Air-to-Air Demonstration: Continue Sidewinder warhead/rocket motor technology risk reduction evaluation in support of PMA 259 FY16 planned block II+/III transition. Continue IM technology evaluation for metal matrix composite rocket motor IM demonstration in support of future Navy rocket transitions.<br><br>Improve Air-Launched Weapons: Continue minimum smoke (MS) propellant demonstration of a cast/cure MS composite propellant that will meet -65 degree requirement for fixed-wing platforms in the current Hellfire configuration. Conduct booster/explosive transition testing and system demonstrations for Joint Service Insensitive Munitions (IM) Technology Program transition explosive for the PMA-201 planned Bomb Live Unit (BLU) 110 upgrade.<br><br>Advanced Containment/Case/Warhead Materials: Initiate a Mk 135 rocket motor nozzle design/demonstration to improve operational performance in the hybrid Mk 135, enabling both improved Insensitive Munitions (IM) and operational performance of the Tomahawk missile.<br><br>Shock/Blast Barrier Protection Modeling, Demonstration, and Testing: Continue shape charge jet (SCJ) barrier evaluation/demonstration for SCJ mitigation in air-launched systems.<br><br>Advanced Energetic Materials: Finalize evaluation of coated explosive material premix for safe production scale manufacture of C-139 explosive (affordable, high-performance IM explosive) and testing for new production research department explosive (elimination of browning effect). | | | | | |
| ***FY 2016 Base Plans:***<br>Improve Air-to-Air Demonstration: Continue Sidewinder warhead/rocket motor technology risk reduction evaluation in support of PMA-259 planned block II+/III transition with high-level group high-performance motor, digital detection initiator, improved multi-layered case warhead design, and radio frequency cook-off sensor. Continue IM technology evaluation for metal matrix composite rocket motor IM demonstration in support of future Navy rocket transitions.<br><br>Improve Air-Launched Weapons: Continue final IM testing/static fire of MS propellant demonstration of a cast/cure MS composite propellant that will meet -65 degree requirement for fixed-wing platforms in the current Hellfire configuration. Conduct IM evaluation of the BLU 110 vented base plug redesign that failed during previous qualification testing. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0592 / *Acft & Ordnance Safety* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Advanced Containment/Case/Warhead Materials: Demonstrate IM performance of the Joint Multiple Effects Warhead System warhead with the redesigned fuze well on the follow-through bomb to enhance survivability during penetration. Initiate an IM evaluation of Mk 135 rocket motor with venting on Mk 14 container used in both shipping and storage of Tomahawk.<br><br>Shock/Blast Barrier Protection Modeling, Demonstration, and Testing: Continue SCJ barrier evaluation/ demonstration for SCJ mitigation in air-launched systems.<br><br>Advanced Energetic Materials: Evaluate a Joint Service Insensitive Munitions (IM) Technology Program (JIMTP) transition new explosive fill for Bomb Live Unit 111 to address Navy unique issues (i.e., irreversible growth, explosive train reliability for a very insensitive main fill, and thermal environments and ullage requirements for the fill to ensure improved IM demonstrated in JIMTP).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.068 | 1.045 | 1.043 | - | 1.043 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

All planned programs are accomplished via civilian labor and use of government testing facilities.

**E. Performance Metrics**

The Aircraft and Ordnance Safety program will initiate six to nine technology development/maturation efforts to improve IM signature and will work to transition those technologies to weapons programs. The weapons programs will be chosen based on PEO(U&W) weapons portfolio and will focus on the priority weapons as defined in the IM strategic plan.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0592 / *Acft & Ordnance Safety* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWCWD : China Lake, CA | 32.313 | 1.068 | Nov 2013 | 1.045 | Nov 2014 | 1.043 | Oct 2015 | - | | 1.043 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 32.313 | 1.068 | | 1.045 | | 1.043 | | - | | 1.043 | - | - | - |

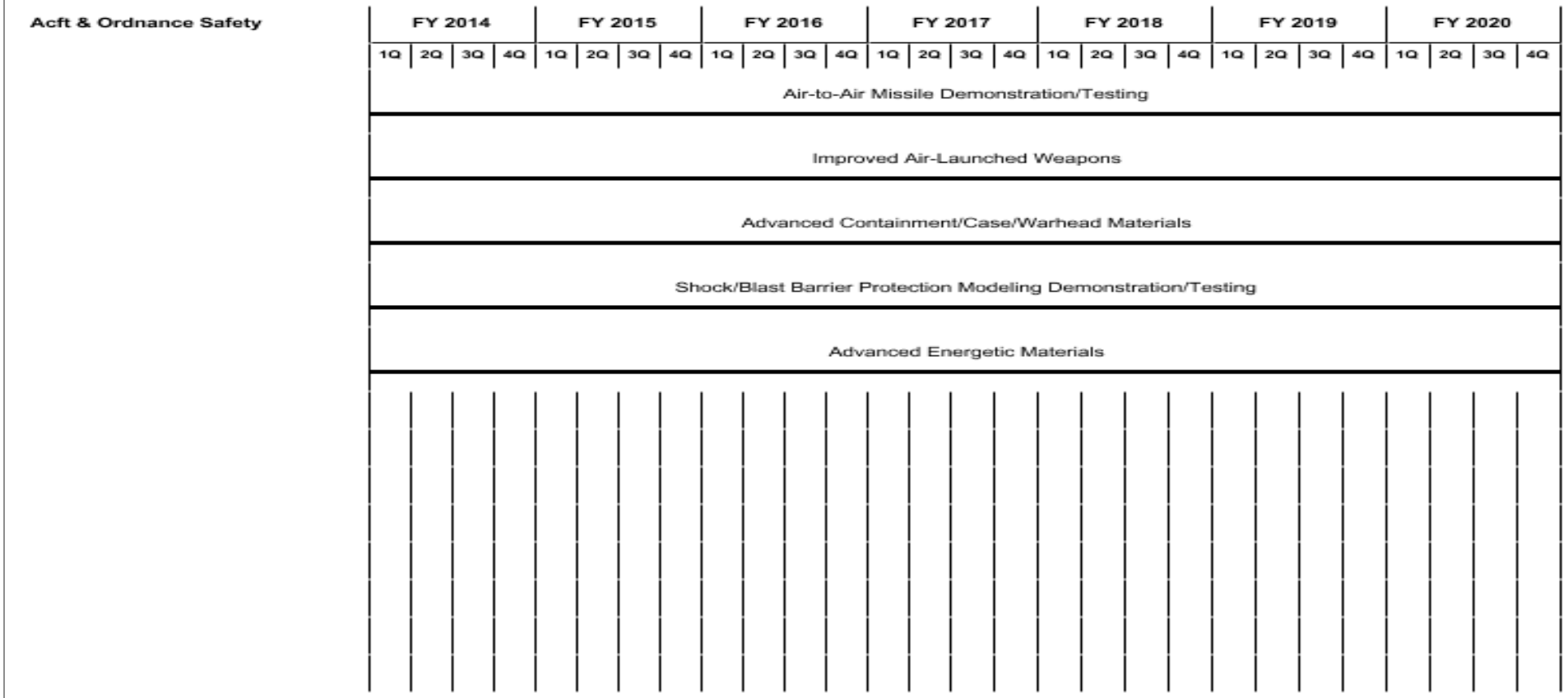
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year Mgmt no longer funded in FYDP | Various | Various : Various | 0.008 | - | | - | | - | | - | | - | - | 0.008 | - |
| | | **Subtotal** | 0.008 | - | | - | | - | | - | | - | - | 0.008 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 32.321 | 1.068 | | 1.045 | | 1.043 | | - | | 1.043 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0592 / *Acft & Ordnance Safety* |




*2016PB - 0603216N - 0592*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>0592 / *Acft & Ordnance Safety* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Acft & Ordnance Safety*** | | | | |
| Air-to-Air Missile Demonstration/Testing | 1 | 2014 | 4 | 2020 |
| Improved Air-Launched Weapons | 1 | 2014 | 4 | 2020 |
| Advanced Containment/Case/Warhead Materials | 1 | 2014 | 4 | 2020 |
| Shock/Blast Barrier Protection Modeling Demonstration/Testing | 1 | 2014 | 4 | 2020 |
| Advanced Energetic Materials | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603216N / *Aviation Survivability* | Project (Number/Name)<br>1819 / *CV Acft Fire Suppress System* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1819: *CV Acft Fire Suppress System* | 1.431 | 0.606 | 0.533 | 0.579 | - | 0.579 | 0.608 | 0.612 | 0.624 | 0.636 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project develops improved fire-fighting systems and fire protective measures for aircraft-related fires on aircraft carriers, including assessment of fire properties, definition of fire threats, improvements to fire-fighting agents and delivery systems, fire detection and suppression system performance evaluations, and fire-fighter training improvements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Fire-Fighting | 0.606 | 0.533 | 0.579 | - | 0.579 |
| ***Articles:*** | - | - | - | - | - |

***FY 2014 Accomplishments:***

Conclude research to prevent aircraft loss due to Li-ion battery runaway casualty. Conclude development of guidance for crash and fire on large-frame unmanned air vehicle (Navy Unmanned Combat Air System). Conclude development of composite filtering flash hood. Study hazards and develop guidance for hot refuel of helicopters using zodiac bags. Analyze and quantify risk to flight deck firefighters from weapons in mishap scenarios. Perform risk analysis tools survey and capability gap assessment in support of mishap scenario task.

***FY 2015 Plans:***

Continue research to prevent aircraft loss and ship storage concerns due to Li-ion battery runaway casualty. Conclude research into thermal imaging camera usage in weapons cooling analysis and provide guidance for flight deck usage and training. Conduct research and testing of lightweight aircraft tiedown chains. Continue work on Electromagnetic Aircraft Launch Systems (EMALS) fire suppression procedures and equipment. Conduct research into commercial product or development to replace the existing flight deck crash-fire-rescue boot. Continue research into finding battery-operated rescue saw. Continue research and testing for development of procedures and training for helicopter rollover rescue aboard air-capable ships.

***FY 2016 Base Plans:***

Continue support for Naval Air Training and Operating Procedures Standardization improvements, and modeling and simulation for fire prediction. Complete the purple K efficiency based on particle size testing and industry assessment. Continue monitoring aqueous film forming foam developments and other clean agents. Continue to develop improved protocols for helicopter roll-over crashes, and evaluate equipment improvements for saws,

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>1819 / *CV Acft Fire Suppress System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| spreaders, and other improvements. Evaluate flash-hood and crash-fire-rescue face shield improvements. Determine final requirements and business case for eye protection for metal and ordnance fires. Continue to monitor and recommend EMALS fire doctrine, Carrier Fixed Wing Aircraft Nuclear hangar bay conflagration management system operations, and unmanned carrier-launched airborne surveillance and strike firefighting operations impacts. Evaluate and develop the protocols to mitigate the risks of mixed fuels on-board carriers. Prioritize highest payoff areas on carriers and other vessels that will lead to the development of automation systems to reduce manning.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.606 | 0.533 | 0.579 | - | 0.579 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

This is a non-ACAT program. Procurement strategy is determined by market survey and cooperative opportunities.

**E. Performance Metrics**

The Carrier Aircraft Fire Suppression (CAFS) program will, at a minimum, fund six to ten projects per year that investigate and evaluate tactical capability gaps and potential capability improvements regarding shipboard aircraft fire suppression doctrine and equipment. CAFS projects will have a greater than 90% success rate of insertion into Department of the Navy shipboard aircraft fire-fighting procedures and documentation.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603216N / *Aviation Survivability* | Project (Number/Name)<br>1819 / *CV Acft Fire Suppress System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | C/CPFF | Thomas Associates : Stevensville, MD | 0.170 | 0.050 | Nov 2013 | - | | - | | - | | - | - | 0.220 | 0.220 |
| Systems Engineering | C/CPFF | ICI : Virginia Beach, VA | 0.000 | - | | 0.020 | Dec 2014 | - | | - | | - | - | 0.020 | 0.020 |
| Systems Engineering | WR | NAWCWD : China Lake, CA | 0.000 | - | | - | | 0.083 | Oct 2015 | - | | 0.083 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | Hughes Associates : Baltimore, MD | 0.000 | - | | - | | 0.046 | Nov 2015 | - | | 0.046 | - | 0.046 | 0.046 |
| Systems Engineering | WR | NSWC : Philadelphia, PA | 0.000 | - | | - | | 0.025 | Oct 2015 | - | | 0.025 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | AVW : Chesapeake, VA | 0.000 | - | | - | | 0.051 | Nov 2015 | - | | 0.051 | - | 0.051 | 0.051 |
| | | **Subtotal** | 0.170 | 0.050 | | 0.020 | | 0.205 | | - | | 0.205 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Support | C/CPFF | ICI : Virginia Beach, VA | 0.070 | 0.035 | Feb 2014 | - | | 0.045 | Nov 2015 | - | | 0.045 | - | 0.150 | 0.150 |
| Engineering Support | C/CPFF | Thomas Associates : Stevensville, MD | 0.000 | - | | 0.040 | Dec 2014 | - | | - | | - | - | 0.040 | 0.040 |
| Engineering Support | WR | NAWCWD : China Lake, CA | 0.000 | - | | - | | 0.098 | Oct 2015 | - | | 0.098 | Continuing | Continuing | Continuing |
| Engineering Support | C/CPFF | Hughes Associates : Baltimore, MD | 0.000 | - | | - | | 0.051 | Nov 2015 | - | | 0.051 | - | 0.051 | 0.051 |
| Engineering Support | WR | NSWC : Philadelphia, PA | 0.000 | - | | - | | 0.035 | Oct 2015 | - | | 0.035 | Continuing | Continuing | Continuing |
| Engineering Support | C/CPFF | AVW : Chesapeake, VA | 0.000 | - | | - | | 0.020 | Nov 2015 | - | | 0.020 | - | 0.020 | 0.020 |
| | | **Subtotal** | 0.070 | 0.035 | | 0.040 | | 0.249 | | - | | 0.249 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603216N / *Aviation Survivability* | Project (Number/Name)<br>1819 / *CV Acft Fire Suppress System* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technology Test & Evaluation | WR | NAWCWD : China Lake, CA | 0.618 | 0.250 | Dec 2013 | 0.253 | Oct 2014 | 0.080 | Oct 2015 | - | | 0.080 | Continuing | Continuing | Continuing |
| Technology Test & Evaluation | WR | NSWC : Philadelphia, PA | 0.084 | 0.070 | Dec 2013 | 0.052 | Oct 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Technology Test & Evaluation | C/CPFF | Thomas Associates : Stevensville, MD | 0.088 | 0.050 | Feb 2014 | 0.035 | Dec 2014 | - | | - | | - | - | 0.173 | 0.173 |
| Technology Test & Evaluation | C/FFP | Hughes Associates : Baltimore, MD | 0.270 | 0.145 | Nov 2013 | 0.118 | Dec 2014 | 0.020 | Nov 2015 | - | | 0.020 | - | 0.553 | 0.553 |
| Technology Test & Evaluation | C/CPFF | AVW : Chesapeake, VA | 0.000 | - | | - | | 0.020 | Nov 2015 | - | | 0.020 | - | 0.020 | 0.020 |
| | | **Subtotal** | 1.060 | 0.515 | | 0.458 | | 0.120 | | - | | 0.120 | - | - | - |

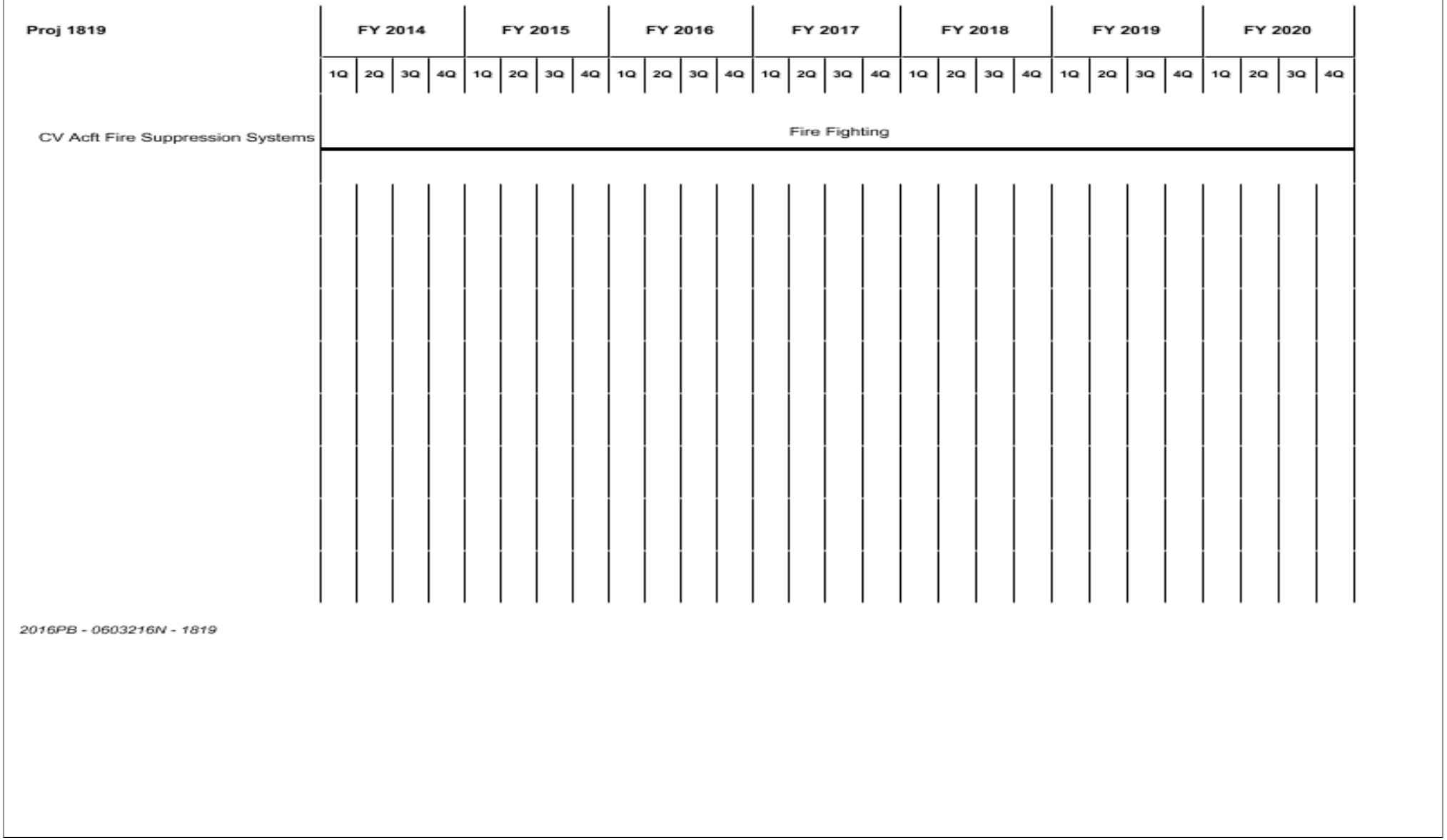
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management | WR | NAWCWD : China Lake, CA | 0.131 | 0.006 | Dec 2013 | 0.015 | Oct 2014 | 0.005 | Oct 2015 | - | | 0.005 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.131 | 0.006 | | 0.015 | | 0.005 | | - | | 0.005 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1.431 | 0.606 | | 0.533 | | 0.579 | | - | | 0.579 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>1819 / *CV Acft Fire Suppress System* |




*2016PB - 0603216N - 1819*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603216N / *Aviation Survivability* | **Project (Number/Name)**<br>1819 / *CV Acft Fire Suppress System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1819*** | | | | |
| CV Acft Fire Suppression Systems: Fire Fighting | 1 | 2014 | 4 | 2020 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603237N *I Deployable JT Cmd & Control* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 224.663 | 3.195 | 2.991 | 3.086 | - | 3.086 | 3.120 | 3.188 | 3.270 | 3.335 | 86.713 | 333.561 |
| 3050: *Deployable JT Command and Control* | 224.663 | 3.195 | 2.991 | 3.086 | - | 3.086 | 3.120 | 3.188 | 3.270 | 3.335 | 86.713 | 333.561 |

**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.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 3.262 | 2.991 | 3.101 | - | 3.101 |
| Current President's Budget | 3.195 | 2.991 | 3.086 | - | 3.086 |
| Total Adjustments | -0.067 | - | -0.015 | - | -0.015 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.067 | - | | | |
| • Rate/Misc Adjustments | - | - | -0.015 | - | -0.015 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603237N / *Deployable JT Cmd & Control* | Project (Number/Name)<br>3050 / *Deployable JT Command and Control* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3050: *Deployable JT Command and Control* | 224.663 | 3.195 | 2.991 | 3.086 | - | 3.086 | 3.120 | 3.188 | 3.270 | 3.335 | 86.713 | 333.561 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**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); rather, DJC2 employs a GCCS in its suite of applications, ensuring interoperability with the worldwide-installed base of GCCS-J.

FY16 funds 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 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Systems Engineering & Integration | 1.258 | 1.164 | 1.240 | - | 1.240 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Provided system enhancements to C2, developed solutions to extend Unified Communication Requirements to DJC2, and developed an Internet Protocol (IP) Satellite Communication (SATCOM) failover capability. Validated solutions through regression testing and participated in operational exercise as a risk reduction effort. Obtained prototype equipment and conducted trade studies per the system engineering guidelines. Conducted engineering design reviews and prepared Engineering Change Proposals and Integrated Logistic Support (ILS) products as required. | | | | | |
| ***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603237N / *Deployable JT Cmd & Control* | **Project (Number/Name)**<br>3050 / *Deployable JT Command and Control* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue to undertake development efforts for the infrastructure and communication subsystems as well as information technology enhancements. Additionally, obsolescence and security posture enhancements will be addressed.<br>***FY 2016 Base Plans:***<br>Continue development efforts of emerging cyber security technologies and new deployable capabilities to meet the warfighter needs.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** DJC2 RDT&E Test Bed | 1.937 | 1.827 | 1.846 | - | 1.846 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Developed and tested software improvements to increase performance and security posture of system. Validated through regression testing to support fielding decision. Developed, designed and integrated new information technology into DJC2. Evaluated options for a mobile Collaborative Information Environment (CIE) architecture to allow the use of tablets or other mobile devices within the DJC2 system.<br>***FY 2015 Plans:***<br>Continue to incorporate fixes to the network system and validate through regression testing to support fielding decisions. Develop, design and integrate new information technology into the DJC2. Use DJC2 test bed for software testing and development of new capabilities.<br>***FY 2016 Base Plans:***<br>Continue to develop, design and integrate new information technology into the DJC2 in order to facilitate virtualization. Continue to use DJC2 test bed for software testing and development of new capabilities.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.195 | 2.991 | 3.086 | - | 3.086 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN /2804: *DJC2* | 3.249 | 1.205 | 2.254 | - | 2.254 | 1.083 | 2.257 | 2.326 | 2.375 | 141.571 | 313.269 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603237N / *Deployable JT Cmd & Control* | **Project (Number/Name)**<br>3050 / *Deployable JT Command and Control* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**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. 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.

**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 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603237N / *Deployable JT Cmd & Control* | 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 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NSWC : PCD | 47.499 | 0.778 | Dec 2013 | 0.717 | Dec 2014 | 0.965 | Dec 2015 | - | | 0.965 | 21.060 | 71.019 | - |
| Engineering Facility Development | WR | NSWC : PCD | 35.933 | 0.930 | Dec 2013 | 0.867 | Dec 2014 | 0.547 | Dec 2015 | - | | 0.547 | 31.135 | 69.412 | - |
| Hardware Development | WR | NSWC : PCD | 20.994 | 0.453 | Dec 2013 | 0.383 | Dec 2014 | 0.529 | Dec 2015 | - | | 0.529 | 7.270 | 29.629 | - |
| | | **Subtotal** | 104.426 | 2.161 | | 1.967 | | 2.041 | | - | | 2.041 | 59.465 | 170.060 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Integration | WR | NSWC : PCD | 40.948 | 0.547 | Dec 2013 | 0.546 | Dec 2014 | 0.557 | Dec 2015 | - | | 0.557 | 4.783 | 47.381 | - |
| Technical Investigations | MIPR | MISC : VA | 13.426 | - | | - | | - | | - | | - | - | 13.426 | - |
| Trade-off Studies & Analyses | MIPR | MISC : VA | 9.000 | - | | - | | - | | - | | - | - | 9.000 | - |
| | | **Subtotal** | 63.374 | 0.547 | | 0.546 | | 0.557 | | - | | 0.557 | 4.783 | 69.807 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NSWC : PCD | 10.405 | 0.139 | Dec 2013 | 0.150 | Dec 2014 | 0.153 | Dec 2015 | - | | 0.153 | 6.170 | 17.017 | - |
| Operational Test & Evaluation | WR | NSWC : PCD | 11.656 | 0.151 | Dec 2013 | 0.144 | Dec 2014 | 0.147 | Dec 2015 | - | | 0.147 | 7.365 | 19.463 | - |
| Test Assets | MIPR | MISC : MISC | 4.000 | - | | - | | - | | - | | - | - | 4.000 | - |
| | | **Subtotal** | 26.061 | 0.290 | | 0.294 | | 0.300 | | - | | 0.300 | 13.535 | 40.480 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603237N / *Deployable JT Cmd & Control* | Project (Number/Name)<br>3050 / *Deployable JT Command and Control* | |

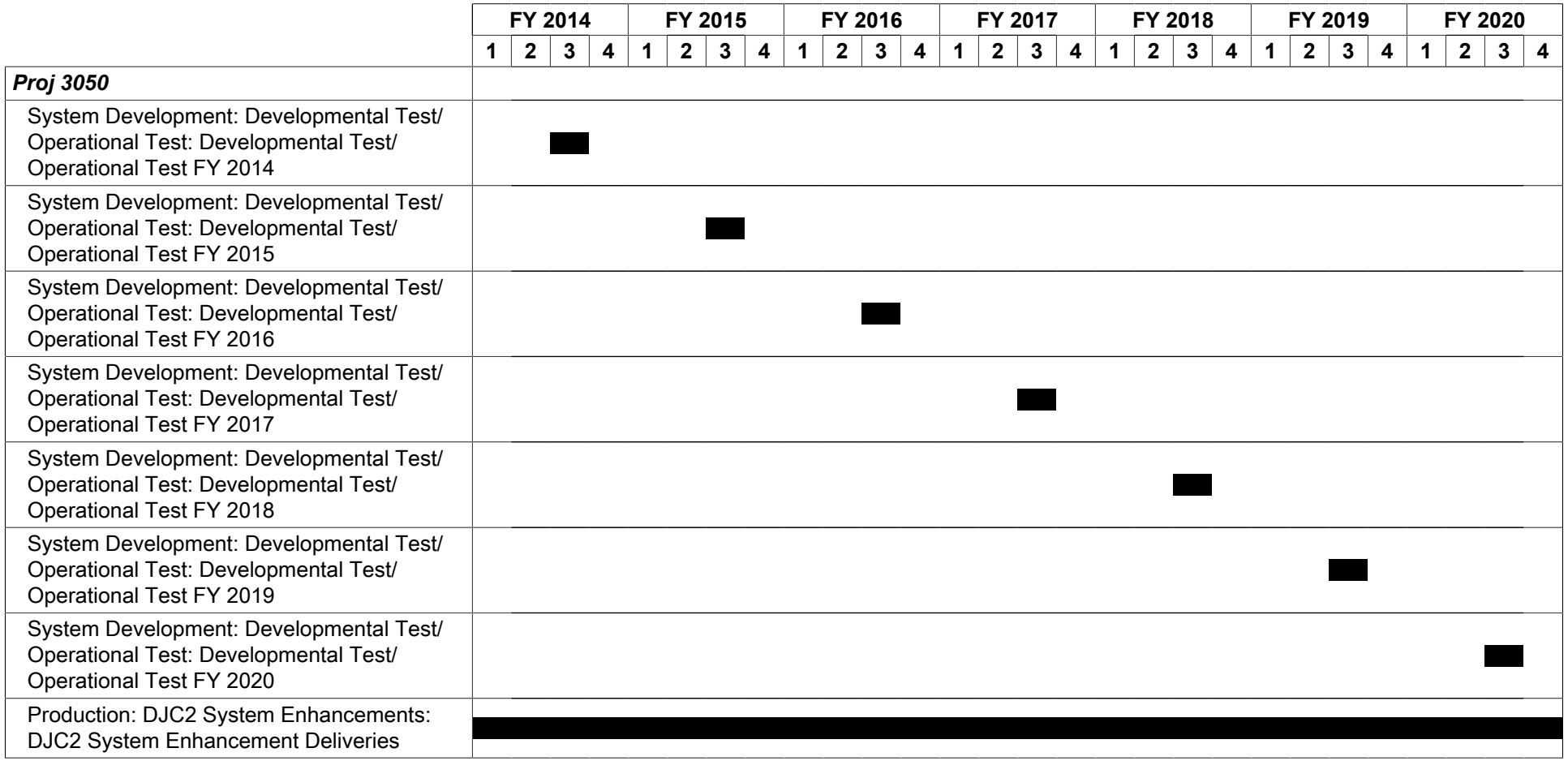
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NSWC : PCD | 30.773 | 0.197 | Dec 2013 | 0.184 | Dec 2014 | 0.188 | Dec 2015 | - | | 0.188 | 12.291 | 43.633 | - |
| Acquisition Work Force | WR | NSWC : PCD | 0.029 | - | | - | | - | | - | | - | - | 0.029 | - |
| | | **Subtotal** | 30.802 | 0.197 | | 0.184 | | 0.188 | | - | | 0.188 | 12.291 | 43.662 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 224.663 | 3.195 | | 2.991 | | 3.086 | | - | | 3.086 | 90.074 | 324.009 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603237N / *Deployable JT Cmd & Control* | **Project (Number/Name)**<br>3050 / *Deployable JT Command and Control* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603237N / *Deployable JT Cmd & Control* | **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: Developmental Test/ Operational Test FY 2014 | 3 | 2014 | 3 | 2014 |
| System Development: Developmental Test/Operational Test: Developmental Test/ Operational Test FY 2015 | 3 | 2015 | 3 | 2015 |
| System Development: Developmental Test/Operational Test: Developmental Test/ Operational Test FY 2016 | 3 | 2016 | 3 | 2016 |
| System Development: Developmental Test/Operational Test: Developmental Test/ Operational Test FY 2017 | 3 | 2017 | 3 | 2017 |
| System Development: Developmental Test/Operational Test: Developmental Test/ Operational Test FY 2018 | 3 | 2018 | 3 | 2018 |
| System Development: Developmental Test/Operational Test: Developmental Test/ Operational Test FY 2019 | 3 | 2019 | 3 | 2019 |
| System Development: Developmental Test/Operational Test: Developmental Test/ Operational Test FY 2020 | 3 | 2020 | 3 | 2020 |
| Production: DJC2 System Enhancements: DJC2 System Enhancement Deliveries | 1 | 2014 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603251N *I (U)AIRCRAFT SYSTEMS* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 31.838 | 10.072 | 12.651 | 11.643 | - | 11.643 | 1.735 | 0.771 | 0.886 | 1.676 | Continuing | Continuing |
| 2777: *Highly Integrated Photonics (HIP)* | 17.724 | - | 10.000 | 9.920 | - | 9.920 | - | - | - | - | - | 37.644 |
| 3331: *C-2 System Development* | 14.114 | 0.072 | 2.651 | 1.723 | - | 1.723 | 1.735 | 0.771 | 0.886 | 1.676 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 10.000 | - | - | - | - | - | - | - | - | - | 10.000 |

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

This program element supports the study, evaluation, optimization and enhancements of fielded aircraft systems not supported by a system specific Research, Development, Test and Evaluation, Navy program element. The supported efforts will provide a basis to recommend options for improved efficiency, minimization of life cycle cost, and other affordable options. As naval aircraft systems age, and analysis of the programmatic and /or reliability enhancements options allows the Department of the Navy to more effectively understand and manage system lifecycle costs and implications in future airborne platforms.

This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 10.074 | 12.651 | 10.000 | - | 10.000 |
| Current President's Budget | 10.072 | 12.651 | 11.643 | - | 11.643 |
| Total Adjustments | -0.002 | - | 1.643 | - | 1.643 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.002 | - | | | |
| • Program Adjustments | - | - | 4.160 | - | 4.160 |
| • Rate/Misc Adjustments | - | - | -2.517 | - | -2.517 |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2014 | FY 2015 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Highly Integrated Photonics (HIP) - Cong* | 10.000 | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603251N *I (U)AIRCRAFT SYSTEMS* |

**Congressional Add Details ($ in Millions, and Includes General Reductions)**

| | FY 2014 | FY 2015 |
|---|---|---|
| Congressional Add Subtotals for Project: 9999 | 10.000 | - |
| Congressional Add Totals for all Projects | 10.000 | - |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not Applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | Project (Number/Name)<br>2777 / *Highly Integrated Photonics (HIP)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2777: *Highly Integrated Photonics (HIP)* | 17.724 | - | 10.000 | 9.920 | - | 9.920 | - | - | - | - | - | 37.644 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

FY14 Congressional Add 2777C is applicable to the project schedule.

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

This program element supports the requirements study, technology maturation, system design and demonstration of a general-purpose, future-proof avionics network that replaces copper with glass. As both analog and digital onboard information transport and processing requirements continue to grow, life cycle costs associated with maintaining and upgrading current stove-piped networks aboard naval aircraft systems becomes unsustainable. The size, weight, power, high data rate and scalability advantages of a single-mode fiber optic network have significant total ownership cost savings implications that will allow the Department of the Navy to more affordably and effectively meet mission requirements well into the future. The activities funded will provide a networking baseline or standard that can be incorporated into airborne platforms that maximize networking system capability while minimizing associated life cycle costs. While the development under this program does specifically address airborne platforms where size and weight of the cable plant is particularly important, ultimately the network technology developed will have broad applicability to shipboard and submarine platform network requirements as well.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Highly Integrated Photonics Naval Networking | - | 10.000 | 9.920 | - | 9.920 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The overarching objective of this activity is to develop and demonstrate a highly integrated Local Area Network for airborne platforms incorporating an optical fiber network that uses wavelength division multiplexing (WDM) to address demanding military network re-configurability, scalability, and technology refresh challenges. The telecommunication network application of WDM technology is fully mature for commercial environments with little constraint on size, weight, and power (SWAP). The program will leverage and enhance the telecommunication standards for optical fiber networks while addressing the SWAP restrictions and severe environmental requirements of military airborne platforms. The functionality of the technology developed cannot be obtained through Commercial-Off-The-Shelf components due to SWAP constraints and the military environment. Effort will involve understanding the properties of engineered optical fiber components and electronic semiconductors as they apply to highly integrated optical fiber networks. Ultimately these higher performance components and networks will address the needs for all classes of military platforms. | | | | | |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>2777 / *Highly Integrated Photonics (HIP)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2015 Plans:***<br>Continue development and demonstration of highly integrated local area network for naval platforms. Fabrication of hardware, integration, and start of testing in platform representative environments. Testing will include engineering unit testing, integration for risk reductions, and environmental testing of the link components.<br>***FY 2016 Base Plans:***<br>Continue development and testing of components for Technology Readiness Level Six assessment in aircraft System Integration Lab environments. Begin initial flight testing of links to establish readiness for transition to platform/systems applications at acceptable risks.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 10.000 | 9.920 | - | 9.920 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Highly Integrated Photonics Naval Networking strategy began as a joint effort with Defense Advanced Research Projects Agency for development and demonstration of Analog and Digital Wavelength Division Multiplex Highly Integrated Photonics for aviation applications with the focus being a future technology refresh for the F-35 and, as an enterprise level technology, other applications. Funding extends the development and technology maturation to a technology/manufacturing readiness level compatible with transition to one, or more, Program(s) of Record.

**E. Performance Metrics**

Performance that adheres to the conventional Wavelength Division Multiplex optical network protocol standards, wavelengths and interface with Ethernet 10Gbit/s, MIL-STD-1553, and other protocols running concurrently on one or more single-mode fibers along with analog signals. Each critical component has a set of physical, environmental, and operational requirements driven by representative platform, systems, and operational metrics. Includes testing in a Systems/Software Integration Laboratory and in test aircraft.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | Project (Number/Name)<br>2777 / *Highly Integrated Photonics (HIP)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental and Architectural Studies | C/FFP | APIC Corp : Culver, CA | 0.500 | - | | 1.600 | Dec 2014 | 0.400 | Dec 2015 | - | | 0.400 | - | 2.500 | 2.500 |
| Primary Hardware Development | C/FFP | APIC Corp : Culver, CA | 1.830 | - | | 2.700 | Dec 2014 | 2.200 | Dec 2015 | - | | 2.200 | - | 6.730 | 6.730 |
| Component Foundry & Fabrication | C/FFP | APIC Corp : Culver, CA | 11.753 | - | | 3.300 | Dec 2014 | 3.600 | Dec 2015 | - | | 3.600 | - | 18.653 | 18.653 |
| Systems Engineering & Testing | C/FFP | APIC Corp : Culver, CA | 2.386 | - | | 0.980 | Dec 2014 | 2.800 | Dec 2015 | - | | 2.800 | - | 6.166 | 6.166 |
| Systems Engineering | WR | SPAWARSYSCEN : San Diego, CA | 0.000 | - | | 0.150 | Nov 2014 | - | | - | | - | - | 0.150 | - |
| Systems Engineering | WR | NRL : Washington, DC | 0.000 | - | | 0.250 | Dec 2014 | - | | - | | - | - | 0.250 | - |
| | | **Subtotal** | 16.469 | - | | 8.980 | | 9.000 | | - | | 9.000 | - | 34.449 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | NAWCAD : Pax River, MD | 0.855 | - | | 0.750 | Oct 2014 | 0.750 | Oct 2015 | - | | 0.750 | - | 2.355 | Continuing |
| | | **Subtotal** | 0.855 | - | | 0.750 | | 0.750 | | - | | 0.750 | - | 2.355 | - |

**Management Services ($ in Millions)**

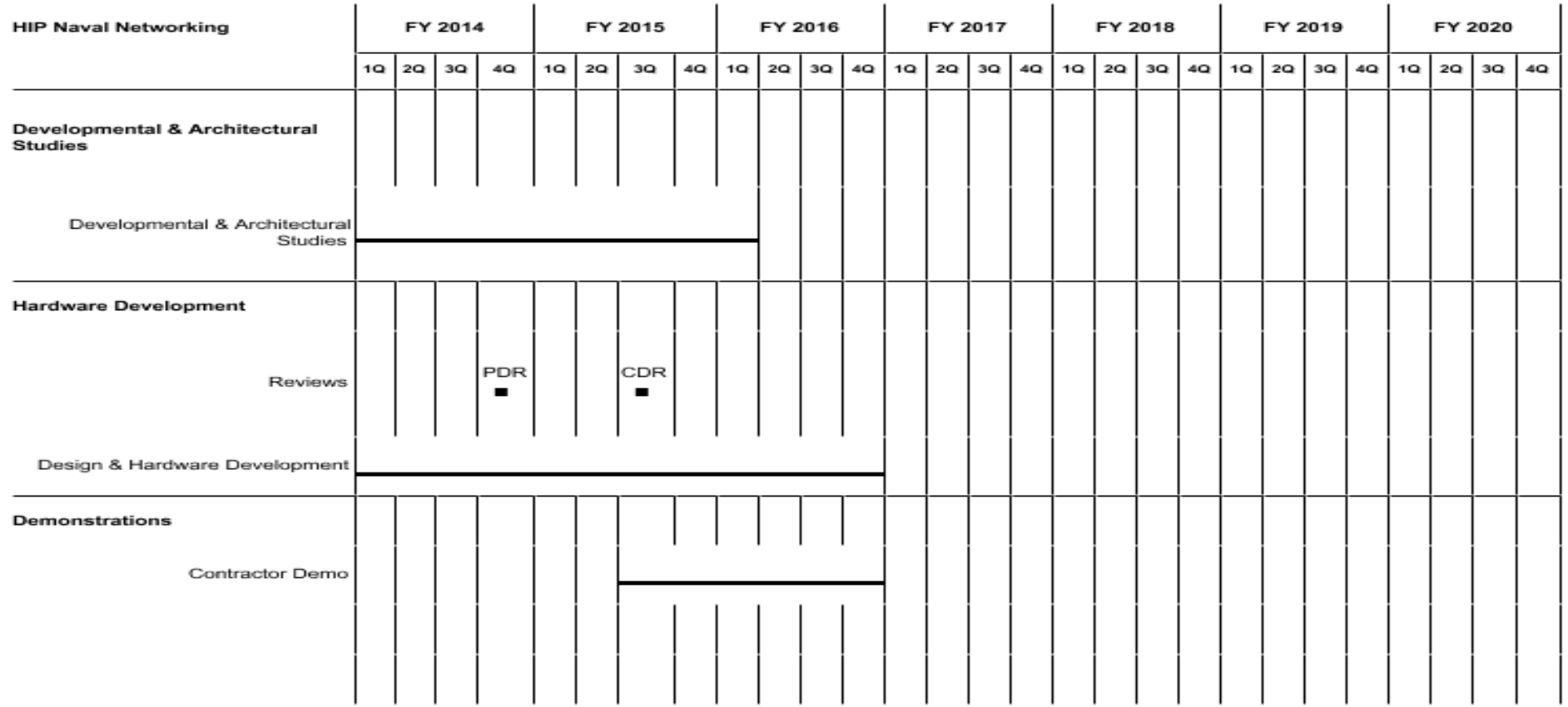
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management | WR | NAWCAD : Pax River, MD | 0.400 | - | | 0.270 | Oct 2014 | 0.170 | Oct 2015 | - | | 0.170 | - | 0.840 | Continuing |
| | | **Subtotal** | 0.400 | - | | 0.270 | | 0.170 | | - | | 0.170 | - | 0.840 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | Project (Number/Name)<br>2777 / *Highly Integrated Photonics (HIP)* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 17.724 | - | | 10.000 | | 9.920 | | - | | 9.920 | - | 37.644 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>2777 / *Highly Integrated Photonics (HIP)* |




2016PB - 0603251N - 2777

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>2777 / *Highly Integrated Photonics (HIP)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***HIP Naval Networking*** | | | | |
| Developmental & Architectural Studies: Developmental & Architectural Studies: | 1 | 2014 | 1 | 2016 |
| Hardware Development: Reviews: Primary | 4 | 2014 | 4 | 2014 |
| Hardware Development: Reviews: CDR | 3 | 2015 | 3 | 2015 |
| Hardware Development: Design & Hardware Development: | 1 | 2014 | 4 | 2016 |
| Demonstrations: Contractor Demo: | 3 | 2015 | 4 | 2016 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | Project (Number/Name)<br>3331 / *C-2 System Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3331: *C-2 System Development* | 14.114 | 0.072 | 2.651 | 1.723 | - | 1.723 | 1.735 | 0.771 | 0.886 | 1.676 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The C-2A Greyhound is a high wing monoplane, twin engine turbo-prop aircraft capable of operating from both a shore base and all operational United States Navy aircraft carrier classes. The mission of the C-2A is to provide rapid response Carrier Onboard Delivery of fleet essential supplies, repair parts, and personnel to sustain at sea operations of deployed battle groups. In addition, the C-2A provides airdrop delivery and mobilization support for special operations forces from land bases and carriers, Search and Rescue, and Humanitarian Relief.

This project will fund required development, analysis, and testing of a Critical Brake Upgrade and other subsystems required to operate the C-2A to the end of its service life.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Critical Brake Upgrade | 0.072 | 2.651 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provides funding for development, design, integration and test of an anti-skid brake system for the C-2A aircraft. This will correct a deficiency related to the operational ground controllability of the C-2A.<br><br>***FY 2014 Accomplishments:***<br>Funding is for on-going efforts to continue development, design, integration and test of anti-skid brake system for the C-2A aircraft.<br><br>***FY 2015 Plans:***<br>Funding is for on-going efforts to complete development, design, integration and test of anti-skid brake system for the C-2A aircraft.<br><br>***FY 2016 Base Plans:***<br>N/A<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Combat Readiness | - | - | 1.723 | - | 1.723 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>3331 / *C-2 System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Description:*** C-2 Combat Readiness establishes an enduring capacity to address obsolescence, safety, and readiness degrader issues for the C-2A(R) aircraft until the end of it's service life.<br><br>***FY 2014 Accomplishments:***<br>N/A<br><br>***FY 2015 Plans:***<br>N/A<br><br>***FY 2016 Base Plans:***<br>Funding is for development and design for C-2 combat readiness.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.072 | 2.651 | 1.723 | - | 1.723 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0556: *C-2A Series* | 0.885 | - | 8.157 | - | 8.157 | 11.988 | 11.406 | 8.376 | 8.278 | 0.482 | 505.819 |

**Remarks**

**D. Acquisition Strategy**

The C-2 Operational Ground Controllability strategy will be exercised under an Engineering Change Proposal.

**E. Performance Metrics**

Validation is planned for first quarter FY15. Final Test Report is planned for fourth quarter FY15. Verification is planned for second quarter FY17.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | Project (Number/Name)<br>3331 / *C-2 System Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | SS/CPFF | NGC : Bethpage, NY | 9.718 | - | | 1.014 | Mar 2015 | - | | - | | - | - | 10.732 | 10.732 |
| Prior year Prod Dev no longer funded in the FYDP | Various | Various : Various | 0.022 | - | | - | | - | | - | | - | - | 0.022 | - |
| | | **Subtotal** | 9.740 | - | | 1.014 | | - | | - | | - | - | 10.754 | - |

**Remarks**

Totals may not add due to rounding.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | NAWCAD : Pax River, MD | 3.456 | - | | 0.303 | Nov 2014 | - | | - | | - | - | 3.759 | - |
| Government Engineering Support | WR | Various : Various | 0.000 | - | | - | | 0.590 | Nov 2015 | - | | 0.590 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | North Island : North Island, CA | 0.804 | 0.070 | Nov 2013 | 0.259 | Nov 2014 | - | | - | | - | - | 1.133 | - |
| Development Support | WR | North Island : North Island, CA | 0.000 | - | | - | | 1.028 | Nov 2015 | - | | 1.028 | Continuing | Continuing | Continuing |
| ILS Support | WR | North Island : North Island, CA | 0.000 | - | | - | | 0.045 | Nov 2015 | - | | 0.045 | Continuing | Continuing | Continuing |
| Prior year Support no longer funded in the FYDP | Various | Various : Various | 0.100 | - | | - | | - | | - | | - | - | 0.100 | - |
| | | **Subtotal** | 4.360 | 0.070 | | 0.562 | | 1.663 | | - | | 1.663 | - | - | - |

**Remarks**

Totals may not add due to rounding.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | Project (Number/Name)<br>3331 / *C-2 System Development* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWCAD : Pax River, MD | 0.000 | - | Nov 2013 | 1.065 | Nov 2014 | 0.050 | Nov 2015 | - | | 0.050 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 1.065 | | 0.050 | | - | | 0.050 | - | - | - |

**Remarks**

Totals may not add due to rounding.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Various | Various : Various | 0.014 | 0.002 | Oct 2013 | 0.010 | Oct 2014 | 0.010 | Nov 2015 | - | | 0.010 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.014 | 0.002 | | 0.010 | | 0.010 | | - | | 0.010 | - | - | - |

**Remarks**

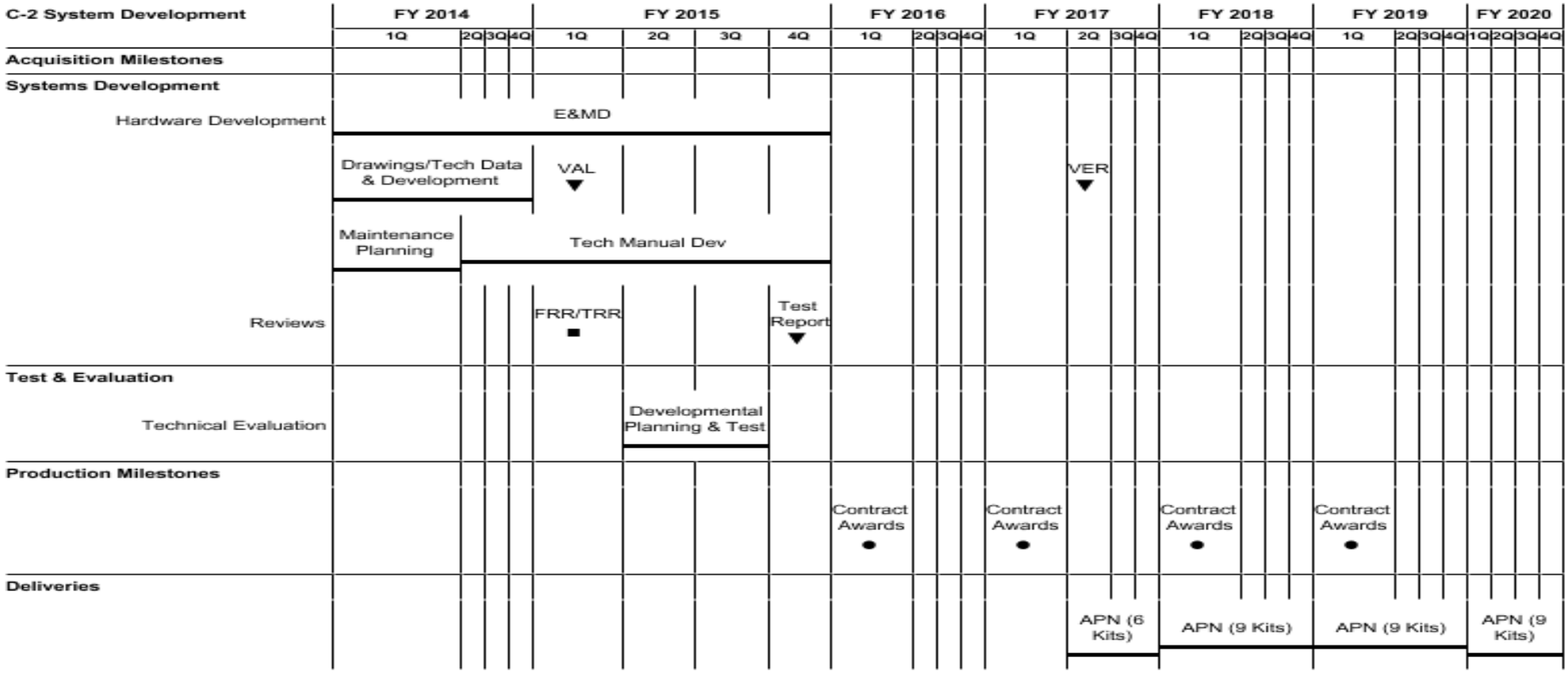
Totals may not add due to rounding.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 14.114 | 0.072 | | 2.651 | | 1.723 | | - | | 1.723 | - | - | - |

**Remarks**

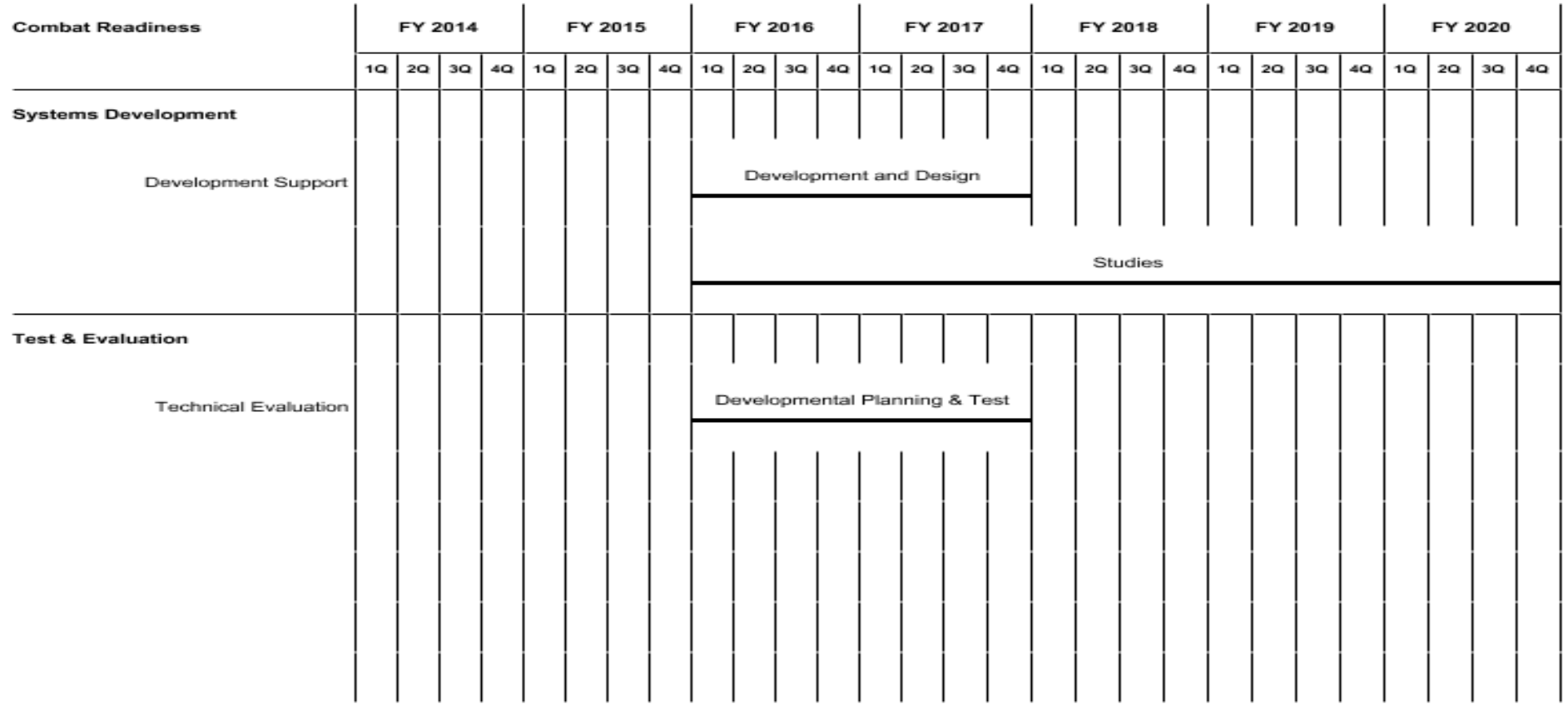
Totals may not add due to rounding.

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>3331 / *C-2 System Development* |




*2016PB - 0603251N - 3331*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>3331 / *C-2 System Development* |




*2016PB - 0603251N - 3331*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>3331 / *C-2 System Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***C-2 System Development*** | | | | |
| Systems Development: Hardware Development: Engineering & Manufacturing Development | 1 | 2014 | 4 | 2015 |
| Systems Development: Hardware Development: Validation | 1 | 2015 | 1 | 2015 |
| Systems Development: Hardware Development: Verification Install | 2 | 2017 | 2 | 2017 |
| Systems Development: Hardware Development: Drawings/Technical Data Development | 1 | 2014 | 4 | 2014 |
| Systems Development: Hardware Development: Maintenance Planning | 1 | 2014 | 1 | 2014 |
| Systems Development: Hardware Development: Technical Manual Development | 2 | 2014 | 4 | 2015 |
| Systems Development: Reviews: Funtional Readiness Review/Test Readiness Review | 1 | 2015 | 1 | 2015 |
| Systems Development: Reviews: Test Report | 4 | 2015 | 4 | 2015 |
| Test & Evaluation: Technical Evaluation: Developmental Planning & Test | 2 | 2015 | 3 | 2015 |
| Production Milestones: Contract Awards FY16 | 1 | 2016 | 1 | 2016 |
| Production Milestones: Contract Awards FY17 | 1 | 2017 | 1 | 2017 |
| Production Milestones: Contract Awards FY18 | 1 | 2018 | 1 | 2018 |
| Production Milestones: Contract Awards FY19 | 1 | 2019 | 1 | 2019 |
| Deliveries: Production Deliveries - APN (6 Kits) FY17 | 2 | 2017 | 4 | 2017 |
| Deliveries: Production Deliveries - APN (9 Kits) FY18 | 1 | 2018 | 4 | 2018 |
| Deliveries: Production Deliveries - APN (9 Kits) FY19 | 1 | 2019 | 4 | 2019 |
| Deliveries: Production Deliveries - APN (9 Kits) FY20 | 1 | 2020 | 4 | 2020 |
| ***Combat Readiness*** | | | | |
| Systems Development: Development Support: Development Support | 1 | 2016 | 4 | 2017 |
| Systems Development: Development Support: Studies | 1 | 2016 | 4 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>3331 / *C-2 System Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluation: Technical Evaluation: Developmental Planning & Test | 1 | 2016 | 4 | 2017 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | - | 10.000 | - | - | - | - | - | - | - | - | - | 10.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This Congressional Add supports the requirements study, technology maturation, system design and demonstration of a general-purpose, future-proof avionics network that replaces copper with glass. As both analog and digital onboard information transport and processing requirements continue to grow, life cycle costs associated with maintaining and upgrading current stove-piped networks aboard naval aircraft systems becomes unsustainable. The size, weight, power, high data rate and scalability advantages of a single-mode fiber optic network have significant total ownership cost savings implications that will allow the Department of the Navy to more affordably and effectively meet mission requirements well into the future. The activities funded will provide a networking baseline or standard that can be incorporated into airborne platforms that maximize networking system capability while minimizing associated life cycle costs. While the development under this program does specifically address airborne platforms where size and weight of the cable plant is particularly important, ultimately the network technology developed will have broad applicability to shipboard and submarine platform network requirements as well.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2014 | FY 2015 |
|---|---|---|
| ***Congressional Add:*** Highly Integrated Photonics (HIP) - Cong | 10.000 | - |
| ***FY 2014 Accomplishments:*** Develop and demonstrate highly integrated local area network for naval platforms. | | |
| ***FY 2015 Plans:*** N/A | | |
| **Congressional Adds Subtotals** | 10.000 | - |

**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 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental and Architectural Studies | C/FFP | APIC Corp : Culver, CA | 0.000 | 1.600 | Mar 2014 | - | | - | | - | | - | - | 1.600 | 1.600 |
| Primary Hardware Development | C/FFP | APIC Corp : Culver, CA | 0.000 | 2.700 | Mar 2014 | - | | - | | - | | - | - | 2.700 | 2.700 |
| Component Foundry | C/FFP | APIC Corp : Culver, CA | 0.000 | 3.626 | Mar 2014 | - | | - | | - | | - | - | 3.626 | 3.625 |
| Systems Engineering | C/FFP | APIC Corp : Culver, CA | 0.000 | 1.380 | Mar 2014 | - | | - | | - | | - | - | 1.380 | 1.380 |
| | | **Subtotal** | 0.000 | 9.306 | | - | | - | | - | | - | - | 9.306 | 9.305 |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | NAWCAD : Pax River, MD | 0.000 | 0.514 | Apr 2014 | - | | - | | - | | - | - | 0.514 | - |
| | | **Subtotal** | 0.000 | 0.514 | | - | | - | | - | | - | - | 0.514 | - |

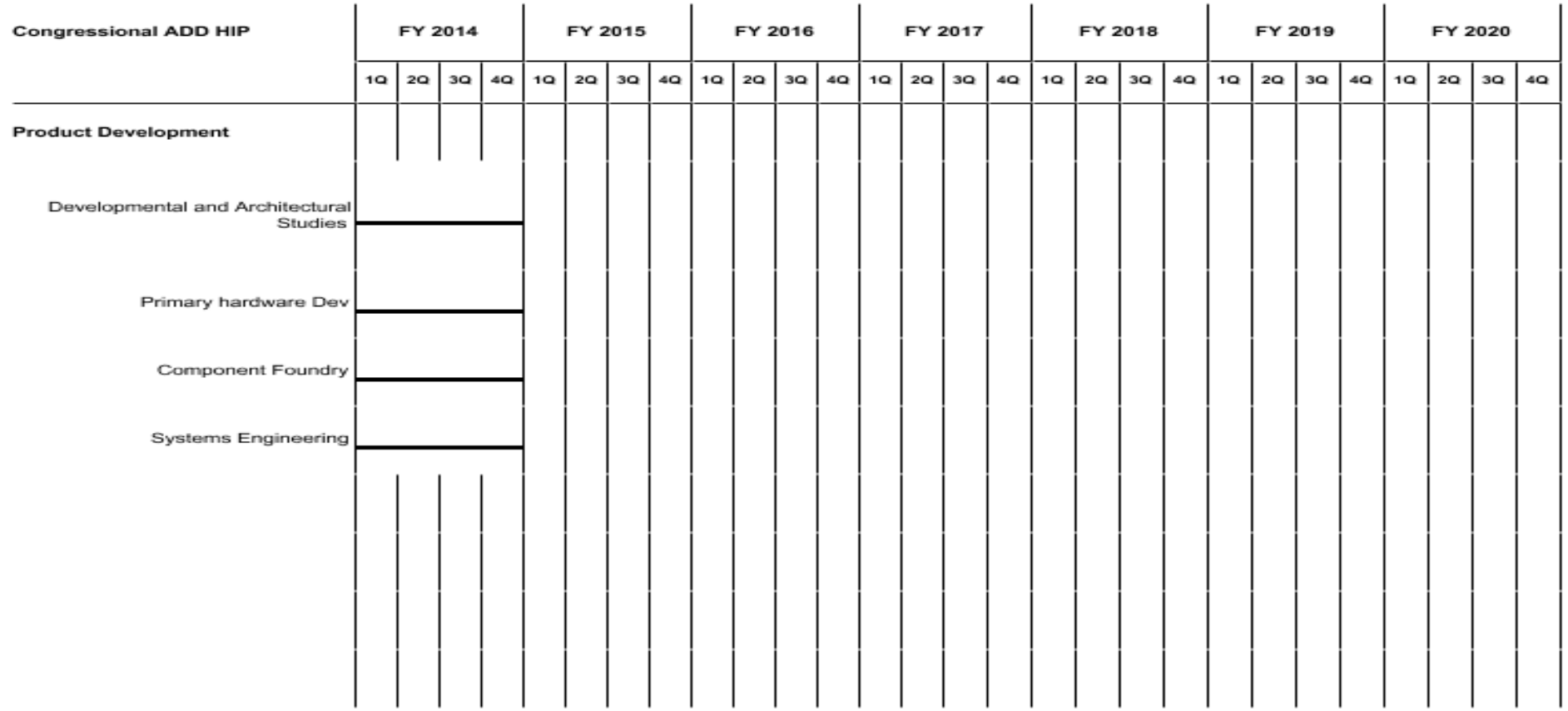
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management | WR | NAWCAD : Pax River, MD | 0.000 | 0.180 | Apr 2014 | - | | - | | - | | - | - | 0.180 | - |
| | | **Subtotal** | 0.000 | 0.180 | | - | | - | | - | | - | - | 0.180 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 10.000 | | - | | - | | - | | - | - | 10.000 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2016PB - 0603251N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603251N / *(U)AIRCRAFT SYSTEMS* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Congressional ADD HIP*** | | | | |
| Product Development: Developmental and Architectural Studies: Schedule Detail | 1 | 2014 | 4 | 2014 |
| Product Development: Primary hardware Dev: Schedule Detail | 1 | 2014 | 4 | 2014 |
| Product Development: Component Foundry: Schedule Detail | 1 | 2014 | 4 | 2014 |
| Product Development: Systems Engineering: Schedule Detail | 1 | 2014 | 4 | 2014 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603254N *I ASW Systems Development* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 118.087 | 6.809 | 7.782 | 5.555 | - | 5.555 | 8.181 | 7.813 | 7.351 | 7.466 | Continuing | Continuing |
| 1292: *Adv ASW Sensors & Proc* | 108.318 | 4.516 | 5.577 | 3.678 | - | 3.678 | 5.742 | 5.480 | 5.097 | 5.175 | Continuing | Continuing |
| 3222: *Advanced High Altitude ASW* | 9.769 | 2.293 | 2.205 | 1.877 | - | 1.877 | 2.439 | 2.333 | 2.254 | 2.291 | Continuing | Continuing |

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

Includes RDT&E funds for advanced development and developmental testing of airborne anti-submarine warfare (ASW) systems, including aircraft, equipment, and devices for use against all types of submarine targets.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

The FY 2016 funding request was reduced by $1.544 million to account for the availability of prior year execution balances.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 6.964 | 7.782 | 7.150 | - | 7.150 |
| Current President's Budget | 6.809 | 7.782 | 5.555 | - | 5.555 |
| Total Adjustments | -0.155 | - | -1.595 | - | -1.595 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.155 | - | | | |
| • Rate/Misc Adjustments | - | - | -1.595 | - | -1.595 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603254N / *ASW Systems Development* | Project (Number/Name)<br>1292 / *Adv ASW Sensors & Proc* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1292: *Adv ASW Sensors & Proc* | 108.318 | 4.516 | 5.577 | 3.678 | - | 3.678 | 5.742 | 5.480 | 5.097 | 5.175 | Continuing | Continuing |
| Quantity of RDT&E Articles | | 100 | 100 | 100 | - | 100 | 100 | 100 | 100 | 100 | | |

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

This program provides Air Anti-Submarine Warfare (ASW) effectiveness through development and maturization of advanced hardware and software associated with airborne acoustic and non-acoustic systems. This includes sensors and components, processing, post-processing, data recording and display capabilities to address regional threat scenarios against surfaced or submerged conventionally and nuclear powered submarines. Key objectives are platform accommodations of advanced active and passive sensors and components, improved detection, classification, localization, tracking, and increased capacity and flexibility to handle multi-sensor data loads. Furthermore, technologies that can be affordably implemented as payload across fixed wing, rotary and unmanned platforms engaged in ASW, will be pursued. Programs being funded during the FYDP will evaluate technologies such as: Over the Horizon (OTH) communications, sonobuoy communication link to/from aircraft, Distributed Netted Sensors, transient signals, and source and receiver improvement technologies that will enhance passive and Multi-static Active Sensor Systems capabilities. Other programs being funded during the FYDP will provide for the development and maturization of persistent tactical search technologies that will allow transition to the localization and attack phase in all operationally relevant environments. In addition, the program will provide for the development and subsequent experimentation, including data collection and engineering measurement, of Multi-static Active Coherent sources and receivers, laser technologies, electro-optical and Multi-Spectral camera technologies, Radar, and Magnetic Anomaly Detection sensors. Those technologies that are deemed mature and provide increased operational capability will be approved for a production Rapid Capability Insertion (RCI) build. The test articles, which consist of passive/active sensors/components and associated processors, will support at-sea trials and experiments.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** System performance assessments | 4.516 | 5.577 | 3.678 | - | 3.678 |
| ***Articles:*** | 100 | 100 | 100 | - | 100 |

***FY 2014 Accomplishments:***

Conducted system performance assessments for Multi-Static Active Coherent ASW algorithms and other Acoustic and Non-Acoustic system enhancements using test articles and prototype software while supporting at-sea trials and experiments such as Under Sea Warfare Employment Emerging Technologies. Conducted data analysis for the engineering measurement program on Science and Technology, Research and Development and operational fleet collected data.

***FY 2015 Plans:***

System performance assessments for Multi-Static Active Coherent ASW algorithms and other prospective Acoustic and Non-Acoustic systems and enhancements. The test articles, which consist of passive/active sensors/components and associated processors, will support at-sea trial and experiments. Develop prototype software for use in at-sea experiment/exercise participation and data collection. Conduct data analysis for the

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603254N / *ASW Systems Development* | **Project (Number/Name)**<br>1292 / *Adv ASW Sensors & Proc* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| engineering measurement program on Science and Technology, Research and Development and operational fleet collected data.<br>***FY 2016 Base Plans:***<br>System performance assessments for Multi-Static Active Coherent ASW algorithms and other Acoustic and Non-Acoustic system enhancements. The test articles, which consist of passive/active sensors/components and associated processors, will support at-sea trial and experiments. Develop prototype software for use in at-sea experiment/exercise participation and data collection. Conduct data analysis for the engineering measurement program on Science and Technology, Research and Development and operational fleet collected data.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.516 | 5.577 | 3.678 | - | 3.678 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E/0480: *ASW Sensors & Proc* | 18.098 | 15.988 | 26.906 | - | 26.906 | 33.120 | 35.042 | 26.562 | 46.875 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The included technology development are primarily in-house with contractor participation through existing vehicles.

**E. Performance Metrics**

System performance assessments for Multi-Static Active Coherent Air Anti-Submarine Warfare (ASW) algorithms and other Acoustic and Non-Acoustic system enhancements by Air ASW Technology Assessment Board.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603254N / *ASW Systems Development* | Project (Number/Name)<br>1292 / *Adv ASW Sensors & Proc* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hdw Development | Various | Various : Various | 1.733 | 0.204 | Dec 2013 | 0.200 | Dec 2014 | 0.200 | Dec 2015 | - | | 0.200 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.733 | 0.204 | | 0.200 | | 0.200 | | - | | 0.200 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | WR | NAWCAD : PATUXENT RIVER, MD | 3.425 | 0.200 | Dec 2013 | 0.400 | Dec 2014 | 0.200 | Dec 2015 | - | | 0.200 | - | 4.225 | - |
| Studies & Analysis | WR | NAWCAD : PATUXENT RIVER, MD | 5.481 | 0.200 | Dec 2013 | 0.400 | Dec 2014 | 0.600 | Dec 2015 | - | | 0.600 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 8.906 | 0.400 | | 0.800 | | 0.800 | | - | | 0.800 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dev Test & Eval | Various | Various : Various | 17.481 | 1.765 | Dec 2013 | 1.863 | Dec 2014 | 0.838 | Dec 2015 | - | | 0.838 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 17.481 | 1.765 | | 1.863 | | 0.838 | | - | | 0.838 | - | - | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Eng Spt | Various | Various : Various | 17.257 | 1.334 | Dec 2013 | 1.381 | Dec 2014 | 0.500 | Dec 2015 | - | | 0.500 | Continuing | Continuing | Continuing |
| ENG & TECH SVCS (NON-FFRDC) | Various | Various : Various | 2.752 | 0.050 | Dec 2013 | 0.045 | Dec 2014 | 0.047 | Dec 2015 | - | | 0.047 | Continuing | Continuing | Continuing |
| MGT & PROF SVCS (FFRDC) | Various | Various : Various | 0.916 | 0.171 | Dec 2013 | 0.153 | Dec 2014 | 0.137 | Dec 2015 | - | | 0.137 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603254N / *ASW Systems Development* | Project (Number/Name)<br>1292 / *Adv ASW Sensors & Proc* | |

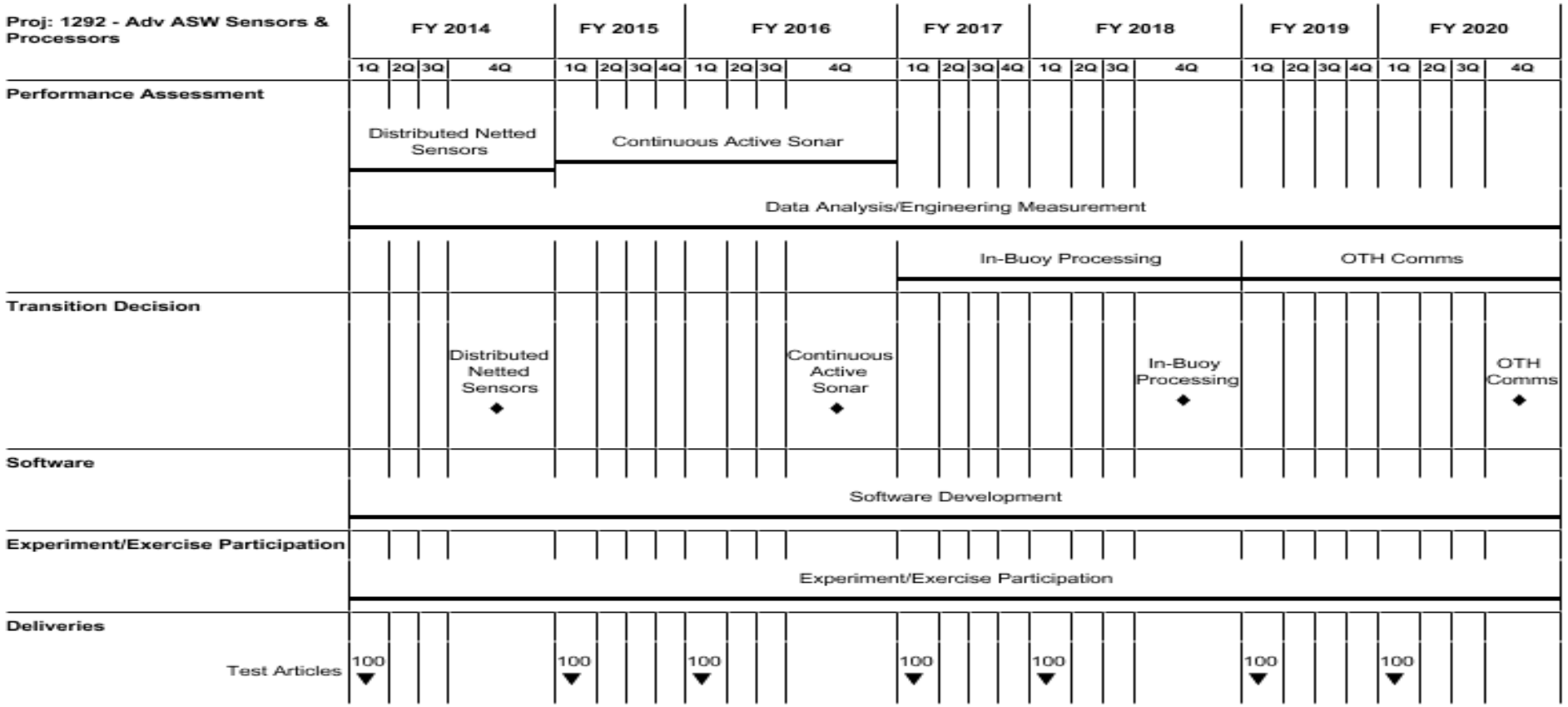
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Eng Spt | WR | NAWCAD : PATUXENT RIVER, MD | 59.146 | 0.587 | Dec 2013 | 1.127 | Dec 2014 | 1.148 | Dec 2015 | - | | 1.148 | Continuing | Continuing | Continuing |
| Travel | Various | VARIOUS : VARIOUS | 0.127 | 0.005 | Dec 2013 | 0.008 | Dec 2014 | 0.008 | Dec 2015 | - | | 0.008 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 80.198 | 2.147 | | 2.714 | | 1.840 | | - | | 1.840 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 108.318 | 4.516 | | 5.577 | | 3.678 | | - | | 3.678 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603254N / *ASW Systems Development* | **Project (Number/Name)**<br>1292 / *Adv ASW Sensors & Proc* |




*2016PB - 0603254N - 1292*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603254N / *ASW Systems Development* | **Project (Number/Name)**<br>1292 / *Adv ASW Sensors & Proc* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj: 1292 - Adv ASW Sensors & Processors*** | | | | |
| Performance Assessment: Distributed Netted Sensors | 1 | 2014 | 4 | 2014 |
| Performance Assessment: Continuous Active Sonar | 1 | 2015 | 4 | 2016 |
| Performance Assessment: Data Analysis/Engineering Measurement | 1 | 2014 | 4 | 2020 |
| Performance Assessment: In-Buoy Processing | 1 | 2017 | 4 | 2018 |
| Performance Assessment: OTH Comms | 1 | 2019 | 4 | 2020 |
| Transition Decision: Distributed Netted Sensors | 4 | 2014 | 4 | 2014 |
| Transition Decision: Continuous Active Sonar | 4 | 2016 | 4 | 2016 |
| Transition Decision: In-Buoy Processing | 4 | 2018 | 4 | 2018 |
| Transition Decision: OTH Comms | 4 | 2020 | 4 | 2020 |
| Software: Software Development | 1 | 2014 | 4 | 2020 |
| Experiment/Exercise Participation: Experiment/Exercise Participation | 1 | 2014 | 4 | 2020 |
| Deliveries: Test Articles: Test Article Deliveries (3) | 1 | 2014 | 1 | 2014 |
| Deliveries: Test Articles: Test Article Deliveries (4) | 1 | 2015 | 1 | 2015 |
| Deliveries: Test Articles: Test Article Deliveries (5) | 1 | 2016 | 1 | 2016 |
| Deliveries: Test Articles: Test Article Deliveries (6) | 1 | 2017 | 1 | 2017 |
| Deliveries: Test Articles: Test Article Deliveries (7) | 1 | 2018 | 1 | 2018 |
| Deliveries: Test Articles: Test Article Deliveries (8) | 1 | 2019 | 1 | 2019 |
| Deliveries: Test Articles: Test Article Deliveries (9) | 1 | 2020 | 1 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603254N / *ASW Systems Development* | Project (Number/Name)<br>3222 / *Advanced High Altitude ASW* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3222: *Advanced High Altitude ASW* | 9.769 | 2.293 | 2.205 | 1.877 | - | 1.877 | 2.439 | 2.333 | 2.254 | 2.291 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Advanced High Altitude Anti-Submarine Warfare (Adv HAASW) program performs research, analyses, and early prototype demonstration activities for new technologies to support future Air Anti-Submarine Warfare (ASW) programs for P-8A and other platforms. Emphasis is placed on evaluation of technologies and prototype systems in realistic operating environments with a focus on new sensors and system components.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Research, analyses, and early prototype demonstration activities | 2.293 | 2.205 | 1.877 | - | 1.877 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Initiated modeling & simulation analysis for additional High Altitude sonobuoy modifications for P-8A application. Conducted analyses on potential new sonobuoys for P-8A application. | | | | | |
| ***FY 2015 Plans:***<br>Scheduled to perform studies, analyses and early prototyping of acoustic and non-acoustic technologies suitable for High Altitude ASW operations for the P-8A aircraft. | | | | | |
| ***FY 2016 Base Plans:***<br>Scheduled to perform studies, analyses and early prototyping of acoustic, non-acoustic and communications technologies suitable for high altitude ASW operations. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.293 | 2.205 | 1.877 | - | 1.877 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Develop modifications to incorporate capability into current sonobuoy sensors and integration into Air ASW platforms, P-8A as the lead aircraft.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603254N / *ASW Systems Development* | **Project (Number/Name)**<br>3222 / *Advanced High Altitude ASW* |

**E. Performance Metrics**

Perform Studies and Analysis to better define Advanced HAASW program needs. Early prototypes will be developed to reduce risk for ASW operations at high altitudes by the P-8A aircraft.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603254N / *ASW Systems Development* | Project (Number/Name)<br>3222 / *Advanced High Altitude ASW* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior years Hdw Dev cost no longer funded in the FYDP | Various | Various : Various | 1.370 | - | | - | | - | | - | | - | - | 1.370 | - |
| | | **Subtotal** | 1.370 | - | | - | | - | | - | | - | - | 1.370 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Studies & Analysis | WR | NAWCAD : PATUXENT RIVER, MD | 1.450 | 0.223 | Nov 2013 | 0.359 | Nov 2014 | 0.752 | Nov 2015 | - | | 0.752 | Continuing | Continuing | Continuing |
| Studies & Analysis | Various | AVIATION SYSTEMS ENGINEERING COMPANY INC : LEXINGTON PARK, MD | 3.637 | 1.500 | Nov 2013 | 1.200 | Nov 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Studies & Analysis | WR | Various : Various | 0.000 | - | | - | | 0.579 | Dec 2015 | - | | 0.579 | - | 0.579 | - |
| | | **Subtotal** | 5.087 | 1.723 | | 1.559 | | 1.331 | | - | | 1.331 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year Test No longer funded in the FYDP | Various | Various : Various | 0.230 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.230 | - | | - | | - | | - | | - | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603254N / *ASW Systems Development* | Project (Number/Name)<br>3222 / *Advanced High Altitude ASW* | |

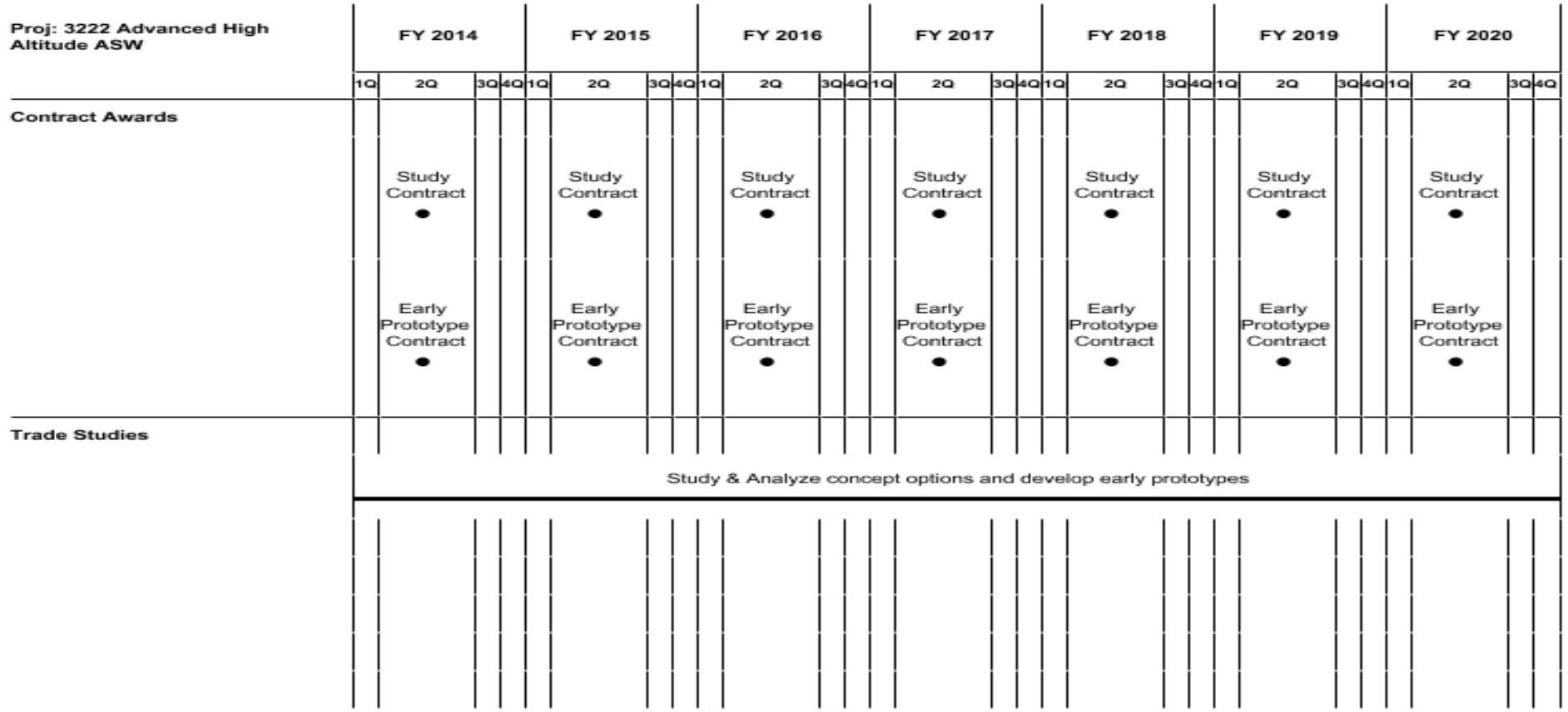
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Eng Spt | Various | Various : Various | 0.685 | - | | 0.136 | Nov 2014 | 0.119 | Dec 2015 | - | | 0.119 | Continuing | Continuing | Continuing |
| ENG & TECH SVCS (NON-FFRDC) | Various | Various : Various | 0.669 | 0.236 | Nov 2013 | 0.209 | Nov 2014 | 0.188 | Dec 2015 | - | | 0.188 | Continuing | Continuing | Continuing |
| Government Eng Spt | WR | NAWCAD : PATUXENT RIVER, MD | 1.700 | 0.330 | Nov 2013 | 0.295 | Nov 2014 | 0.231 | Dec 2015 | - | | 0.231 | Continuing | Continuing | Continuing |
| Travel | Various | Various : Various | 0.028 | 0.004 | Nov 2013 | 0.006 | Nov 2014 | 0.008 | Nov 2015 | - | | 0.008 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.082 | 0.570 | | 0.646 | | 0.546 | | - | | 0.546 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 9.769 | 2.293 | | 2.205 | | 1.877 | | - | | 1.877 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603254N / *ASW Systems Development* | **Project (Number/Name)**<br>3222 / *Advanced High Altitude ASW* |




*2016PB - 0603254N - 3222*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603254N / *ASW Systems Development* | **Project (Number/Name)**<br>3222 / *Advanced High Altitude ASW* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj: 3222 Advanced High Altitude ASW*** | | | | |
| Contract Awards: Study Contract (2) | 2 | 2014 | 2 | 2014 |
| Contract Awards: Study Contract (3) | 2 | 2015 | 2 | 2015 |
| Contract Awards: Study Contract (4) | 2 | 2016 | 2 | 2016 |
| Contract Awards: Study Contract (5) | 2 | 2017 | 2 | 2017 |
| Contract Awards: Study Contract (6) | 2 | 2018 | 2 | 2018 |
| Contract Awards: Study Contract (7) | 2 | 2019 | 2 | 2019 |
| Contract Awards: Study Contract (8) | 2 | 2020 | 2 | 2020 |
| Contract Awards: Early Prototype Contract (2) | 2 | 2014 | 2 | 2014 |
| Contract Awards: Early Prototype Contract (3) | 2 | 2015 | 2 | 2015 |
| Contract Awards: Early Prototype Contract (4) | 2 | 2016 | 2 | 2016 |
| Contract Awards: Early Prototype Contract (5) | 2 | 2017 | 2 | 2017 |
| Contract Awards: Early Prototype Contract (6) | 2 | 2018 | 2 | 2018 |
| Contract Awards: Early Prototype Contract (7) | 2 | 2019 | 2 | 2019 |
| Contract Awards: Early Prototype Contract (8) | 2 | 2020 | 2 | 2020 |
| Trade Studies: Trade Studies | 1 | 2014 | 4 | 2020 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603261N *I Tactical Airborne Reconnaissance* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 58.744 | 5.257 | 5.270 | 3.087 | - | 3.087 | 3.652 | 3.600 | 3.563 | 3.617 | Continuing | Continuing |
| 2467: *UAV Conops* | 58.744 | 5.257 | 5.270 | 3.087 | - | 3.087 | 3.652 | 3.600 | 3.563 | 3.617 | Continuing | Continuing |

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

This program element funds efforts to develop Concept of Operations in support of the Navy's overall Unmanned Aircraft Systems (UAS) Strategy integrating UAS into the Chief of Naval Operations Navy Vision of Sea Power 21 (Sea Shield, Sea Strike, Sea Basing and FORCEnet). Also funds Navy's contribution supporting the Joint Technology Center/System Integration Laboratory providing experimentation for Unmanned Aerial Vehicle technology assessment, insertion, demonstration, transfer as well as simulation and exercise support.

This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

The FY 2016 funding request was reduced by $337 thousand to account for the availability of prior year execution balances.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 5.257 | 5.275 | 3.451 | - | 3.451 |
| Current President's Budget | 5.257 | 5.270 | 3.087 | - | 3.087 |
| Total Adjustments | - | -0.005 | -0.364 | - | -0.364 |
| • Congressional General Reductions | - | -0.005 | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | - | - | -3.451 | - | -3.451 |
| • Rate/Misc Adjustments | - | - | 3.087 | - | 3.087 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603261N / *Tactical Airborne Reconnaissance* | Project (Number/Name)<br>2467 / *UAV Conops* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2467: *UAV Conops* | 58.744 | 5.257 | 5.270 | 3.087 | - | 3.087 | 3.652 | 3.600 | 3.563 | 3.617 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Naval Unmanned Aircraft Systems (UAS) Strategy employs a family of UAS to perform tactical, persistent and penetrating Intelligence, Surveillance, and Reconnaissance in support of Naval and Joint missions from forward bases/platforms and naval ships.

In support of the Navy's overall UAS strategy, this program develops Concept of Operations (CONOPS) that integrate UAS into the Chief of Naval Operations Navy Vision of Sea Power 21 (Sea Shield, Sea Strike, Sea Basing and FORCEnet). By providing fleet input based on current operations with UAS in a simulated combat environment, this CONOPS development investment is the foundation of how the Carrier Strike Group and the Expeditionary Strike Group will operate a combined Manned and Unmanned Naval Air Force. This program establishes the common architecture, including Command & Control, for all unmanned systems to support and inform CONOPS development. This effort provides for a cross-program view of Naval Unmanned Systems and is the entry point for OSD and other services for commonality and interoperability. Specifically:

- Provides studies and demonstrations in support of the Naval UAS Family of Systems (FoS) CONOPS development.
- Horizontally integrates across the Naval UAS FoS for the Naval Aviation Enterprise through interoperability and common system solutions.
- Develops the Naval UAS FoS Architecture to support integration into the Naval Unmanned Systems Cross Functional Team.
- Provides Naval support for development of Standards across Department of Defense (DoD) UAS and North Atlantic Treaty Organization, emphasizing standardization and interoperability.
- Conducts CONOPS studies, demonstrations, and exercises for Vehicle Control, Targeting, and Weapons, Sensor and Payload Employment.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Studies and Demonstrations | 1.031 | 1.253 | 1.530 | - | 1.530 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Studies and demonstrations to develop CONOPS for manned-unmanned integration of UAS and aircraft systems. Build a UAS simulation environment for Modeling and Simulation of common UAS components in representative battlespace architectures. | | | | | |
| ***FY 2014 Accomplishments:***<br>Conducted a study and developed an approach to demonstrate the capabilities of existing Visual Information (VI) Programs of Record, and emerging VI systems to meet current Navy Operational tasking (OPTASK) orders | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603261N / *Tactical Airborne Reconnaissance* | **Project (Number/Name)**<br>2467 / *UAV Conops* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| and Joint Urgent Operational Needs (JUONS) for tactical VI to the fleet. This approached has been approved by Fleet Forces Command to be demonstrated as part of Trident Warrior 15.<br>***FY 2015 Plans:***<br>Continue development of the UAS modeling and simulation of Fleet Concept of Operations scenarios. Demonstrate Manned/Unmanned interoperability.<br>***FY 2016 Base Plans:***<br>Continue to conduct studies, demonstrations, and testing to validate the Naval Interoperability profiles within the context of Integrated Warfare Capabilities.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Architecture Support/Common Ground Station | 2.000 | 1.824 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop a Joint Service revision and configuration management of UAS interoperability profiles and Joint Common Ground Station Architecture and related government engineering support.<br>***FY 2014 Accomplishments:***<br>Continue to develop a Joint Service revision and configuration management of UAS interoperability profiles and Joint Common Ground Station Architecture and related government engineering support.<br>***FY 2015 Plans:***<br>Continue to develop a Joint Service revision and configuration management of UAS interoperability profiles and Joint Common Ground Station Architecture and related government engineering support.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Naval Interoperability & Standardization | 2.226 | 2.193 | 1.557 | - | 1.557 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603261N / *Tactical Airborne Reconnaissance* | **Project (Number/Name)**<br>2467 / *UAV Conops* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Description:*** Increase Naval Unmanned Systems interoperability emphasizing Naval, Joint Service, and international standardization.<br><br>***FY 2014 Accomplishments:***<br>Developed and released the following Naval Interoperability Profiles (NIOPs) documentation: Vehicle Management Advanced Command & Control, Payload Management Advanced Command & Control, Motion Imagery, Full Motion Video, and Standard Common Data Link.<br><br>***FY 2015 Plans:***<br>Continue to develop Unmanned Systems Interoperability profiles and Navy implementation conventions for Naval UAS FoS Architecture. Support OSD Joint Service and NATO coalition interoperability efforts. Provide government engineering support, program office travel, and contract support services.<br><br>***FY 2016 Base Plans:***<br>Continue to develop Unmanned Systems Naval Interoperability Profiles in support of Integrated Warfare Capability Packages. Support OSD Joint Service and NATO coalition interoperability efforts. Provide government engineering support, program office travel, and contract support services.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 5.257 | 5.270 | 3.087 | - | 3.087 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

The program office will leverage existing Government facilities (e.g., Joint Technology Center/System Integration Laboratory and Naval Unmanned Aircraft Systems (UAS) Program of Record assets as available) to develop and demonstrate Naval UAS Concept of Operations. Government engineering support will be used for Standards Development, Architectural Analysis, Modeling and Simulation efforts and testing.

**E. Performance Metrics**

UAS operations and interoperability for systems delivered to the warfighter are continually improved upon increasing the level of integration, standardization and effective employment in maritime battle space dominance.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603261N / *Tactical Airborne Reconnaissance* | Project (Number/Name)<br>2467 / *UAV Conops* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ship Integration | C/CPFF | L-3 Titan : Marlton, NJ | 8.777 | 0.919 | Jan 2014 | 0.856 | Jan 2015 | - | | - | | - | - | 10.552 | 10.552 |
| Systems Engineering | WR | NAWCAD : Pax River, MD | 2.935 | 0.551 | Dec 2013 | 0.243 | Dec 2014 | - | | - | | - | - | 3.729 | - |
| Prior year Prod Dev no longer funded in the FYDP | Various | Various : Various | 3.350 | - | | - | | - | | - | | - | - | 3.350 | - |
| | | **Subtotal** | 15.062 | 1.470 | | 1.099 | | - | | - | | - | - | 17.631 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | Various | Various : Various | 13.894 | 0.191 | Dec 2013 | 0.145 | Dec 2014 | - | | - | | - | - | 14.230 | 14.230 |
| Software Development | MIPR | JTC/SIL : Redstone Arsenal, AL | 9.531 | - | | 1.824 | Jan 2015 | - | | - | | - | - | 11.355 | 11.355 |
| Software Development | MIPR | TACOM : Warren, MI | 0.000 | 1.745 | Jan 2014 | - | | - | | - | | - | - | 1.745 | 1.745 |
| Studies & Demonstrations | WR | NAWCAD : Pax River, MD | 3.646 | 0.574 | Dec 2013 | 0.234 | Dec 2014 | 0.234 | Dec 2015 | - | | 0.234 | Continuing | Continuing | Continuing |
| Standards Development | C/CPFF | Engility : Lexington Park, MD | 0.000 | - | | - | | 1.235 | Jan 2016 | - | | 1.235 | - | 1.235 | 1.235 |
| Prior year Support no longer funded in the FYDP | Various | Various : Various | 2.830 | - | | - | | - | | - | | - | - | 2.830 | - |
| | | **Subtotal** | 29.901 | 2.510 | | 2.203 | | 1.469 | | - | | 1.469 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year Test & Eval no longer funded in the FYDP | Various | Various : Various | 2.627 | - | | - | | - | | - | | - | - | 2.627 | - |
| | | **Subtotal** | 2.627 | - | | - | | - | | - | | - | - | 2.627 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603261N / *Tactical Airborne Reconnaissance* | **Project (Number/Name)**<br>2467 / *UAV Conops* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | Various | Various : Various | 3.503 | 0.540 | Dec 2013 | 0.540 | Dec 2014 | 0.322 | Jan 2016 | - | | 0.322 | - | 4.905 | 4.905 |
| Government Engineering Support | WR | NAWCAD : Pax River, MD | 6.105 | 0.687 | Dec 2013 | 1.423 | Dec 2014 | 1.291 | Dec 2015 | - | | 1.291 | Continuing | Continuing | Continuing |
| Travel | WR | NAVAIR HQ : Pax River, MD | 0.496 | 0.050 | Nov 2013 | 0.005 | Nov 2014 | 0.005 | Nov 2015 | - | | 0.005 | Continuing | Continuing | Continuing |
| Prior year Mgmt Services no loner funded in the FYDP | Various | Various : Various | 1.050 | - | | - | | - | | - | | - | - | 1.050 | - |
| | | **Subtotal** | 11.154 | 1.277 | | 1.968 | | 1.618 | | - | | 1.618 | - | - | - |

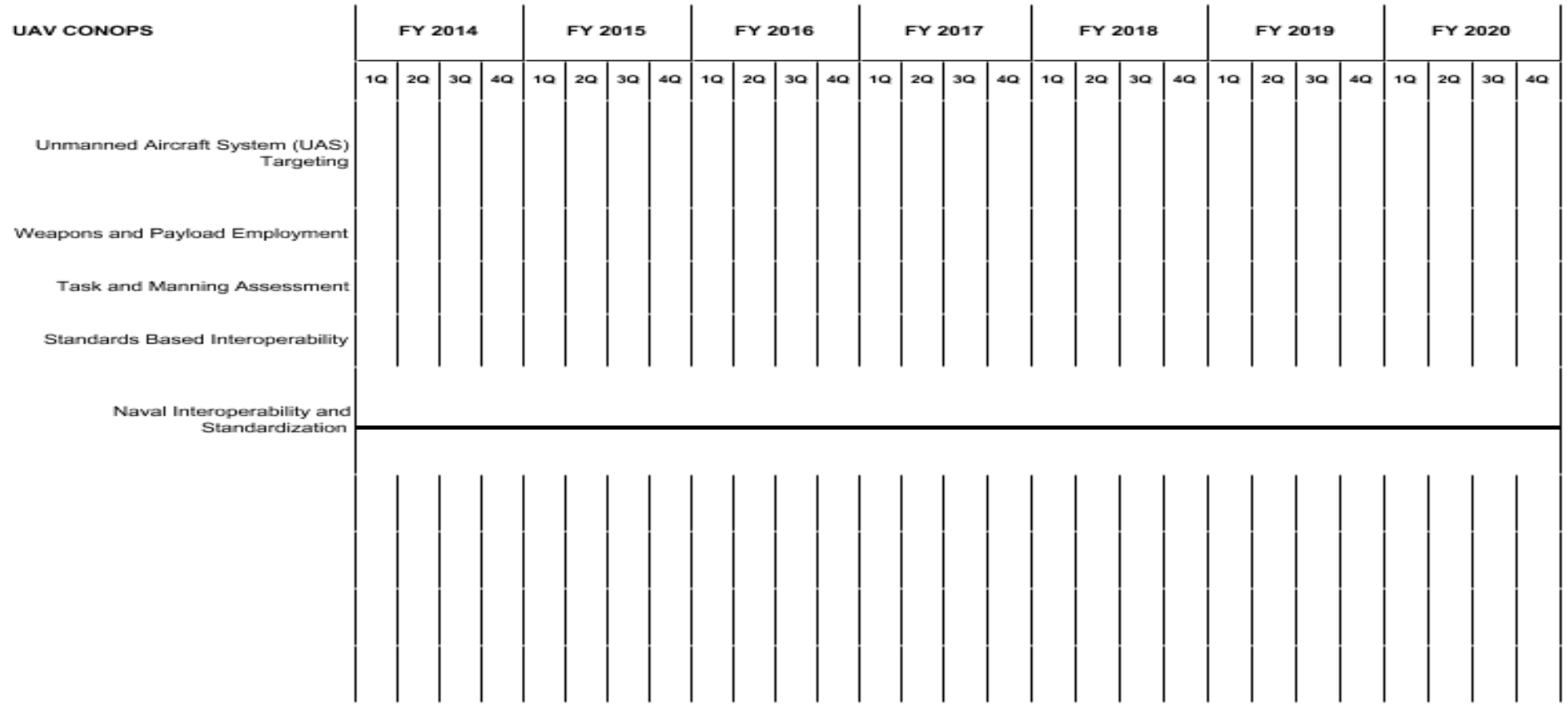
**Remarks**

Travel contract type is TO.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 58.744 | 5.257 | | 5.270 | | 3.087 | | - | | 3.087 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603261N / *Tactical Airborne Reconnaissance* | **Project (Number/Name)**<br>2467 / *UAV Conops* |




*2016PB - 0603261N - 2467*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603261N / *Tactical Airborne Reconnaissance* | **Project (Number/Name)**<br>2467 / *UAV Conops* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***UAV CONOPS*** | | | | |
| Naval Interoperability and Standardization: Naval UASs interoperability on Joint Service and International Standardization | 1 | 2014 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603382N *I Advanced Combat Systems Tech* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 62.573 | 1.510 | 1.639 | 1.636 | - | 1.636 | 1.775 | 1.795 | 1.805 | 1.842 | Continuing | Continuing |
| 0324: *Adv Combat System Technology* | 62.573 | 1.510 | 1.639 | 1.636 | - | 1.636 | 1.775 | 1.795 | 1.805 | 1.842 | Continuing | Continuing |
| **MDAP/MAIS Code:** 180 | | | | | | | | | | | | |

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

The Advanced Combat System Technology line is to evolve the technical and business practices for programs to change to an open architecture construct. The program was constructed to mature both technical and business model integration for C5I systems programs of record in an open architecture environment. The priority was incorporating the principles of modular design and design disclosure, reusable application software, interoperability and secure information exchange, lifecycle affordability and encouraging competition and collaboration.

Project Unit 0324: Funding is to maintain and update an information exchange environment to improve transparency of design disclosure and information exchange on past and current investments to support the principle of cross-program reuse, and to provide the tools and leadership for assisting programs through the transition to Naval Open Architecture (OA). The other elements of the OA transformation effort are being realized as management efficiencies within programs. Those elements include ensuring that all naval systems, families of systems, and programs move to modular OA in accordance with Department of Defense (DoD) Instruction 5000.1 dated 12 May 2003 which mandates that all DoD programs utilize open systems architectures to rapidly field affordable and interoperable systems. By direction of the Navy Service Acquisition Executive (SAE), PEO IWS was assigned overall responsibility and authority to direct the Navy's OA effort until that duty transferred to DASN (RDTE) in 2011. The Core OA funding line has remained with PEO IWS. That policy established a need to coordinate acquisition strategies, develop guidance and tools, and develop analysis of alternatives to determine OA software reuse practices within and across the Navy Communities of Interest (COI - Surface, Subsurface, Air, Space, C4I, USMC, and ONR). This project facilitates a strategic shift in the acquisition business process to facilitate cooperative competition in cross-domain/COI business relationships. This improves innovation and economies of scale throughout the Navy and Marine Corps. This leadership effort has identified the business case and potential return on investment for moving the Navy towards an open systems approach, supported the development of open systems technologies, and integrated best business and technical practices for open systems development within Naval acquisition. Naval OA ensures Navy-wide system architectures become extensible and scalable in function, capacity, and workload to meet Joint warfighting requirements. This also includes the identification and development of common software components, functions, reuse methodologies, and extensible product lines. In summary, this funding supports the management of a reuse repository and reuse information exchange portal, and the evolving business, systems engineering, and cultural changes required across all Naval programs as they migrate to function in a Joint, net-centric warfare environment.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | R-1 Program Element (Number/Name)<br>PE 0603382N *I Advanced Combat Systems Tech* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | 1.563 | 1.646 | 1.718 | - | 1.718 |
| Current President's Budget | 1.510 | 1.639 | 1.636 | - | 1.636 |
| Total Adjustments | -0.053 | -0.007 | -0.082 | - | -0.082 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.053 | - | | | |
| • Program Adjustments | - | - | -0.068 | - | -0.068 |
| • Rate/Misc Adjustments | - | -0.007 | -0.014 | - | -0.014 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $.068 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603382N / *Advanced Combat Systems Tech* | Project (Number/Name)<br>0324 / *Adv Combat System Technology* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0324: *Adv Combat System Technology* | 62.573 | 1.510 | 1.639 | 1.636 | - | 1.636 | 1.775 | 1.795 | 1.805 | 1.842 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Project Unit 0324: Funding is to maintain and update a information exchange environment to improve transparency of design disclosure and information exchange on past and current investments to support the principle of cross-program reuse, and to provide the tools and leadership for assisting programs through the transition to Naval Open Architecture (OA). The other elements of the OA transformation effort are being realized as management efficiencies within programs. Those elements include ensuring that all naval systems, families of systems, and programs move to modular OA in accordance with Department of Defense (DoD) Instruction 5000.1 dated 12 May 2003 which mandates that all DoD programs utilize open systems architectures to rapidly field affordable and interoperable systems. By direction of the Navy Service Acquisition Executive (SAE), PEO IWS was assigned overall responsibility and authority to direct the Navy's OA effort until the duty transferred to DASN (RDTE) in 2011 The Core OA funding line has remained with PEO IWS. That policy established a need to coordinate acquisition strategies, develop guidance and tools, and develop analysis of alternatives to determine OA software reuse practices within and across the Navy Communities of Interest (COI - Surface, Subsurface, Air, Space, C4I, USMC, and ONR). This project facilitates a strategic shift in the acquisition business process to facilitate cooperative competition in cross-domain/COI business relationships. This improves innovation and economies of scale throughout the Navy and Marine Corps. This leadership effort has identified the business case and potential return on investment for moving the Navy towards an open systems approach, supported the development of open systems technologies, and integrated best business and technical practices for open systems development within Naval acquisition. Naval OA ensures Navy-wide system architectures become extensible and scalable in function, capacity, and workload to meet Joint warfighting requirements. This also includes the identification and development of common software components, functions, reuse methodologies, and extensible product lines. In summary, this funding supports the management of a reuse repository and reuse information exchange portal, and the evolving business, systems engineering, and cultural changes required across all Naval programs as they migrate to function in a Joint, net-centric warfare environment.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Align the Naval Enterprise Across All Domains to Implement OA | 0.257 | 0.272 | 0.292 | - | 0.292 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Supported the execution of Naval OSA Policy and Strategy, including OSAET meetings for the enterprise (as scheduled) and OSA program reporting requirements. Specifically, this included OSAET reporting of action items to DASN RDT&E, quarterly OSA Reports to Congress via ASN RDA, as well as the annual OSA budget submission and financial reporting for this project. Alignment across the Naval Enterprise also included the development and management of all other activities as DASN RDT&E or ASN RDA directs. The OSA | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603382N / *Advanced Combat Systems Tech* | **Project (Number/Name)**<br>0324 / *Adv Combat System Technology* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| program also successfully completed the execution of another war game using the "Massive Multiplayer Online War Game Leveraging the Internet" (MMOWGLI), to help solve issues surrounding data rights and Intellectual Property in DoD acquisitions.<br>***FY 2015 Plans:***<br>Establish transition of programs to fully utilize the principles and practices of OA in accordance with the ASN(RDA) approved Naval OSA Strategy of November 2012. Transition the sustainment of the OSA initiative from a unique OA Executive forum to a permanent organization; the Systems Engineering Stakeholders Group. Continue to coordinate and develop the quarterly OA Report to Congress, annual budget submission and financial reporting for this project. By FY-15 the Naval OSA Strategy will need to be revisited and updated to stay current with changes in best practices to include all other activities as the SESG, DASN RDT&E or ASN(RDA) directs.<br>***FY 2016 Base Plans:***<br>Continue FY2015 Plan in addition to:<br>Implement Enterprise architecture of modular development and maximum reuse. Promote tailor-able open standards relative to Technical Reference Frameworks attributes.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Change the Naval and Marine Corps Cultures to Institutionalize OA Principle | 0.302 | 0.373 | 0.378 | - | 0.378 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>The OSA program enabled the institutional adoption of OSA principles and practices through stakeholder management, communications, mentoring, training, and curriculum adjustment. Key activities included maintenance of Defense Acquisition University (DAU) online OSA training modules, working with DAU to incorporate OSA principles into existing coursework materials, presentation of existing training courses, and participation in symposia and panels to discuss OSA implementation, and using other communication vehicles to promulgate OSA standards and methodologies for inclusion into Naval systems acquisition.<br>***FY 2015 Plans:***<br>Continue with direct engagement with programs to improve OA principles and practices through stakeholder management, communications, mentoring, training, and curriculum adjustment. Establish and maintain communication and transparency across programs to highlight new opportunities for enterprise product reuse | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603382N / *Advanced Combat Systems Tech* | **Project (Number/Name)**<br>0324 / *Adv Combat System Technology* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| and improved interoperability. Sustain a strong message to the public and industry on the value of OA for cost-effective management of the acquisition portfolio.<br>***FY 2016 Base Plans:***<br>Continue with FY2015 Plan in addition to:<br><br>Adjust funding techniques for cross-Enterprise co-development. Identify best practices and collaborative forums to increase the likelihood of transitioning maturing technology into programs of record.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** OA Systems Engineering Leadership | 0.332 | 0.375 | 0.395 | - | 0.395 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>The OSA program supported systems engineering collaboration across the Naval Enterprise to facilitate the fielding of interoperability capabilities, including a) the further alignment of PEO architectures; b) provided guidance for government-to-government coordination of OSA implementation efforts to ensure standardized and disciplined processes, interfaces, and services were utilized; c) worked with the Science and Technology (S&T) community to ensure OSA is being incorporated into emerging technologies; and d) worked with the Test and Evaluation (T&E) community, academia, and industry partners to identify opportunities to reduce T&E expenses through the use of OSA principles and practices. The Core OSA/OSAET continued to work with, and across PEOs to adopt automated test and analysis tools.<br>***FY 2015 Plans:***<br>Key activities of the third year of the strategy include; inter-program alignment toward the use of common technical frameworks. Establish transition of programs to fully utilize the principles and practices of OA in accordance with the ASN(RDA) approved Naval OSA Strategy of November 2012. Establish collaboration and cooperation incentives, and improve techniques for finding and using modular capabilities. Complete the transformation of oversight and governance of programs that are implementing or have implemented OA principles and practices through mechanisms such as Community of Interest forums, Technical Authority, Technical Warrant Holders and Product DASN engagments.<br>***FY 2016 Base Plans:***<br>Continue FY2015 Plan in addition to: | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603382N / *Advanced Combat Systems Tech* | **Project (Number/Name)**<br>0324 / *Adv Combat System Technology* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Adjust incentives for collaboration and cooperation between programs. Establish reward mechanisms for programs and personnel successful in achieving OSA implementations that rapidly integrate innovation and lower total ownership costs.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Knowledge Products for Implementing OSA | 0.619 | 0.619 | 0.571 | - | 0.571 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>The OSA program worked to improve System Reuse and Business Practices using the following tactics: a) development and refinement of policies, guidance, and terminology establishing a consistent approach for OSA across the Enterprise; b) the development and maintenance of analytical toolsets to assist Milestone Decision Authorities, Program Managers, and Resource Sponsors in assessing program openness and making informed OSA investment decisions; and c) the facilitation of design disclosure, information sharing, and cross domain component reuse to reduce costs and enable more effective technology insertion, including the administration of the OSA Information Exchange Portal hosted at Forge.mil. The Core OSA/OSAET worked with, and across, the PEOs to adopt automated test and analysis tools. | | | | | |
| ***FY 2015 Plans:***<br>Evolve the Program Managers OSA Workbook and other associated knowledge products to position Naval Programs to take advantage of consistent business and technical practices. Establish collaboration forums so that best practices can be shared so that the OA related knowledge products are kept up to date with the latest innovations being used in program execution. This includes working with outside organizations such as DISA's Forge.mil as well as the Navy's NSERC/NARS environments. Ensure that DAU is addressing training on OSA as directed to them under the Better Buying Power implementation memo that assigns DASN RDT&E the lead for providing baseline information for curriculum development. Continue to develop new training on OA, including deployment of Naval unique training on OA throughout the SYSCOMs and PEOs. | | | | | |
| ***FY 2016 Base Plans:***<br>Continue FY2015 Plan in addition to:<br>Minimize DAU courses to fill needed knowledge gaps. Establish an OSA mentoring program for acquisition professionals. | | | | | |
| ***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603382N / *Advanced Combat Systems Tech* | **Project (Number/Name)**<br>0324 / *Adv Combat System Technology* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.510 | 1.639 | 1.636 | - | 1.636 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

This risk reduction effort evolved and shifted from a PEO IWS 1.0 task to Naval Surface Warfare Center (NSWC)/Dahlgren to an Assistant Secretary of the Navy, Research, Development & Acquisition (ASN-RDA) directed task to fund the Navy's OA Enterprise effort from this core OA Budget line (policy statement dated 5 August 2004). The strategy was further refined in the Deputy Chief of Naval Operations (DCNO) requirement of 23 December 2005 (N6/7) with guidance for this effort to assist the Milestone Decision Authority (MDA), program managers, and resource sponsors in assessing enterprise program assets where appropriate. Office of the Chief of Naval Operations (OPNAV) has directed this program to provide objective, measurable, performance based assessments as Business Case Analysis (BCA) baselines for future system changes and spiral developments.

**E. Performance Metrics**

Change Naval Processes and business practices to cost-effectively innovate and deploy improved warfighting capability based on fleet requirements. Provide OA Systems Engineering to field common, interoperable capabilities; Change Navy and Marine Corps Business processes to Institutionalize OA Principles.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603382N / *Advanced Combat Systems Tech* | Project (Number/Name)<br>0324 / *Adv Combat System Technology* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SE/OA Domain Support | C/FP | APL/ IET Contract : VARIOUS | 1.388 | 0.619 | Nov 2013 | 0.626 | Nov 2014 | 0.653 | Nov 2015 | - | | 0.653 | - | 3.286 | Continuing |
| Systems Engineering | MIPR | NSWC / Dahlgren : Dahlgren, VA | 12.839 | 0.220 | Nov 2013 | 0.248 | Nov 2014 | 0.261 | Nov 2015 | - | | 0.261 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC/CRANE, Carderock, DISA : VARIOUS | 2.597 | 0.257 | Dec 2013 | 0.265 | Dec 2014 | 0.210 | Dec 2015 | - | | 0.210 | - | 3.329 | Continuing |
| Systems Engineering | C/CPAF | ASSETT; Lockheed Martin, NJ; Gartner, VA : Washington DC | 5.114 | - | Nov 2013 | - | | - | | - | | - | - | 5.114 | Continuing |
| OA DOMAIN SUPPORT | WR | NUWC/Newport, Spawar, Navair : VARIOUS | 11.931 | - | | - | | - | | - | | - | - | 11.931 | Continuing |
| SE/Signal Processor | C/CPAF | Lockheed Martin : VARIOUS | 6.000 | - | | - | | - | | - | | - | - | 6.000 | Continuing |
| SE/Signal Processor | C/CPAF | BAE : VARIOUS | 0.300 | - | | - | | - | | - | | - | - | 0.300 | Continuing |
| SE/Signal Processor | C/CPAF | Raytheon : VARIOUS | 0.100 | - | | - | | - | | - | | - | - | 0.100 | Continuing |
| SE/Signal Processor | WR | NSWC/DD, NRL, PHD : VARIOUS | 0.600 | - | | - | | - | | - | | - | - | 0.600 | Continuing |
| | | **Subtotal** | 40.869 | 1.096 | | 1.139 | | 1.124 | | - | | 1.124 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Industry Development | C/FP | IBM, ANGLE, TBD (New IET Contract) : VARIOUS | 9.130 | 0.302 | Nov 2013 | 0.373 | Nov 2014 | - | | - | | - | - | 9.805 | Continuing |
| Technical Data-Academia | WR | NPS-Monterey/DAU : MONTEREY, CA | 2.109 | 0.112 | Nov 2013 | 0.127 | Nov 2014 | - | | - | | - | - | 2.348 | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603382N / *Advanced Combat Systems Tech* | Project (Number/Name)<br>0324 / *Adv Combat System Technology* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | C/FP | TRIDENT, ASSET : VARIOUS | 0.309 | - | | - | | - | | - | | - | - | 0.309 | Continuing |
| | | **Subtotal** | 11.548 | 0.414 | | 0.500 | | - | | - | | - | - | 12.462 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Test & Evaluation | WR | NSWC/DD : DAHLGREN, VA | 2.216 | - | | - | | - | | - | | - | - | 2.216 | Continuing |
| OA Asset Repository (SBIR Account) | WR | Miscellaneous : VARIOUS | 0.150 | - | | - | | - | | - | | - | - | 0.150 | Continuing |
| | | **Subtotal** | 2.366 | - | | - | | - | | - | | - | - | 2.366 | - |

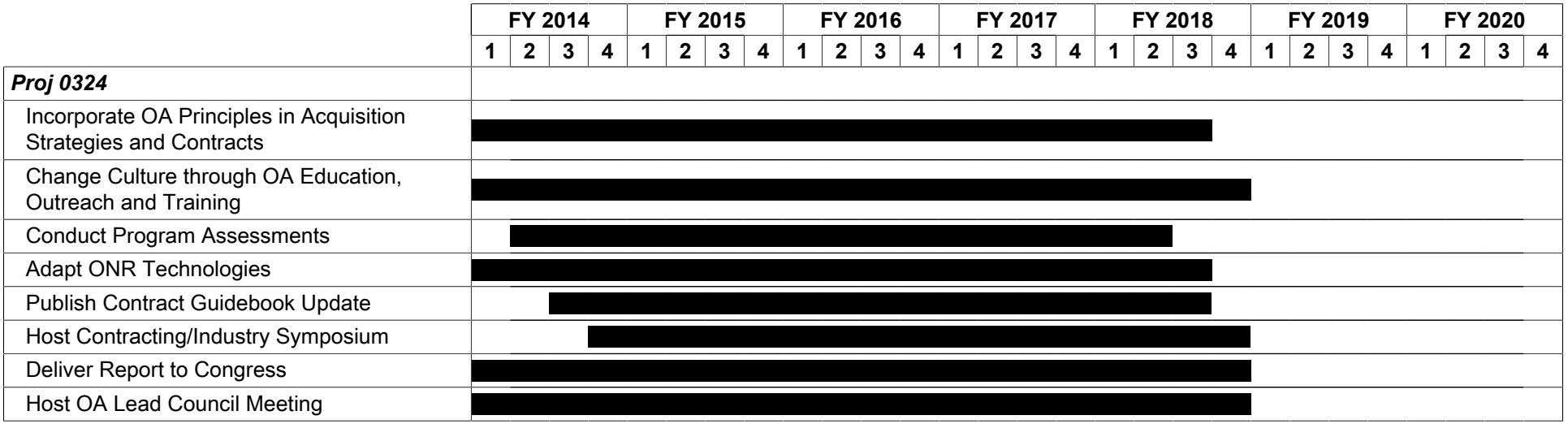
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPAF | Miscellaneous : VARIOUS | 3.021 | - | | - | | 0.378 | Nov 2015 | - | | 0.378 | Continuing | Continuing | Continuing |
| SBIR Assessment (Cong Add) | WR | NSWC/DD : DAHLGREN, VA | 4.748 | - | | - | | 0.134 | Nov 2015 | - | | 0.134 | - | 4.882 | Continuing |
| DAWDF | TBD | TBD : TBD | 0.021 | - | | - | | - | | - | | - | - | 0.021 | Continuing |
| | | **Subtotal** | 7.790 | - | | - | | 0.512 | | - | | 0.512 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 62.573 | 1.510 | | 1.639 | | 1.636 | | - | | 1.636 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603382N / *Advanced Combat Systems Tech* | **Project (Number/Name)**<br>0324 / *Adv Combat System Technology* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603382N / *Advanced Combat Systems Tech* | **Project (Number/Name)**<br>0324 / *Adv Combat System Technology* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0324*** | | | | |
| Incorporate OA Principles in Acquisition Strategies and Contracts | 1 | 2014 | 3 | 2018 |
| Change Culture through OA Education, Outreach and Training | 1 | 2014 | 4 | 2018 |
| Conduct Program Assessments | 2 | 2014 | 2 | 2018 |
| Adapt ONR Technologies | 1 | 2014 | 3 | 2018 |
| Publish Contract Guidebook Update | 3 | 2014 | 3 | 2018 |
| Host Contracting/Industry Symposium | 4 | 2014 | 4 | 2018 |
| Deliver Report to Congress | 1 | 2014 | 4 | 2018 |
| Host OA Lead Council Meeting | 1 | 2014 | 4 | 2018 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603502N *I Surface & Shallow Water MCM* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,588.067 | 150.540 | 86.333 | 118.588 | - | 118.588 | 134.937 | 126.400 | 165.073 | 198.818 | Continuing | Continuing |
| 0260: *Remote Minehunting Systems* | 490.384 | 33.799 | - | - | - | - | - | - | - | - | - | 524.183 |
| 0530: *Mine Hunt Systems* | 270.881 | - | - | 9.536 | - | 9.536 | 9.851 | 4.109 | 4.261 | 4.351 | Continuing | Continuing |
| 1233: *Surface MCM Mid-life Upgrade* | 177.187 | 33.369 | 12.584 | 7.861 | - | 7.861 | 4.411 | 1.956 | 1.902 | 1.032 | Continuing | Continuing |
| 1234: *Unmanned Surface Vehicle (USV)* | 0.000 | - | 23.974 | 34.072 | - | 34.072 | 10.826 | 1.695 | 4.162 | 6.372 | Continuing | Continuing |
| 1235: *Mine Warfare Planning and Analysis* | 0.000 | - | - | 9.064 | - | 9.064 | 9.267 | 7.513 | 6.823 | 6.964 | Continuing | Continuing |
| 2094.: *Unmanned Underwater Vehicle* | 32.562 | 19.637 | 13.674 | 25.065 | - | 25.065 | 73.986 | 89.327 | 126.324 | 154.719 | Continuing | Continuing |
| 2131: *Assault Breaching System* | 528.358 | 49.432 | 17.908 | 15.598 | - | 15.598 | 21.400 | 16.424 | 16.007 | 17.354 | Continuing | Continuing |
| 3123: *SMCM UUV* | 88.695 | 14.303 | 18.193 | 17.392 | - | 17.392 | 5.196 | 5.376 | 5.594 | 8.026 | Continuing | Continuing |
| **MDAP/MAIS Code:**<br>**Other MDAP/MAIS Code(s):** 286 | | | | | | | | | | | | |

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

This program element provides resources for development of mine countermeasure systems to provide minehunting, minesweeping, and neutralization to counter known and projected mine threats. The mine countermeasures 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 and minesweeping systems and the intelligence and oceanographic capabilities that will enable mine warfare superiority. Tactics and techniques used vary across a diversity of environments and a diversity of 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. Increased capability includes conducting minefield reconnaissance (mine density and location) at high area search rates, improving detection capability, decreasing sensor false alarm rates, reducing or eliminating post-mission analysis detect, classify, identify, decide 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, unmanned, modular systems; the establishment of a capable networked command and control systems; and standing up an accurate and interactive environmental system with the ability to form and disseminate a

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603502N *I Surface & Shallow Water MCM* |

Common Environmental Picture. 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 Surface Mine Countermeasures (SMCM) programs are platform independent and will provide detection, classification, localization, identification, neutralization, and influence clearance capabilities. Programs develop: (1) remote minehunting capability for surface platforms; (2) the integration and improvement of new and existing systems (3) support for systems which detect, localize, classify, identify, and neutralize all mine types across Mine Countermeasure (MCM) Avenger Class and other platforms; (4) systems for neutralizing mines and light obstacles through the entire water column to include shallow water, very shallow water, surf zones, and beach landing craft zones in support of operations; (5) the integration of Unmanned Undersea Vehicles (UUVs) to meet Undersea Surveillance capabilities as well as other prioritized and enduring capabilities, requirements and gaps and (6) integrate hardware for experimental testing related to surface ship, aircraft, and other cross platform applications.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 160.040 | 100.349 | 75.597 | - | 75.597 |
| Current President's Budget | 150.540 | 86.333 | 118.588 | - | 118.588 |
| Total Adjustments | -9.500 | -14.016 | 42.991 | - | 42.991 |
| • Congressional General Reductions | - | -0.025 | | | |
| • Congressional Directed Reductions | - | -13.991 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -4.471 | - | | | |
| • SBIR/STTR Transfer | -5.029 | - | | | |
| • Program Adjustments | - | - | 36.285 | - | 36.285 |
| • Rate/Misc Adjustments | - | - | 6.706 | - | 6.706 |

**Change Summary Explanation**

Program Adjustments:
FY14 -$9,500K Total adjustments; Reprogramming CMS -$6,600K, RMS +$2,879K, Stalker -$750K; SBIR -$5,029K.

FY15 -$14.016K Total adjustments: Congressional Reductions SSQ-94 Trainer -$1,500K, USV Development -$3,600K, USV Support -$1,000K, USV Flight 2 -$7,891K, FFRDC Reduction -25K.

FY16 $42,991K Total adjustments; +$7,285K Unmanned Surface Vehicle, +$10,000K LDUUV, +$9,571K AN/AQS-20 Realigned from PE 0604373N, -$1,000K LDUUV, $20,000K USV Speed to Fleet and -$2,865K Misc Adjustments.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>0260 / *Remote Minehunting Systems* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0260: *Remote Minehunting Systems* | 490.384 | 33.799 | - | - | - | - | - | - | - | - | - | 524.183 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**MDAP/MAIS Code:** 286

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

The AN/WLD-1(V)2 Remote Minehunting System (RMS) is a mine reconnaissance system designed for the detection, classification, identification, and localization of bottom and moored mines in shallow and deep water. The RMS will provide the Navy the capability to keep ships and sailors out of the minefield. The RMS is deployed from the Littoral Combat Ship (LCS) as part of the ships' Mine Countermeasure (MCM) Mission Package (MP). The RMS is a fully integrated system consisting of a semi-submersible Remote Multi-Misson Vehicle (RMMV) towing a variable depth sensor, the AN/AQS-20A. This budget line supports the RMMV. The RMMV is a high-endurance, semi-autonomous, low-observable, unmanned, diesel-powered vehicle, operated and maintained from the LCS. Line-of-sight (LOS) and over-the-horizon (OTH) data links provide real time vehicle command and control and mine reconnaissance sensor data transmission to/from LCS.

The first RMMV Low Rate Initial Production (LRIP) units (LRIP 1) were used during the RMMV Reliability Growth Program (RGP) v4.2 configuration and are being upgraded to the version 6.0 (v6.0) configuration to support LCS integration.

In the first quarter of FY14, the improved performance was validated during RMMV Developmental Testing (DT-IIG). A Defense Acquisition Board (DAB) was held in July FY14 for a production decision. The DAB deferred production decision until receipt of proposals (2Q FY15) for the RMMV Competitive contract to procure the next LRIPs.

This is not a new start. Acquisition Category (ACAT) 1D Transparency requirement realigned program funding to Project Element 0604122N/Project Unit 0260 beginning in FY15.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development: | 17.474 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>- Completed grooming of RMMVs to support v4.2 RMMV DT-IIG.<br>- Corrected technical issues discovered during v4.2 RMMV DT-IIG.<br>- Completed RMMV v4.2 Technical Data Package (TDP).<br>- Implemented Operational Availability (Ao) hardware/software improvements. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Support LCS MCM MP and RMMV integration efforts (RMMV v6.0 Preliminary Engineering Change Proposals (PECPs)) on (4) RMMVs. The PECP improvements include structural upgrades to support safe launch and recovery on the LCS, integration of the Multi Vehicle Communication System (MVCS), AN/AQS-20A Sonar Pre-Planned Product Improvement (P3I), and fleet suitability upgrades.<br>***FY 2015 Plans:***<br>- Realigned to PE 0604122N<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Support: | 6.664 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>- Provided engineering, logistics, and programmatic support of RMMV DT-IIG.<br>- Completed RMMV v4.2 Physical Configuration Audit (PCA), Interactive Electronic Technical Manual (IETM), and TDP.<br>- Prepared for Milestone (MS) C DAB and acquisition documentation.<br>- Conducted a DAB IPR vice a MS C DAB.<br>- Provided engineering, logistics, and programmatic support for LCS MCM MP Test events.<br>- Provided on-site engineering support and production oversight at contractor facility.<br>- Conducted RMMV Ready For Issue (RFI) Inspections.<br>***FY 2015 Plans:***<br>- Realigned to PE 0604122N<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Test & Evaluation: | 8.531 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>- Completed RMMV v4.2 DT-IIG. Achieved more than 385 hours of total system operating time during 18 off-shore operationally-representative mine-hunting missions. LCS MCM MP Detachment sailors executed all phases of the RMS mine-hunting mission, including mission planning, mission operations, and post-mission data analysis for the entire test period.<br>- Supported integration and verification testing of RMMV v6.0 including with upgraded AN/AQS-20A Sonar P3I.<br>***FY 2015 Plans:***<br>Realigned to PE 0604122N<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Management: | 1.130 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>- Provided program management oversight in support of v4.2 RMMV DT-IIG.<br>- Provided program management and oversight of RMMV v6.0.<br>- Prepared acquisition documentation in support of the MS C DAB.<br>- Prepared for development and release of the new start RMMV Competitive Low Rate Initial Production (LRIP 2)/Full Rate Production (FRP) contract.<br>- Prepared for the award of the LRIP 1 RMMV Integration/Maintenance contract.<br>***FY 2015 Plans:***<br>- Realigned to PE 0604122N<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 33.799 | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0604122N: *Remote Minehunting System* | - | 21.110 | 20.089 | - | 20.089 | 28.018 | 8.219 | 9.951 | 8.632 | - | 96.019 |

**Remarks**

**D. Acquisition Strategy**

Completed all requirements set forth in Nunn-McCurdy Acquisiton Decison Memorandum (ADM) in FY14. Conducted DAB IPR in 4th QTR FY14.

**E. Performance Metrics**

- Completed exit criteria set forth in Nunn-McCurdy ADM (FY14)
- Completed RMS RGP DT (FY14)
- Conducted DAB IPR (FY14)

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Development & Integration 1 | SS/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 132.439 | 6.738 | Oct 2013 | - | | - | | - | | - | - | 139.177 | - |
| Hardware Development & Integration 2 | C/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 95.993 | - | | - | | - | | - | | - | - | 95.993 | - |
| Hardware Development & Integration | WR | NSWC. PC : Panama City, FL | 11.770 | - | Oct 2013 | - | | - | | - | | - | - | 11.770 | - |
| Systems Engineering 1 | C/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 5.465 | - | | - | | - | | - | | - | - | 5.465 | - |
| Systems Engineering 2 | C/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 16.211 | - | | - | | - | | - | | - | - | 16.211 | - |
| Systems Engineering 3 | WR | NSWC, PC : Panama City, FL | 5.294 | - | | - | | - | | - | | - | - | 5.294 | - |
| Award Fees | SS/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 5.485 | - | | - | | - | | - | | - | - | 5.485 | - |
| Hardware Devleopment & Integration | C/FFP | ARL/PSU : State College, PA | 0.655 | - | | - | | - | | - | | - | - | 0.655 | - |
| Hardware Development & Integration 3 | SS/CPFF | LOCKHEED MARTIN : West Palm Beach, FL | 0.000 | 10.736 | Oct 2013 | - | | - | | - | | - | - | 10.736 | - |
| | | **Subtotal** | 273.312 | 17.474 | | - | | - | | - | | - | - | 290.786 | - |

**Remarks**

ARL/PSU - Applied Reseach Laboratory - Pennsylvania State University

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>0260 / *Remote Minehunting Systems* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development 1 | C/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 7.092 | - | | - | | - | | - | | - | - | 7.092 | - |
| Software Development 2 | C/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 6.961 | - | | - | | - | | - | | - | - | 6.961 | - |
| Software Development 3 | WR | NSWC, PC : West Palm Beach, FL | 2.142 | - | | - | | - | | - | | - | - | 2.142 | - |
| ILS 1 | C/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 17.836 | - | | - | | - | | - | | - | - | 17.836 | - |
| ILS 2 | SS/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 2.000 | - | | - | | - | | - | | - | - | 2.000 | - |
| Engineeing Support/ILS 3 | WR | NSWC, PC : Panama City, FL | 11.075 | 4.722 | Oct 2013 | - | | - | | - | | - | - | 15.797 | - |
| ILS 4 | WR | VARIOUS : Various | 1.125 | 0.328 | Jul 2014 | - | | - | | - | | - | - | 1.453 | - |
| Ship Integration 1 | SS/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 1.258 | - | | - | | - | | - | | - | - | 1.258 | - |
| Ship Integration 2 | C/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 11.938 | - | | - | | - | | - | | - | - | 11.938 | - |
| Ship Integration 3 | Various | VARIOUS : Various | 13.714 | - | | - | | - | | - | | - | - | 13.714 | - |
| Engineering Support | WR | NSWC Corona : Corona, CA | 0.110 | - | | - | | - | | - | | - | - | 0.110 | - |
| Engineering Support | WR | NUWC, NPT : Newport, RI | 2.695 | 0.512 | Oct 2013 | - | | - | | - | | - | - | 3.207 | - |
| Engineering Support | WR | NUWC, KPT : Keyport, WA | 1.062 | 0.629 | Oct 2013 | - | | - | | - | | - | - | 1.691 | - |
| ILS Support | WR | NAWCAD : Patuxent, MD | 0.312 | - | | - | | - | | - | | - | - | 0.312 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>0260 / *Remote Minehunting Systems* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Support | WR | NSWC Carderock : Carderock, MD | 0.755 | 0.250 | Oct 2013 | - | | - | | - | | - | - | 1.005 | - |
| Sandia labs - Reliability Engineering | WR | NSWC, PC : Panama City, FL | 1.649 | - | Oct 2013 | - | | - | | - | | - | - | 1.649 | - |
| Enginerring Support | WR | PORTSMOUTH NSY : Portsmouth, NH | 0.263 | 0.223 | Oct 2013 | - | | - | | - | | - | - | 0.486 | - |
| | | **Subtotal** | 81.987 | 6.664 | | - | | - | | - | | - | - | 88.651 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation 1 | C/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 18.470 | - | | - | | - | | - | | - | - | 18.470 | - |
| Developmental Test & Evaluation | SS/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 56.996 | 3.123 | Oct 2013 | - | | - | | - | | - | - | 60.119 | - |
| Developmental Test & Evaluation | WR | NSWC, PC : Panama City, FL | 15.338 | 3.736 | Oct 2013 | - | | - | | - | | - | - | 19.074 | - |
| Developmental Test & Evaluation | WR | COTF : Norfolk, VA | 0.861 | 0.488 | Oct 2013 | - | | - | | - | | - | - | 1.349 | - |
| Developmental Test & Evaluation | WR | VARIOUS : Various | 5.298 | - | | - | | - | | - | | - | - | 5.298 | - |
| Developmental Test & Evaluation | WR | NSWC/Carderock : Carderock, MD | 0.870 | 0.744 | Oct 2013 | - | | - | | - | | - | - | 1.614 | - |
| Developmental Test & Evaluation | WR | LCSRON : San Diego, CA | 0.000 | 0.440 | Oct 2013 | - | | - | | - | | - | - | 0.440 | - |
| | | **Subtotal** | 97.833 | 8.531 | | - | | - | | - | | - | - | 106.364 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

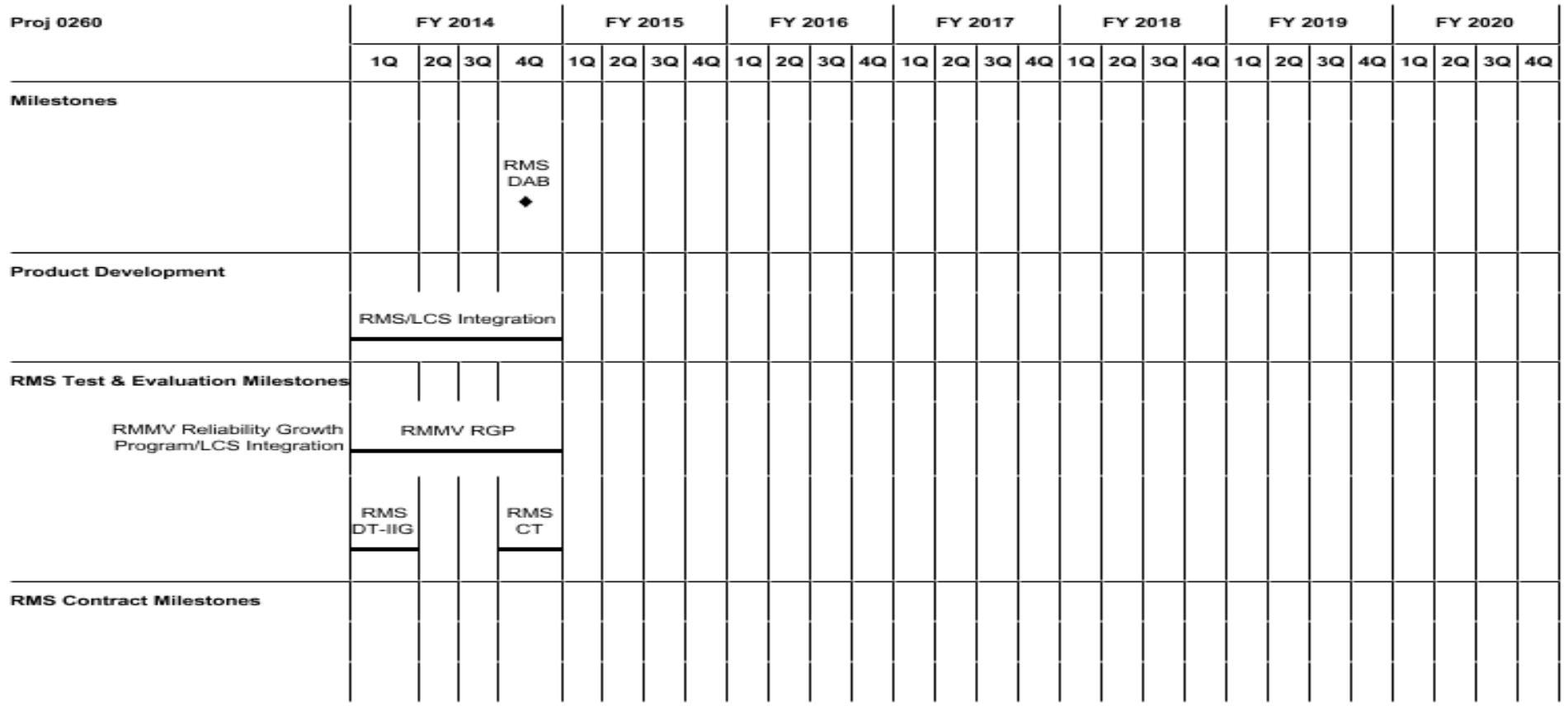
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | C/CPIF | LOCKHEED MARTIN : West Palm Beach, FL | 6.569 | - | | - | | - | | - | | - | - | 6.569 | - |
| Government Engineering Support1 | WR | NSWC, PC : Panama City, FL | 22.996 | - | | - | | - | | - | | - | - | 22.996 | - |
| Government Engineering Support2 | WR | NSWC, PC : Panama City, FL | 0.237 | - | | - | | - | | - | | - | - | 0.237 | - |
| Program Management Support | C/CPFF | CACI : Washington, DC | 6.719 | 1.085 | Oct 2013 | - | | - | | - | | - | - | 7.804 | - |
| Travel | WR | NAVSEA : WNY, DC | 0.731 | 0.045 | Oct 2013 | - | | - | | - | | - | - | 0.776 | - |
| | | **Subtotal** | 37.252 | 1.130 | | - | | - | | - | | - | - | 38.382 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 490.384 | 33.799 | | - | | - | | - | | - | - | 524.183 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |




*2016OSD - 0603502N - 0260*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0260*** | | | | |
| Milestones: Defense Acquisition Board | 4 | 2014 | 4 | 2014 |
| Product Development: RMS/LCS Integration | 1 | 2014 | 4 | 2014 |
| RMS Test & Evaluation Milestones: RMMV Reliability Growth Program/LCS Integration: RMMV Reliability Growth Program | 1 | 2014 | 4 | 2014 |
| RMS Test & Evaluation Milestones: RMMV Reliability Growth Program/LCS Integration: RMS DT-IIG | 1 | 2014 | 1 | 2014 |
| RMS Test & Evaluation Milestones: RMMV Reliability Growth Program/LCS Integration: RMS v6.0 Contractor Testing (CT) | 4 | 2014 | 4 | 2014 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>0530 / *Mine Hunt Systems* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0530: *Mine Hunt Systems* | 270.881 | - | - | 9.536 | - | 9.536 | 9.851 | 4.109 | 4.261 | 4.351 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project contains resources for systems, subsystems, and sensors integrated for use with the Remote Minehunting System (RMS) Remote Multi-Mission Vehicle (RMMV) for mine detection, classification, localization, identification, neutralization, and influence clearance capabilities. Research, development, test, and evaluation efforts are for increasing capability by decreasing time required to conduct Mine Countermeasures (MCM) operations, ensuring low risk to naval and commercial vessels, and removing the man from the minefield. Increased capability includes conducting minefield reconnaissance (mine density and location) at high area search rates, improving detection capability, decreasing sensor false alarm rates, and reducing post-mission analysis for detection, classification, identification, and neutralization.

The AN/AQS-20A is a mine hunting and identification system with acoustic and optic sensors housed in an underwater towed body. The acoustic sensors are designated for the detection, classification and localization of bottom, close-tethered, and volume targets in a single plas. The Electro-Optic Identification Device (EOID) replaces the Volume Search Sonar (VSS) for identification of bottom targets. The system will be deployed from the Littoral Combat Ship (LCS) as part of the MCM Mission Package. The RMS Remote Multi-Mission Vehicle (RMMV) tows the AN/AQS-20A.

In FY16, the AN/AQS-20A Block 2 P3I program will initiate Synthetic Aperture Sonar Acoustic (SAS) Identification (ID) development. The Block 2 P3I program begins in FY16 and continues beyond FY20. The AN/AQS-20A program will also develop a Waveform Generator improvement to support SAS capability at maximum RMMV speeds. Development and Testing of IOT&E deficiency corrective actions will also occur. Material Reliability, obsolescence, and performance Engineering Change Proposal (ECP) efforts will continue beyond FY20.

This is not a new start. Realigned program funding from Program Element 0604373N/Project Unit 0529 beginning in FY16.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** AN/AQS-20A Product Development: | - | - | 5.550 | - | 5.550 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Cited in Program Element 0604373N. | | | | | |
| ***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0530 / *Mine Hunt Systems* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Cited in Program Element 0604373N.<br>***FY 2016 Base Plans:***<br>- Develop replacement Wave Form Generator ECP to resolve obsolescence and support Synthetic Aperture Sonar (SAS) capability at maximum RMMV mine hunting search speeds.<br>- Continue SAS Acoustic Identification development.<br>- Develop corrective actions for deficiencies identified during IOT&E.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** AN/AQS-20A Support: | - | - | 2.071 | - | 2.071 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Cited in Program Element 0604373N.<br>***FY 2015 Plans:***<br>-Cited in Program Element 0604373N.<br>***FY 2016 Base Plans:***<br>- Provide ongoing technical engineering support to AN/AQS-20A.<br>- Complete updates to logistics products based on the results of LCS MCM MP IOT&E.<br>- Conduct repairs to AN/AQS-20A following IOT&E activities.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** AN/AQS-20A Test and Evaluation | - | - | 0.615 | - | 0.615 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Cited in Program Element 0604373N.<br>***FY 2015 Plans:***<br>-Cited in Program Element 0604373N.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0530 / *Mine Hunt Systems* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Verify correction of deficiencies identified during IOT&E.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** AN/AQS-20A Management Services | - | - | 1.300 | - | 1.300 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Cited in Program Element 0604373N.<br>***FY 2015 Plans:***<br>-Cited in Program Element 0604373N.<br>***FY 2016 Base Plans:***<br>- Provide planning and management for the AN/AQS-20A program.<br>- Update acquisition documentation in support of FRP Decison Review and Initial Operational Capability.<br>- Conduct FRP Decision Review.<br>- Provide Program Office travel support.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | - | 9.536 | - | 9.536 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN 1601: *LCS MCM Mission Modules (AN/AQS-20A)* | 16.196 | 8.244 | 32.434 | - | 32.434 | 39.200 | 29.900 | 30.800 | 16.200 | Continuing | Continuing |
| • RDTE&E 0604373N: *Airborne Mine Countermeasures (AMCM)* | 40.862 | 13.319 | - | - | - | - | - | - | - | - | 325.062 |

**Remarks**

**D. Acquisition Strategy**

AN/AQS-20A LRIP procurement continues following Block 2 competitive contract award in FY14. FRPDR will occur in second quarter FY16. Procure P3I kits to upgrade all Block 1 units to meet Block 2 capability.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0530 / *Mine Hunt Systems* |

AN/AQS-24C contract award will occur 3Q FY14 and integrate and test volume search upgrade kits.

**E. Performance Metrics**

AN/AQS-20A Block 2 competitive award in FY14.
AN/AQS-20A - Successfully complete Block 2 IOT&E in FY15.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0530 / *Mine Hunt Systems* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AN/AQS-20A Hardware/ Software Development Q-20 on the H-53 | SS/CPIF | Raytheon : Portsmouth, RI | 31.120 | - | | - | | - | | - | | - | - | 31.120 | - |
| AN/AQS-20A Hardware/ Software Development Q-20A on the H-60 | C/CPFF | Raytheon : Portsmouth, RI | 60.150 | - | | - | | - | | - | | - | - | 60.150 | - |
| AN/AQS-20A Hardware/ Software Development | WR | NSWC, PC : Panama City FL | 14.578 | - | | - | | - | | - | | - | - | 14.578 | - |
| AN/AQS-20A Hardware/ Software Development | C/FP | Northrop Grumman : Melbourne, FL | 4.572 | - | | - | | - | | - | | - | - | 4.572 | - |
| AN/AQS-20A P3I | C/CPFF | Raytheon : Portsmouth, RI | 16.441 | - | | - | | 4.315 | Nov 2015 | - | | 4.315 | Continuing | Continuing | Continuing |
| AN/AQS-20A P3I | C/CPFF | ARL/UT : Austin, TX | 7.767 | - | | - | | 0.400 | Dec 2015 | - | | 0.400 | Continuing | Continuing | Continuing |
| AN/AQS-20A P3I | WR | NSWC, PC : Panama City FL | 3.732 | - | | - | | 0.800 | Oct 2015 | - | | 0.800 | - | 4.532 | - |
| AN/AQS-20A Materiel Reliability ECP Development | C/CPFF | Raytheon : Portsmouth, RI | 0.000 | - | | - | | - | | - | | - | - | - | - |
| AN/AQS-20A P3I | WR | Naval Research Lab : Stennis Space Center, MS | 0.225 | - | | - | | - | | - | | - | - | 0.225 | - |
| | | **Subtotal** | 138.585 | - | | - | | 5.515 | | - | | 5.515 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AN/AQS-20A Engineering Services | WR | NSWC, PC : Panama City, FL | 31.570 | - | | - | | 0.406 | Oct 2015 | - | | 0.406 | - | 31.976 | - |
| AN/AQS-20A Engineering Services | C/CPFF | Raytheon : Portsmouth, RI | 3.686 | - | | - | | 1.500 | Oct 2015 | - | | 1.500 | - | 5.186 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>0530 / *Mine Hunt Systems* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AN/AQS-20A Engineering Services | Various | Various : Various | 54.018 | - | | - | | - | | - | | - | - | 54.018 | - |
| AN/AQS-20A Engineering Services 2 | SS/CPIF | Raytheon : Portsmouth, RI | 3.464 | - | | - | | - | | - | | - | - | 3.464 | - |
| AN/AQS-20A ILS Function | WR | NSWC, PC : Panama City FL | 6.368 | - | | - | | 0.200 | Oct 2015 | - | | 0.200 | - | 6.568 | - |
| AN/AQS-20A ILS Function | SS/CPIF | Raytheon : Portsmouth, RI | 1.546 | - | | - | | - | | - | | - | - | 1.546 | - |
| AN/AQS-20A ILS Function | Various | Various : Various | 0.981 | - | | - | | - | | - | | - | - | 0.981 | - |
| AN/AQS-20A Engineering Services | WR | NSWC/CD : Carderock, MD | 0.500 | - | | - | | - | | - | | - | - | 0.500 | - |
| | | **Subtotal** | 102.133 | - | | - | | 2.106 | | - | | 2.106 | - | 104.239 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AN/AQS-20A T&E Functions | WR | COTF : Norfolk, VA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| AN/AQS-20A T&E Functions | WR | NSWC, PC : Panama City FL | 18.115 | - | | - | | 0.615 | Oct 2015 | - | | 0.615 | - | 18.730 | - |
| AN/AQS-20A T&E Functions | C/CPFF | Raytheon : Portsmouth, RI | 4.134 | - | | - | | - | | - | | - | - | 4.134 | - |
| AN/AQS-20A T&E Functions | Various | Various : Various | 1.583 | - | | - | | - | | - | | - | - | 1.583 | - |
| AN/AQS-20A T&E Functions | C/CPFF | ARL/UT : Austin, TX | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 23.832 | - | | - | | 0.615 | | - | | 0.615 | - | 24.447 | - |

**Remarks**

COFT - Naval Command Operational Test and Evaluation Force

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0530 / *Mine Hunt Systems* |

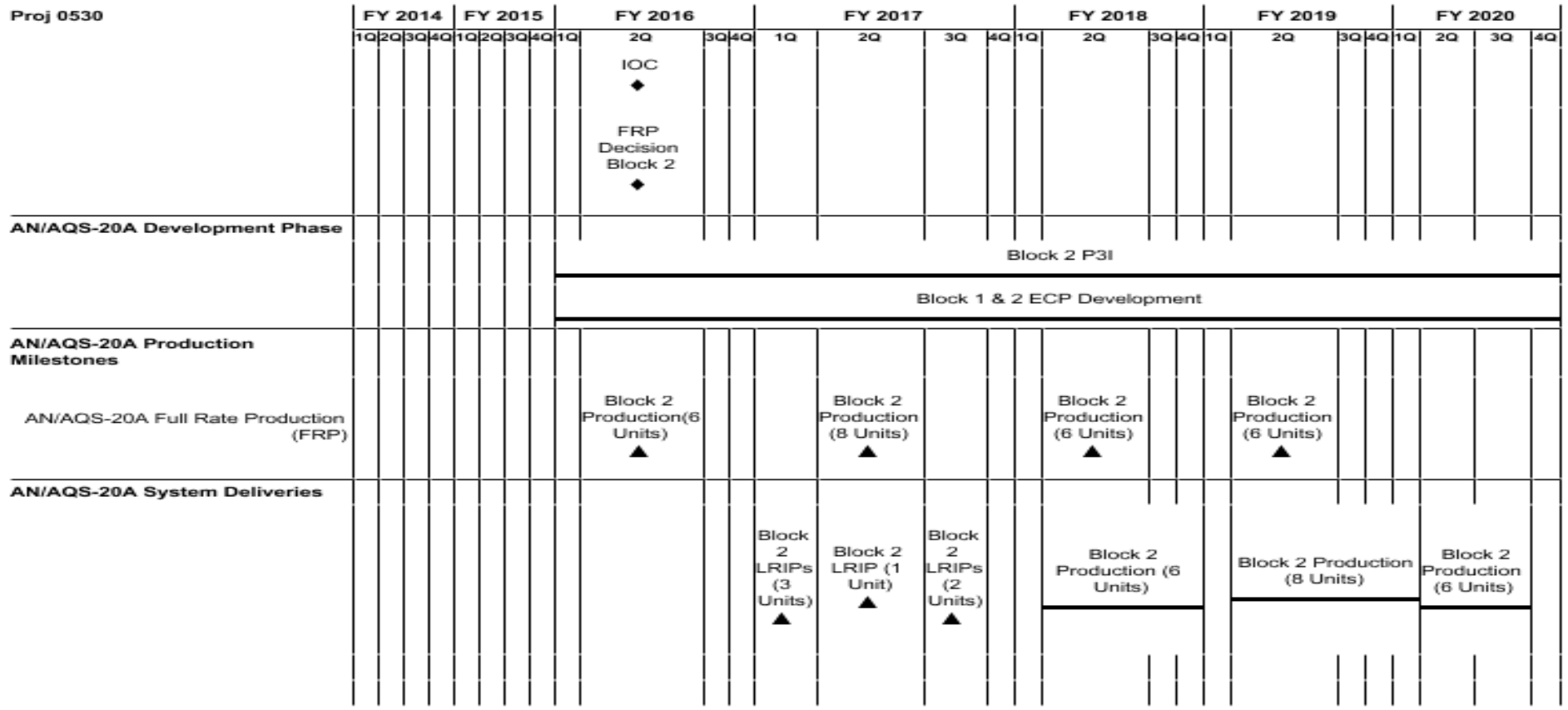
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AN/AQS-20A Management Services | TBD | Various : Various | 5.732 | - | | - | | 1.260 | Dec 2015 | - | | 1.260 | - | 6.992 | - |
| AN/AQS-20A Travel | TBD | Various : Various | 0.587 | - | | - | | 0.040 | Jan 2016 | - | | 0.040 | - | 0.627 | - |
| AN/AQS-20A Acquisition Workforce Fund | Various | Various : Various | 0.012 | - | | - | | - | | - | | - | - | 0.012 | - |
| Need Item Text | C/BA | Not Specified : Not Specified | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 6.331 | - | | - | | 1.300 | | - | | 1.300 | - | 7.631 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 270.881 | - | | - | | 9.536 | | - | | 9.536 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0530 / *Mine Hunt Systems* |




*2016PB - 0603502N - 0530*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0530 / *Mine Hunt Systems* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0530*** | | | | |
| Initial Operatonal Capablity (IOC) | 2 | 2016 | 2 | 2016 |
| AN/AQS-20A Full Rate Production (FRP) Decision Block 2 | 2 | 2016 | 2 | 2016 |
| AN/AQS-20A Development Phase: AN/AQS-20A Block 2 P3I | 1 | 2016 | 4 | 2020 |
| AN/AQS-20A Development Phase: AN/AQS-20A Materiel Reliability, Obsolesence, and Performance ECP Development (Block 1 & 2) | 1 | 2016 | 4 | 2020 |
| AN/AQS-20A Production Milestones: AN/AQS-20A Full Rate Production (FRP): AN/AQS-20A Block 2 Production Basic Award (6 Units) | 2 | 2016 | 2 | 2016 |
| AN/AQS-20A Production Milestones: AN/AQS-20A Full Rate Production (FRP): AN/AQS-20A Block 2 Production Option 1 Award (8 Units) | 2 | 2017 | 2 | 2017 |
| AN/AQS-20A Production Milestones: AN/AQS-20A Full Rate Production (FRP): AN/AQS-20A Block 2 Production Option 2 Award (6 Units) | 2 | 2018 | 2 | 2018 |
| AN/AQS-20A Production Milestones: AN/AQS-20A Full Rate Production (FRP): AN/AQS-20A Block 2 Production Option 3 Award (6 Units) | 2 | 2019 | 2 | 2019 |
| AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 LRIP Basic Award Systems (3 Units) | 1 | 2017 | 1 | 2017 |
| AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 LRIP Basic Award Systems (2 Units) | 3 | 2017 | 3 | 2017 |
| AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 LRIP Option 1 Award System (1 Unit) | 2 | 2017 | 2 | 2017 |
| AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Production Basic Award Systems (6 Units) | 2 | 2018 | 4 | 2018 |
| AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Production Option 1 Award Systems (8 Units) | 2 | 2019 | 1 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>0530 / *Mine Hunt Systems* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Production Option 2 Award Systems (6 Units) | 2 | 2020 | 3 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1233 / *Surface MCM Mid-life Upgrade* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1233: *Surface MCM Mid-life Upgrade* | 177.187 | 33.369 | 12.584 | 7.861 | - | 7.861 | 4.411 | 1.956 | 1.902 | 1.032 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

UISS and Multi-Function USV funding moved to PE 0603502N Proj:1234 Unmanned Surface Vehicle (USV)

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

This project provides resources for development, improvement and integration of MCM systems. A description of the major planned programs include the following:

1) AN/SQQ-32(V)4 High-Frequency, Wide Band (HFWB) is a technology upgrade to the AN/SQQ-32 Towed Body which will incorporate HFWB technology into the detection sonar to address performance deficiencies against new mine threats in the littorals. This upgrade will be installed on MCM-1 Class ships with the AN/SQQ-32(V)3 and will develop new transducer modules, fiber optic cable and modify topside processing and display software. 2) Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System - Maritime (GCCS-M). MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander. 3) Develop and implement Mine Countermeasures Commander's Estimate of the Situation (MCM CES). 4) The Unmanned Influence Sweep System (UISS) utilizes an Unmanned Surface Vehicle (USV) integrated with an Unmanned Surface Sweep System (US3), a magnetic/acoustic sweep system developed to sweep acoustic/magnetic influence mines, which can be deployed from the Littoral Combat Ship (LCS) or a ship of opportunity; 5) The Multi-Function USV replaces the sweep system with a minehunting sensor. The capability leverages off a common USV to conduct minehunting missions. 6) AN/SLQ-60 Mine Neutralization System (MNS) Seafox on the MCM Class ships. MNS is the replacement to the existing AN/SLQ-48 Mine Neutralization System. 7) SSQ-94 MCM Trainer upgrade will incorporate the AN/SQQ-32 (V)8 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** HFWB/PRODUCT DEVELOPMENT: | 1.133 | 0.856 | 0.890 | - | 0.890 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued systems engineering, requirements analysis, design and development for AN/SQQ-32(V)4 HFWB P3I thru the sensor effort. | | | | | |
| ***FY 2015 Plans:***<br>Continue systems engineering, requirements analysis, design and development for AN/SQQ-32(V)4 HFWB P3I thru the sensor effort. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue systems engineering, requirements analysis, design and development for AN/SQQ-32(V)4 HFWB P3I thru the sensor effort.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** HFWB/SUPPORT: | 0.394 | 0.394 | 0.155 | - | 0.155 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued software requirements, configuration, and software integration for AN/SQQ-32(V)4 HFWB P3I through the sensor.<br>***FY 2015 Plans:***<br>Continue software requirements, configuration, and software integration for AN/SQQ-32(V)4 HFWB P3I through the sensor.<br>***FY 2016 Base Plans:***<br>Continue software requirements, configuration, and software integration for AN/SQQ-32(V)4 HFWB P3I through the sensor.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** HFWB/TEST AND EVALUATION: | 0.310 | 0.303 | 0.650 | - | 0.650 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued to perform Lab and At Sea testing for AN/SQQ-32(V)4 HFWB P3I effort.<br>***FY 2015 Plans:***<br>Continue to perform Lab and At Sea testing for AN/SQQ-32(V)4 HFWB P3I effort.<br>***FY 2016 Base Plans:***<br>Continue to perform Lab and At Sea testing for AN/SQQ-32(V)4 HFWB P3I effort and thru the senor testing.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MEDAL/PRODUCT DEVELOPMENT: | 4.333 | 3.512 | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed development of MEDAL EA Iteration 7. Conduct Contractor and Government testing for MEDAL EA v1.<br>***FY 2015 Plans:***<br>Conduct Test & Evaluation of MINEnet Tactical (MEDAL EA). Integration activities with LCS Mission Package. Develop Information Assurance documentation for Authority to Operate on Navy networks. Conduct series of Devlopment tests (DTs). Continue planning for the development of MEDAL EA Increment 2. Begin development of MEDAL EA course curriculum. Conduct series of regression tests.<br>***FY 2016 Base Plans:***<br>Moved to Project Unit (PU) 1235<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MEDAL/SUPPORT: | 0.550 | 0.536 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Oversaw technical integration of developed algorithms and models that have demonstrated their effectiveness with respect to their objectives. Supported efforts to include communication with activities such as applied labs, government activities, and designated contractors. Assisted in providing the speed, agility, adaptability, and flexibility required for modern MCM operations. Completed Fielding Plan for MEDAL EA; submited logistics and DOD Information Assurance (IA) Certification and Accreditation Process (DIACAP) packages.<br>***FY 2015 Plans:***<br>Oversee technical integration of developed algorithms and models that have demonstrated their effectiveness with respect to their objectives. Support effort to include communication with activities such as applied labs, government activities, and designated contractors. Assist in providing the speed, agility, adaptability, and flexibility required for modern MCM operations. Achieve IOC and begin fielding to achieve FOC. Continue introduction of CES capability and Planning on Risk (PoR) functionality via a limited fielding to Fleet Users | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| including Mine Countermeasures Squadrons (MCMRONs) and Naval Mine and Anti Submarine Warfare Command (NMAWC). Provide in-service support to MEDAL EA IOC units.<br>***FY 2016 Base Plans:***<br>Moved to Project Unit (PU) 1235<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MEDAL/TEST AND EVALUATION: | 1.960 | 1.735 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Incorporated lessons learned from MINENet Tactical CT.<br>***FY 2015 Plans:***<br>Continue System Integration testing activities wih multiple platforms. Continue planning for subsequent OA events. Deliver to Fleet in accordance with the MEDAL EA Fielding Plan. Conduct system Integration testing activities with LCS, CANES and ISNS.<br>***FY 2016 Base Plans:***<br>Moved to Project Unit (PU) 1235<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MEDAL/MANAGEMENT: | 0.759 | 0.768 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Provided program management support and travel for MEDAL program. Provided overall technical guidance and leadership for the program. Oversaw financial and logistics efforts and coordinated with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. As part of the systems engineering element of PM, communicate and coordinate with MIW C4ISR, ICWS, Organic MCM, Mainstreaming MIEW, Expeditionary Warfare C4ISR, tactics development, long term planning, Naval Special Clearance Team (NSCT-1) Assault Breaching Systems of Systems (ABSoS), LCS, and other programs as they | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| relate to MEDAL and MIW Mission Planning, Evaluation, and C4ISR. Other PM tasking to include briefings, demonstrations, and project planning as required.<br>***FY 2015 Plans:***<br>Provide program management support and travel for MEDAL program. Program management shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. As part of the systems engineering element of PM, communicate and coordinate with MIW C4ISR, ICWS, Organic MCM, Mainstreaming MIEW, Expeditionary Warfare C4ISR, tactics development, long term planning, Naval Special Clearance Team (NSCT-1) Assault Breaching Systems of Systems (ABSoS), LCS, and other programs as they relate to MEDAL and MIW Mission Planning, Evaluation, and C4ISR. Other PM tasking to include briefings, demonstrations, and project planning as required.<br>***FY 2016 Base Plans:***<br>Moved to Project Unit (PU) 1235<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MNS Replacement | 1.815 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed SMCM ship system engineering and testing for the MCM Ship Mine Neutralization System (Seafox)Replacement program.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** SSQ-94 MCM Trainer Development | 4.100 | 4.480 | 6.166 | - | 6.166 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| SSQ-94 Mine Warfare Countermeasures Simulator; developed the hardware and software upgrades to the combat system team/individual training capabilities on the MCM Class Ship<br>***FY 2015 Plans:***<br>SSQ-94 Mine Warfare Countermeasures Simulator; continue development of hardware and software upgrades to the combat system team/individual training capabilities on the MCM Class Ship<br>***FY 2016 Base Plans:***<br>SSQ-94 Mine Warfare Countermeasures Simulator; continue development of hardware and software upgrades to the combat system team/individual training capabilities on the MCM Class Ship<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** UISS /PRODUCT DEVELOPMENT: | 6.000 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed MS B. Began Engineering and Manufacturing Design (E&MD) phase. Award Engineering Development Model (EDM) contract. Design and build EDM. Develop software and hardware interfaces.<br>***FY 2015 Plans:***<br>Moved to Project Unit 1234<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** UISS / SUPPORT: | 2.250 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed Milestone B documentation. Commenced Engineering and ILS support for E&MD phase efforts.<br>***FY 2015 Plans:***<br>Moved to Project Unit 1234.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** UISS / TEST AND EVALUATION: | 3.665 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Developed TEMP.<br>***FY 2015 Plans:***<br>Moved to Project Unit 1234<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** UISS / MANAGEMENT: | 1.900 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Commence E&MD contract management. Commence progam support for Milestone C documentation.<br>***FY 2015 Plans:***<br>Moved to Project Unit 1234.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** USV / PRODUCT DEVELOPMENT | 3.800 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Developed hardware and software changes to tow minehunting sensor. Tested sonar performance when towed by RHIB in various sea states.<br>***FY 2015 Plans:***<br>Moved to Project Unit 1234.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** USV / SUPPORT | 0.400 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Engineering and Logistic support for hardware development.<br>***FY 2015 Plans:***<br>Moved to Project Unit 1234.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 33.369 | 12.584 | 7.861 | - | 7.861 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2622: *LV075/LV078/LV080* | 29.779 | 16.262 | 7.572 | - | 7.572 | 11.036 | 6.760 | 1.628 | 0.798 | - | 177.262 |

**Remarks**

**D. Acquisition Strategy**

HFWB - Naval Surface Warfare Center, Panama City (NSWC, PC) and ARL UT designed and developed the HFWB upgrade to the AN/SQQ-32.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

Mine Warfare and Environmental Decision Aids Library (MEDAL) - requirements for MEDAL Builds are generated through a formal requirements process. Requirements conferences gather a list of candidate functions based on a logical sequence to fully implement the overall software architecture. The fleet is presented with a recommended list of candidate capabilities based on this program plan, doctrine, fleet comments, and technology. These capability items are then prioritized by the fleet representatives (coordinated by Naval Mine Warfare and Anti-Submarine Command (NMAWC).The fleet inputs are then consolidated by COMINEWARCOM into an overall list which is then presented to Navy leadership for pricing and final selection. The selection is based on price, risk, available funding, and possibly by other program factors (e.g., ensure that MEDAL supports other program delivery schedules). Selection balances immediate needs, long term objectives, technical maturity and other programmatic factors. A verification and validation process is applied to any algorithms, tactics, or models to be incorporated in the software. MEDAL development to include integration of data fusion techniques and incorporation of Data Access Layer (DAL) architecture to meet FORCEnet requirements. Acquisition strategy for Mine Countermeasures Commander's Estimate of the situation (MCM CES) is to deliver the software module within MEDAL builds by implementing the CES framework into the MEDAL software. SSQ-94 MCM Trainer upgrade will incorporate the AN/SQQ-32 (V)8 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.

UISS (US3)- Requirements for Unmanned Influence Sweep System (UISS) are documented in the Unmanned Influence Sweep System (UISS) Capability Development Document (CDD). Two Engineering and Manufacturing Development (EMD) contracts will be awarded in FY14 with an option for Low Rate Initial Production (LRIP). The UISS program moved to Project Unit 1234 starting in FY15.

**E. Performance Metrics**

UISS - Successfully reach Milestone B in FY14; Award EDM contract.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1233 / *Surface MCM Mid-life Upgrade* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MNS Development | Various | TBD : TBD | 20.640 | 1.815 | Nov 2013 | - | | - | | - | | - | - | 22.455 | - |
| SSQ-94 Trainer | WR | NSWC, PC : TBD | 0.000 | 4.100 | Dec 2013 | 4.480 | Nov 2014 | 6.166 | Nov 2015 | - | | 6.166 | - | 14.746 | - |
| BSP: Develop Bottom Sediment Classifier | WR | NRL : WASHINGTON, DC | 0.258 | - | | - | | - | | - | | - | - | 0.258 | - |
| Systems Engineering and Integration | WR | NSWC, PC : PANAMA CITY, FL | 0.306 | - | | - | | - | | - | | - | - | 0.306 | - |
| System Development 1 | WR | NSWC, PC : SAN DIEGO, CA | 0.373 | - | | - | | - | | - | | - | - | 0.373 | - |
| Systems Engineering 2 | WR | NSWC, PC : PANAMA CITY, FL | 2.915 | - | | - | | - | | - | | - | - | 2.915 | - |
| Systems Engineering 3 MCM CES | WR | NSWC, PC : PANAMA CITY, FL | 1.633 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| HFWB: Primary Hardware Development 1 | C/CPAF | NSWC, PC/ARL UT : FLORIDA/TEXAS | 15.511 | - | | - | | - | | - | | - | - | 15.511 | - |
| Primary Hardware Development 2 | WR | ARL-UT : AUSTIN, TX | 0.000 | - | | - | | - | | - | | - | - | - | - |
| HFWB: Tow Cable Development | C/CPAF | NSWC, PC/ARL UT : FLORIDA/TEXAS | 1.399 | - | | - | | - | | - | | - | - | 1.399 | - |
| HFWB: Ship Integration | WR | NSWC, PC : PANAMA CITY, FL | 1.697 | - | | - | | - | | - | | - | - | 1.697 | - |
| HFWB: SYSTEM ENGINEER | C/CPAF | NSWC/ARL UT : FLORIDA/TEXAS | 5.874 | 1.133 | Nov 2013 | 0.856 | Nov 2014 | 0.890 | Nov 2015 | - | | 0.890 | - | 8.753 | - |
| Software Development MEDAL EA | C/CPFF | SAIC : McLean, VA | 33.335 | 4.333 | Nov 2013 | 3.512 | Nov 2014 | - | | - | | - | - | 41.180 | - |
| UISS: Product Development 1 | C/CPIF | ITT : Panama City, FL | 5.198 | - | | - | | - | | - | | - | - | 5.198 | - |
| UISS: Product Development 2 | WR | NSWC, PC : Panama City, FL | 4.323 | - | | - | | - | | - | | - | - | 4.323 | - |
| UISS: Product Development 3 | C/CPIF | Various : Various | 2.781 | - | | - | | - | | - | | - | - | 2.781 | - |
| UISS: Product Development 4 | C/CPIF | TBD : TBD | 8.930 | 6.000 | Sep 2014 | - | | - | | - | | - | - | 14.930 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1233 / *Surface MCM Mid-life Upgrade* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UISS: Product Development 5 | WR | NSWC, CD : Bethesda, MD | 1.224 | - | | - | | - | | - | | - | - | 1.224 | - |
| USV: Product Development | C/CPIF | TBD : TBD | 0.000 | 3.800 | Sep 2014 | - | | - | | - | | - | - | 3.800 | - |
| | | **Subtotal** | 106.397 | 21.181 | | 8.848 | | 7.056 | | - | | 7.056 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Develop Logistics Products | WR | NSWC, PC : PANAMA CITY, FL | 0.243 | - | | - | | - | | - | | - | - | 0.243 | - |
| Software Development 1 | C/CPFF | SAIC : McLean, VA | 0.350 | - | | - | | - | | - | | - | - | 0.350 | - |
| Software Development 2 | C/CPFF | SAIC : McLean, Va | 0.914 | - | | - | | - | | - | | - | - | 0.914 | - |
| HFWB Software Development | WR | NSWC, PC/ARL-UT : FLORIDA/TEXAS | 7.382 | 0.394 | Nov 2013 | 0.394 | Nov 2014 | 0.155 | Nov 2015 | - | | 0.155 | - | 8.325 | - |
| HFWB Integrated Logistics Support | WR | NSWC, PC : PANAMA CITY, FL | 2.765 | - | Nov 2013 | - | Nov 2014 | - | | - | | - | - | 2.765 | - |
| Software Engineering 1 MCM CES | WR | NSWC, PC : PANAMA CITY, FL | 1.517 | - | | - | | - | | - | | - | - | 1.517 | - |
| Software Engineering 2 MEDAL | WR | NSWC, PC : PANAMA CITY, FL | 1.472 | 0.550 | Nov 2013 | 0.536 | Nov 2014 | - | | - | | - | - | 2.558 | - |
| UISS: Engineering 1 | C/CPAF | ITT : Panama City, FL | 3.018 | - | | - | | - | | - | | - | - | 3.018 | - |
| UISS: Engineering 2 | WR | NSWC, PC : Panama City, FL | 5.451 | 1.050 | Dec 2013 | - | | - | | - | | - | - | 6.501 | - |
| UISS: Engineering 3 | WR | NSWC, CD : Bethesda, MD | 1.500 | 1.100 | Dec 2013 | - | | - | | - | | - | - | 2.600 | - |
| UISS: Integrated Logistics 1 | C/CPAF | ITT : Panama City, FL | 1.408 | - | | - | | - | | - | | - | - | 1.408 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1233 / *Surface MCM Mid-life Upgrade* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UISS: Integrated Logistics 2 | WR | NSWC, PC : Panama City, FL | 5.738 | - | | - | | - | | - | | - | - | 5.738 | - |
| UISS: Integrated Logistics 3 | WR | NSWC, CD : Bethesda, MD | 0.000 | 0.250 | Dec 2013 | - | | - | | - | | - | - | 0.250 | - |
| USV : Engineering 1 | WR | NSWC, CD : Bethesda, MD | 0.000 | 0.250 | Dec 2013 | - | | - | | - | | - | - | 0.250 | - |
| USV : Engineering 2 | WR | NSWC, PC : Panama City, FL | 0.000 | - | | - | | - | | - | | - | - | - | - |
| USV : Integrated Logistics 1 | WR | NSWC, CD : Bethesda, MD | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 31.758 | 3.594 | | 0.930 | | 0.155 | | - | | 0.155 | - | 36.437 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEDAL Test and Evaluation | C/FP | SAIC : McLean, VA | 3.964 | 1.960 | Nov 2013 | 1.735 | Nov 2014 | - | | - | | - | - | 7.659 | - |
| MCM CES Test and Evaluation 1 | C/CPAF | VARIOUS : VARIOUS | 1.782 | - | | - | | - | | - | | - | - | 1.782 | - |
| HFWB: Developmental Test and Evaluation | WR | NSWC, PC/ARL-UT : FLORIDA/TEXAS | 4.549 | 0.310 | Nov 2013 | 0.303 | Nov 2014 | 0.650 | Nov 2015 | - | | 0.650 | - | 5.812 | - |
| Test and Evaluation 2 | C/CPAF | VARIOUS : VARIOUS | 5.204 | - | | - | | - | | - | | - | - | 5.204 | - |
| UISS: Test and Evaluation 1 | C/CPIF | ITT : Panama City, FL | 2.118 | - | | - | | - | | - | | - | - | 2.118 | - |
| UISS: Test and Evaluation 2 | WR | NSWC, PC : Panama City, FL | 3.912 | 1.650 | Dec 2013 | - | | - | | - | | - | - | 5.562 | - |
| UISS: Test and Evaluation 3 | WR | NSWC, CCD : Bethesda, MD | 1.084 | 1.670 | Dec 2013 | - | | - | | - | | - | - | 2.754 | - |
| UISS: Test and Evaluation 4 | C/CPIF | TBD : TBD | 1.244 | 0.145 | Mar 2014 | - | | - | | - | | - | - | 1.389 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UISS: Test and Evaluation 5 | WR | COTF : Norfolk, VA | 0.000 | 0.200 | Dec 2013 | - | | - | | - | | - | - | 0.200 | - |
| | | **Subtotal** | 23.857 | 5.935 | | 2.038 | | 0.650 | | - | | 0.650 | - | 32.480 | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support 1 | C/CPFF | CACI : WASHINGTON, DC | 0.263 | - | | - | | - | | - | | - | - | 0.263 | - |
| Travel 1 | WR | NAVSEA : WNY, DC | 0.084 | - | | - | | - | | - | | - | - | 0.084 | - |
| Government Engineering Support1 | WR | NSWC, PC : PANAMA CITY, FL | 0.325 | - | | - | | - | | - | | - | - | 0.325 | - |
| MEDAL Program Management Support 2 | Various | VARIOUS : VARIOUS | 1.400 | 0.759 | Nov 2013 | 0.768 | Nov 2014 | - | | - | | - | - | 2.927 | - |
| SBIR Assessment 2 | Various | VARIOUS : VARIOUS | 0.019 | - | | - | | - | | - | | - | - | 0.019 | - |
| Program Management Support 3 | C/CPFF | CACI : WASHINGTON, DC | 1.341 | - | | - | | - | | - | | - | - | 1.341 | - |
| Program Management Support 4 | C/CPFF | CACI : WASHINGTON, DC | 0.080 | - | | - | | - | | - | | - | - | 0.080 | - |
| Government Engineering Support3 | WR | NSWC, PC : PANAMA CITY, FL | 0.090 | - | | - | | - | | - | | - | - | 0.090 | - |
| Travel 3 | C/CPAF | NAVSEA : WNY, DC | 0.256 | - | | - | | - | | - | | - | - | 0.256 | - |
| Program Management Support 5 | C/CPFF | CACI : WASHINGTON, DC | 0.167 | - | | - | | - | | - | | - | - | 0.167 | - |
| Government Engineering Support4 | WR | NSWC, PC : PANAMA CITY, FL | 0.010 | - | | - | | - | | - | | - | - | 0.010 | - |
| Travel4 | C/CPAF | NSWC, PC : PANAMA CITY, FL | 0.069 | - | | - | | - | | - | | - | - | 0.069 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1233 / *Surface MCM Mid-life Upgrade* | |

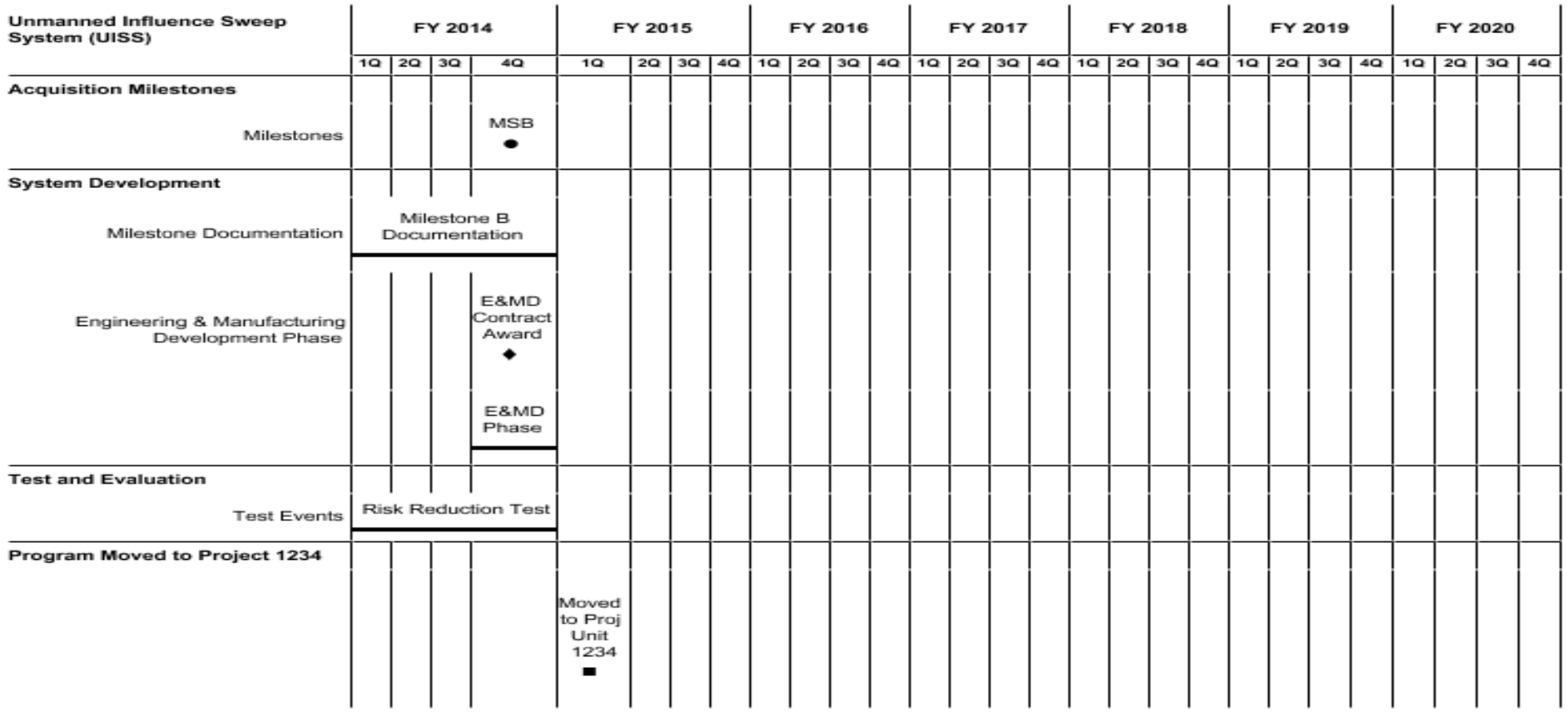
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HFWB: Program Management Support 6 | C/CPAF | VARIOUS : VARIOUS | 1.442 | - | | - | | - | | - | | - | - | 1.442 | - |
| HFWB: Government Engineering Support5 | WR | NSWC, PC : PANAMA CITY, FL | 0.750 | - | | - | | - | | - | | - | - | 0.750 | - |
| HFWB: Travel 5 | C/CPAF | NAVSEA : WNY, DC | 0.080 | - | | - | | - | | - | | - | - | 0.080 | - |
| Government Engineering Support6 | WR | NSWC, PC : PANAMA CITY, FL | 1.352 | - | | - | | - | | - | | - | - | 1.352 | - |
| Travel 6 | C/CPAF | NAVSEA : WNY, DC | 0.238 | - | | - | | - | | - | | - | - | 0.238 | - |
| SBIR Assessment 6 | Various | VARIOUS : VARIOUS | 0.054 | - | | - | | - | | - | | - | - | 0.054 | - |
| Program Management Support 7 | C/CPAF | VARIOUS : VARIOUS | 0.350 | - | | - | | - | | - | | - | - | 0.350 | - |
| Acquisition Workforce Fund | Various | VARIOUS : VARIOUS | 0.122 | - | | - | | - | | - | | - | - | 0.122 | - |
| UISS: Contractor Management 3 | WR | ITT : PANAMA CITY, FL | 0.776 | - | | - | | - | | - | | - | - | 0.776 | - |
| UISS: Government Management | WR | VARIOUS : VARIOUS | 4.458 | - | | - | | - | | - | | - | - | 4.458 | - |
| UISS: Contractor Management 7 | C/CPAF | CACI : WASHINGTON, DC | 0.249 | - | | - | | - | | - | | - | - | 0.249 | - |
| UISS: Contractor Management | C/CPFF | TBD : TBD | 0.880 | 1.800 | Apr 2014 | - | | - | | - | | - | - | 2.680 | - |
| UISS: Travel | WR | NAVSEA : WNY, DC | 0.320 | 0.100 | Dec 2013 | - | | - | | - | | - | - | 0.420 | - |
| | | **Subtotal** | 15.175 | 2.659 | | 0.768 | | - | | - | | - | - | 18.602 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 177.187 | 33.369 | | 12.584 | | 7.861 | | - | | 7.861 | - | - | - |

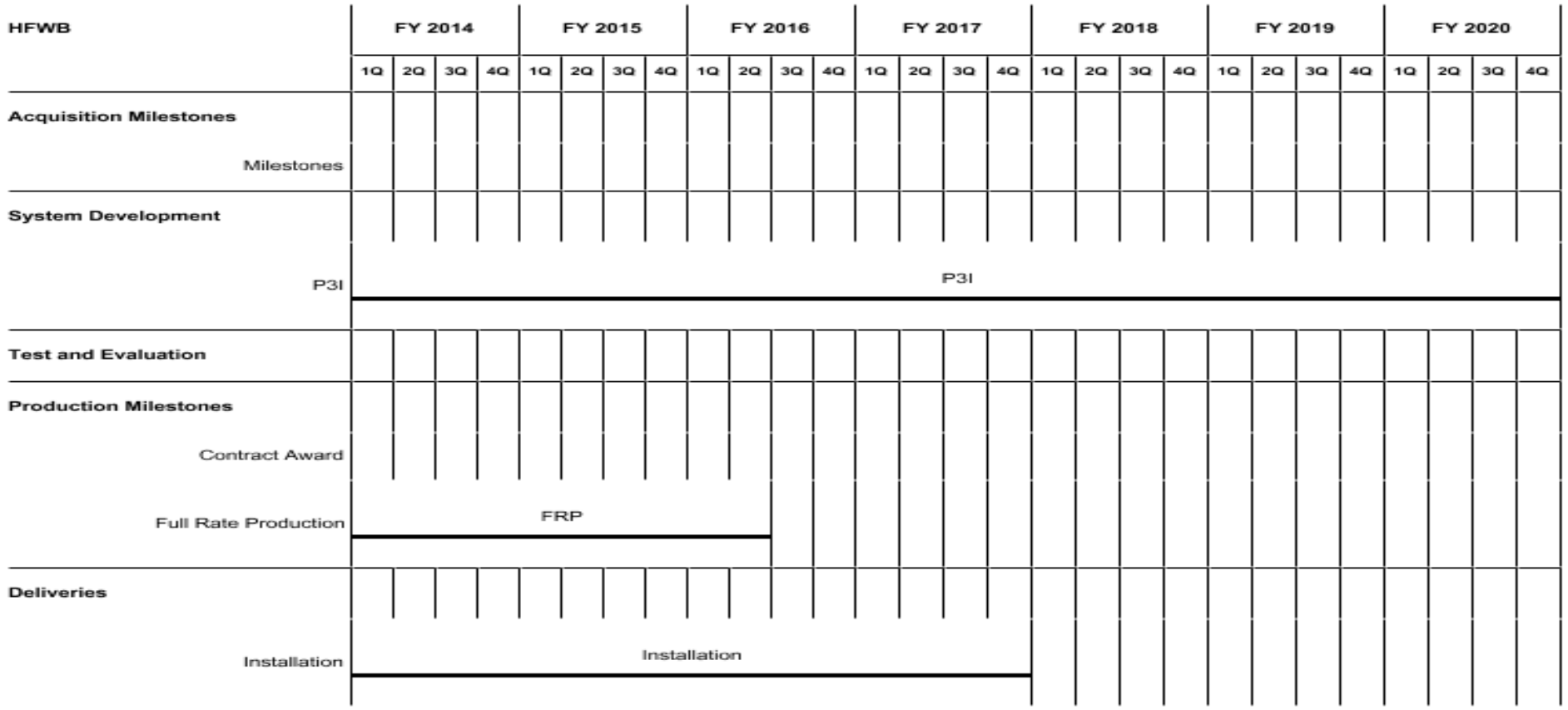
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |



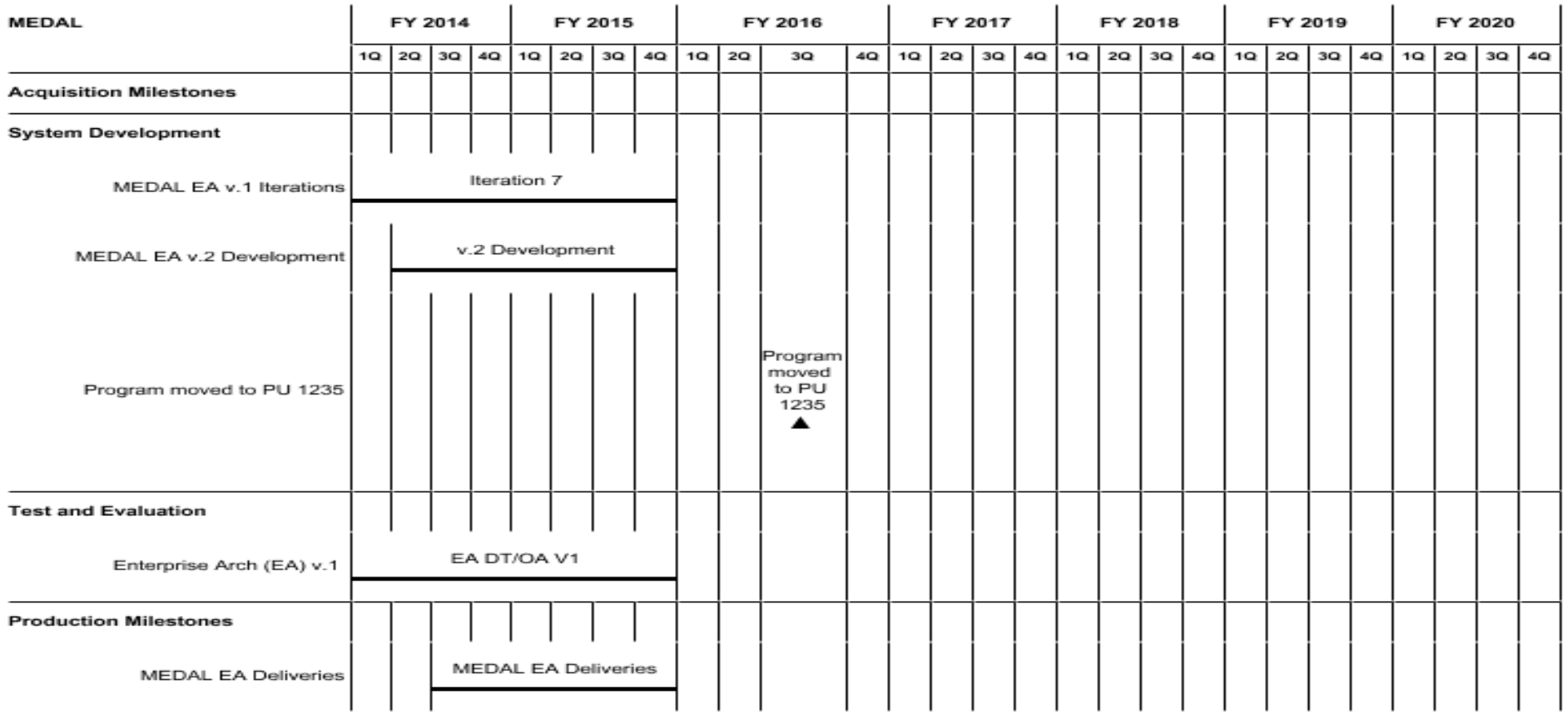

*2016PB - 0603502N - 1233*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |



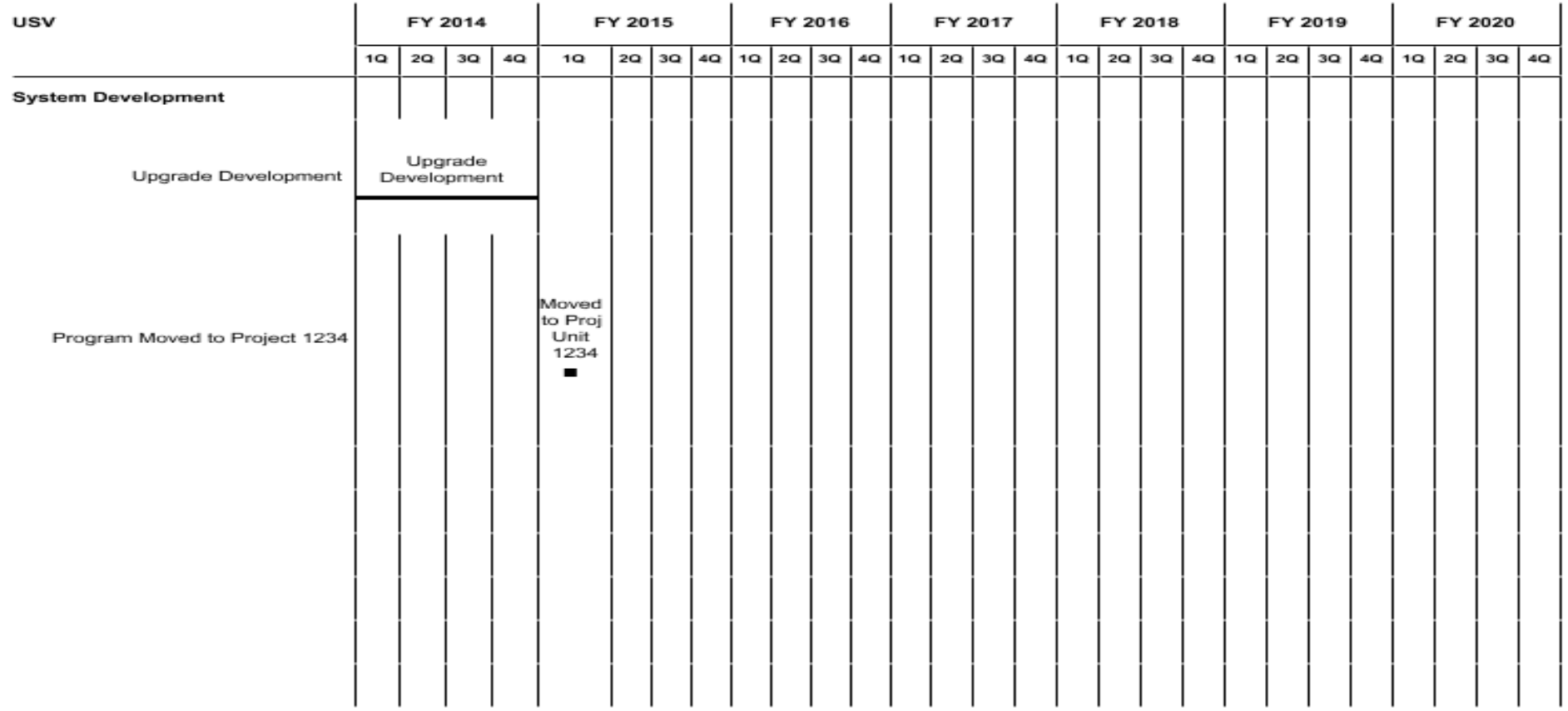

*2016PB - 0603502N - 1233*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |



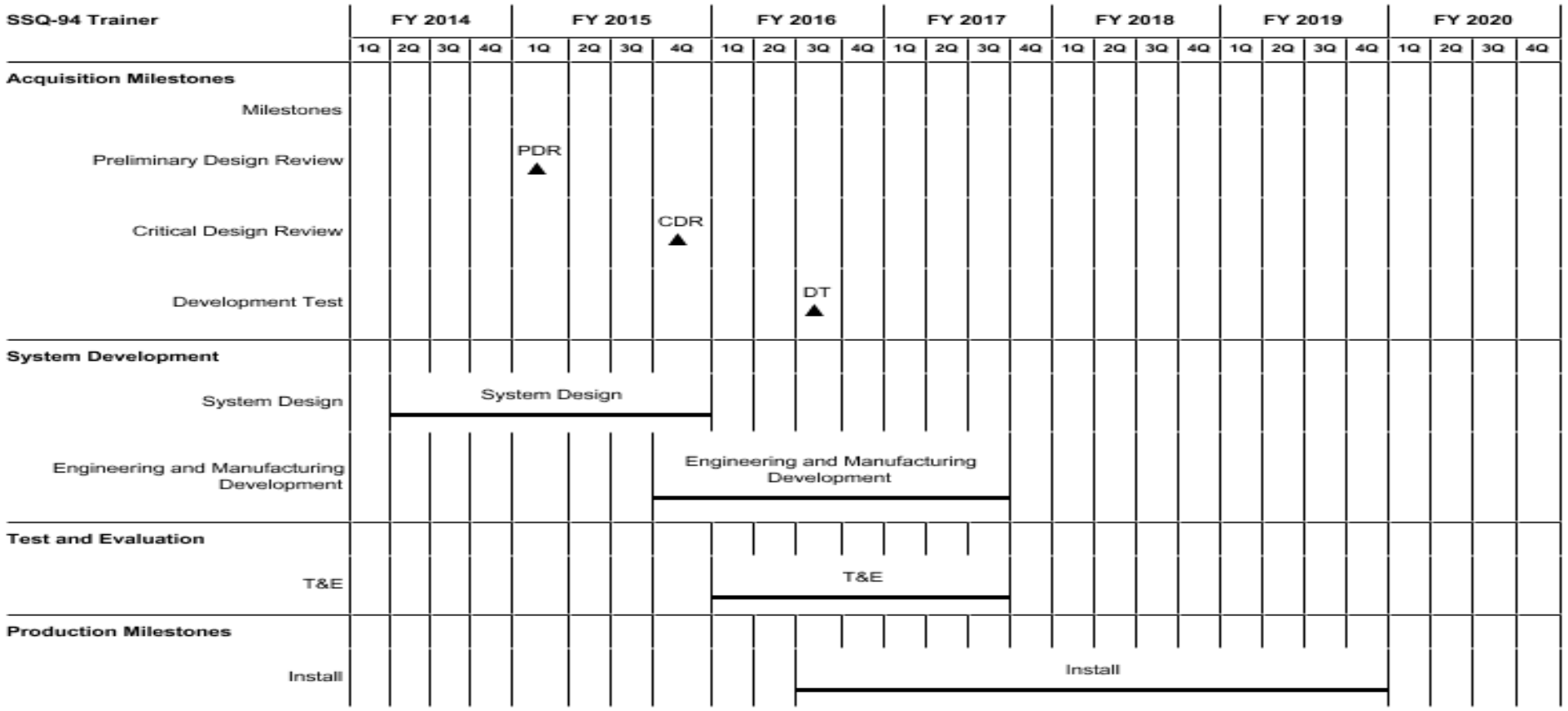

*2016PB - 0603502N - 1233*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |




*2016PB - 0603502N - 1233*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |




*2016PB - 0603502N - 1233*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Unmanned Influence Sweep System (UISS)*** | | | | |
| Acquisition Milestones: Milestones: Milestone B | 4 | 2014 | 4 | 2014 |
| System Development: Milestone Documentation: Milestone B Documentation | 1 | 2014 | 4 | 2014 |
| System Development: Engineering & Manufacturing Development Phase: E&MD Contract Award | 4 | 2014 | 4 | 2014 |
| System Development: Engineering & Manufacturing Development Phase: Engineering & Manufacturing Development phase | 4 | 2014 | 4 | 2014 |
| Test and Evaluation: Test Events: Risk Reduction | 1 | 2014 | 4 | 2014 |
| Program Moved to Project 1234: Move to PU 1234 | 1 | 2015 | 1 | 2015 |
| ***HFWB*** | | | | |
| System Development: P3I: P3I Development | 1 | 2014 | 4 | 2020 |
| Production Milestones: Full Rate Production: FRP | 1 | 2014 | 2 | 2016 |
| Deliveries: Installation: Installation | 1 | 2014 | 4 | 2017 |
| ***MEDAL*** | | | | |
| System Development: MEDAL EA v.1 Iterations: EA v.1 Iteration 7 | 1 | 2014 | 4 | 2015 |
| System Development: MEDAL EA v.2 Development: EA v.2 Development | 2 | 2014 | 4 | 2015 |
| System Development: Program moved to PU 1235: Program moved to PU 1235 | 3 | 2016 | 3 | 2016 |
| Test and Evaluation: Enterprise Arch (EA) v.1: Enterprise Arch (EA) v.1 Development and Test | 1 | 2014 | 4 | 2015 |
| Production Milestones: MEDAL EA Deliveries: Deliveries | 3 | 2014 | 4 | 2015 |
| ***USV*** | | | | |
| System Development: Upgrade Development: | 1 | 2014 | 4 | 2014 |
| System Development: Program Moved to Project 1234: | 1 | 2015 | 1 | 2015 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1233 / *Surface MCM Mid-life Upgrade* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***SSQ-94 Trainer*** | | | | |
| Acquisition Milestones: Preliminary Design Review: Preliminary Design Review | 1 | 2015 | 1 | 2015 |
| Acquisition Milestones: Critical Design Review: Critical Design Review | 4 | 2015 | 4 | 2015 |
| Acquisition Milestones: Development Test: Development Test | 3 | 2016 | 3 | 2016 |
| System Development: System Design: System Design | 2 | 2014 | 4 | 2015 |
| System Development: Engineering and Manufacturing Development: Engineering and Manufacturing Development | 4 | 2015 | 3 | 2017 |
| Test and Evaluation: T&E: T&E | 1 | 2016 | 3 | 2017 |
| Production Milestones: Install: Install | 3 | 2016 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1234 / *Unmanned Surface Vehicle (USV)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1234: *Unmanned Surface Vehicle (USV)* | - | - | 23.974 | 34.072 | - | 34.072 | 10.826 | 1.695 | 4.162 | 6.372 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding prior to FY15 in PE 0603502N Project Unit 1233.

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

This project provides resources for development, improvement and integration of Unmanned Surface Vehicle (USV) Mine Countermeasure systems. A description of the major planned programs include the following:

1) The Unmanned Influence Sweep System (UISS) utilizes an Unmanned Surface Vehicle (USV) integrated with an Unmanned Surface Sweep System (US3), a magnetic/acoustic sweep system developed to sweep acoustic/magnetic influence mines, which can be deployed from the Littoral Combat Ship (LCS) or a ship of opportunity; 2) Mine Hunting USVs (MHUs) include USVs towing AN/AQS-24A mine hunting sonars and associated support equipment, including a command and control center that will be deployed from shore and vessels of opportunity. MHUs are in response to an Urgent Operational Need (UON) from Naval Forces Central Command. FY16 Speed to Fleet (S2F) funding to design and fabricate two replacement MHU vehicles, including new command and control center, and associated in-theater support equipment.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** UISS Product Development | - | 13.090 | 8.163 | - | 8.163 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A - Funded in Project Unit 1233 in FY14 | | | | | |
| ***FY 2015 Plans:***<br>Continue building Engineering Development Model (EDM). Conduct Preliminary Design Review (PDR).Conduct Critical Design Review (CDR). | | | | | |
| ***FY 2016 Base Plans:***<br>Complete EDM. | | | | | |
| ***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1234 / *Unmanned Surface Vehicle (USV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** UISS Support | - | 5.073 | 1.060 | - | 1.060 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A - Funded in Project Unit 1233 in FY14 | | | | | |
| ***FY 2015 Plans:***<br>Continue engineering and integrated logistic support (ILS) for the Engineering and Manufacturing Development (E&MD) phase. | | | | | |
| ***FY 2016 Base Plans:***<br>Complete engineering and logistic support for E&MD. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** UISS Test and Evaluation | - | 0.400 | 2.600 | - | 2.600 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A - Funded in Project Unit 1233 in FY14 | | | | | |
| ***FY 2015 Plans:***<br>Complete Test and Evaluation Master Plan (TEMP). | | | | | |
| ***FY 2016 Base Plans:***<br>Conduct contractor testing. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** UISS Management | - | 1.050 | 1.034 | - | 1.034 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A - Funded in Project Unit 1233 in FY14 | | | | | |
| ***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1234 / *Unmanned Surface Vehicle (USV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue EDM contract management. Initiate development of Milestone (MS) C documentation.<br>***FY 2016 Base Plans:***<br>Continue EDM contract management. Continue development of MS C documentation.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MHU Product Development | - | 3.780 | 20.815 | - | 20.815 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>Integrate upgraded minehunting sonar (AN/AQS-24B) onboard MHUs, to include upgrading Comand and Control (C2) center, MHU electronics and associated equipment. Conduct performance testing of AN/AQS-24B sonar towed from MHUs.<br>***FY 2016 Base Plans:***<br>Continue improvements to the Comand and Control (C2) center, MHU electronics and associated equipment. Complete integration of AN/AQS-24B sonar with MHU. Conduct performance testing of AN/AQS-24B sonar towed from MHUs. Commence design and fabrication of 2 improved MHU hulls, additional C2 center equipment, and in-theater support equipment. Commence AN/AQS-24B integration with improved MHU vehicles.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MHU Support | - | 0.581 | 0.400 | - | 0.400 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>Provide engineering and logistic support for upgrade training and forward-deployed operations.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1234 / *Unmanned Surface Vehicle (USV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Provide engineering and logistic support for product improvements and forward-deployed operations.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 23.974 | 34.072 | - | 34.072 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0603596N: *LCS Mission Modules* | 9.000 | 24.329 | 2.348 | - | 2.348 | 7.129 | 3.894 | - | - | - | 46.700 |

**Remarks**

**D. Acquisition Strategy**

UISS - Requirements will be documented in the Unmanned Influence Sweep System (UISS) Capability Development Document (CDD). An Engineering and Manufacturing Development (E&MD) contract was awarded in FY14 with an option for Low Rate Initial Production (LRIP).

**E. Performance Metrics**

UISS - Successfully reach Milestone C in 3Q FY17

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1234 / *Unmanned Surface Vehicle (USV)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UISS: Product Development 1 | C/CPIF | Textron Systems Inc : Hunt Valley, MD | 0.000 | - | | 13.090 | Feb 2015 | 8.163 | Dec 2015 | - | | 8.163 | Continuing | Continuing | Continuing |
| MHU: Product Development 1 | C/FFP | TBD : TBD | 0.000 | - | | 2.150 | Jan 2015 | 20.309 | Jan 2016 | - | | 20.309 | Continuing | Continuing | Continuing |
| MHU: Product Development 2 | WR | NSWC PC : Panama City, FL | 0.000 | - | | 0.501 | Dec 2014 | 0.260 | Dec 2015 | - | | 0.260 | Continuing | Continuing | Continuing |
| MHU: Product Development 3 | WR | NUWC N : Newport, RI | 0.000 | - | | 0.360 | Dec 2014 | 0.130 | Dec 2015 | - | | 0.130 | Continuing | Continuing | Continuing |
| MHU: Product Development 4 | WR | NSWC CD : Bethesda, MD | 0.000 | - | | 0.110 | Dec 2014 | 0.050 | Dec 2015 | - | | 0.050 | Continuing | Continuing | Continuing |
| MHU: Product Development 5 | WR | Various : Various | 0.000 | - | | 0.420 | Dec 2014 | 0.150 | Dec 2015 | - | | 0.150 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 16.631 | | 29.062 | | - | | 29.062 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UISS: Engineering Support 1 | WR | NUWC, N : Newport, RI | 0.000 | - | | 0.200 | Dec 2014 | 0.150 | Dec 2015 | - | | 0.150 | Continuing | Continuing | Continuing |
| UISS: Engineering Support 2 | WR | NSWC, PC : Panama City, FL | 0.000 | - | | 1.486 | Dec 2014 | 0.203 | Dec 2015 | - | | 0.203 | Continuing | Continuing | Continuing |
| UISS: Engineering Support 3 | WR | NSWC, CD : Bethesda, MD | 0.000 | - | | 1.586 | Dec 2014 | 0.125 | Dec 2015 | - | | 0.125 | Continuing | Continuing | Continuing |
| UISS: Engineering Support 4 | C/CPFF | Textron Systems Inc : Hunt Valley, MD | 0.000 | - | | 0.550 | Feb 2015 | 0.120 | Dec 2015 | - | | 0.120 | Continuing | Continuing | Continuing |
| UISS: Integrated Logistics 1 | WR | NSWC, PC : Panama City, FL | 0.000 | - | | 0.200 | Dec 2014 | 0.090 | Dec 2015 | - | | 0.090 | Continuing | Continuing | Continuing |
| UISS: Integrated Logistics 2 | WR | NSWC, CD : Bethesda, MD | 0.000 | - | | 0.408 | Dec 2014 | 0.203 | Dec 2015 | - | | 0.203 | Continuing | Continuing | Continuing |
| UISS: Integrated Logistics 3 | C/CPFF | Textron Systems, Inc : Hunt Valley, MD | 0.000 | - | | 0.643 | Feb 2015 | 0.085 | Dec 2015 | - | | 0.085 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1234 / *Unmanned Surface Vehicle (USV)* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHU: Engineering Support 1 | WR | SSC, PAC : San Diego, CA | 0.000 | - | | 0.210 | Dec 2014 | 0.050 | Dec 2015 | - | | 0.050 | Continuing | Continuing | Continuing |
| MHU: Engineering Support 2 | WR | NSWC, PC : Panama City, FL | 0.000 | - | | 0.160 | Dec 2014 | 0.200 | Dec 2015 | - | | 0.200 | Continuing | Continuing | Continuing |
| MHU: Engineering Support 3 | WR | NUWC, N : Newport, RI | 0.000 | - | | 0.160 | Dec 2014 | 0.100 | Dec 2015 | - | | 0.100 | Continuing | Continuing | Continuing |
| MHU: Engineering Support 4 | WR | NSWC, CD : Bethesda, MD | 0.000 | - | | 0.110 | Dec 2014 | 0.050 | Dec 2015 | - | | 0.050 | Continuing | Continuing | Continuing |
| MHU: Engineering Support 5 | WR | Various : Various | 0.000 | - | | 0.180 | Dec 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 5.893 | | 1.376 | | - | | 1.376 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UISS: Test and Evaluation 1 | WR | NSWC, PC : Panama City, FL | 0.000 | - | | 0.100 | Dec 2014 | 0.500 | Mar 2016 | - | | 0.500 | Continuing | Continuing | Continuing |
| UISS: Test and Evaluation 2 | WR | NSWC, CD : Bethesda, MD | 0.000 | - | | 0.250 | Dec 2014 | 0.600 | Mar 2016 | - | | 0.600 | Continuing | Continuing | Continuing |
| UISS: Test and Evaluation 3 | C/CPIF | TBD : TBD | 0.000 | - | | 0.050 | Dec 2014 | 1.500 | Mar 2016 | - | | 1.500 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 0.400 | | 2.600 | | - | | 2.600 | - | - | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UISS: Travel | WR | NAVSEA : Washington, DC | 0.000 | - | | 0.100 | Jun 2015 | 0.100 | Jun 2016 | - | | 0.100 | - | 0.200 | - |
| UISS: Management 1 | C/CPAF | TBD : TBD | 0.000 | - | | 0.950 | Feb 2015 | 0.934 | Dec 2015 | - | | 0.934 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1234 / *Unmanned Surface Vehicle (USV)* |

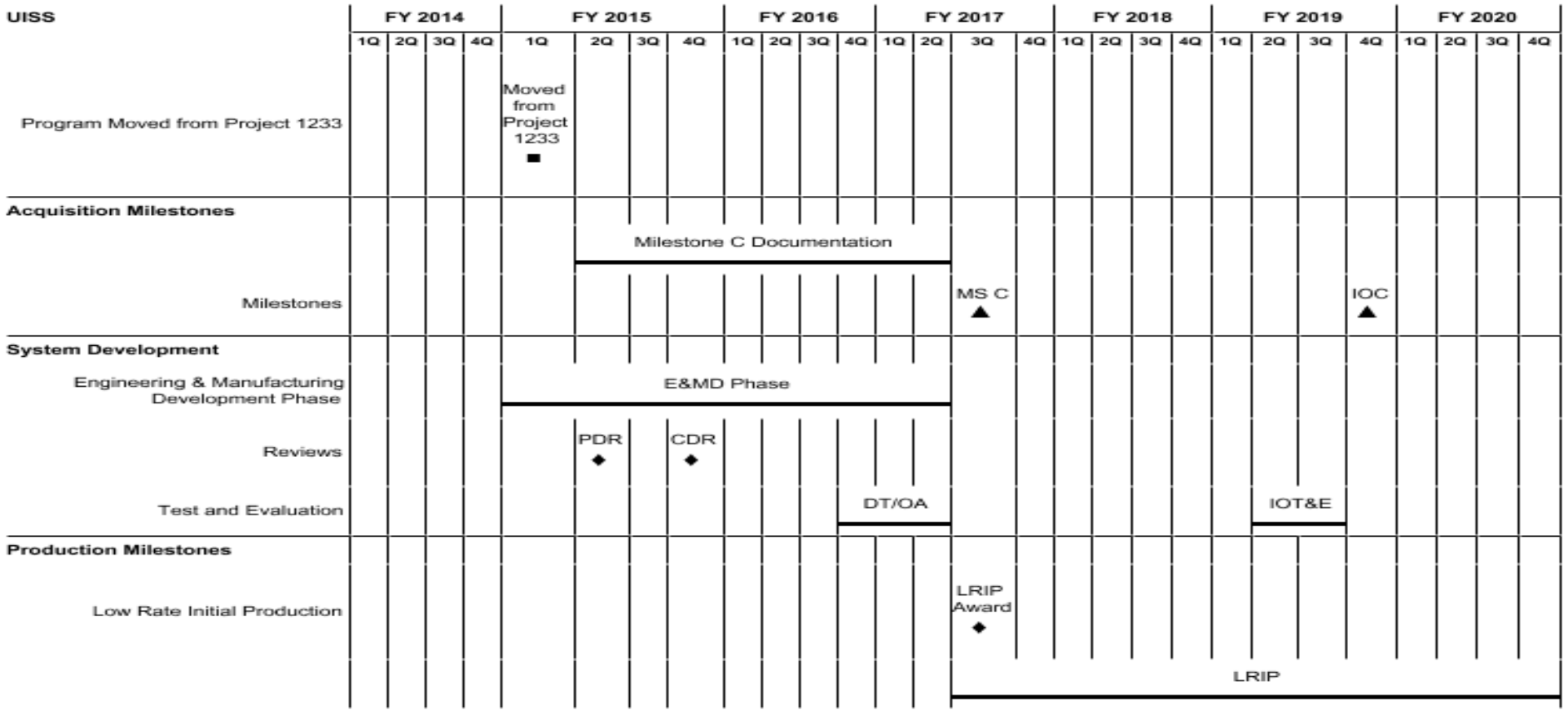
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 0.000 | - | | 1.050 | | 1.034 | | - | | 1.034 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 23.974 | | 34.072 | | - | | 34.072 | - | - | - |

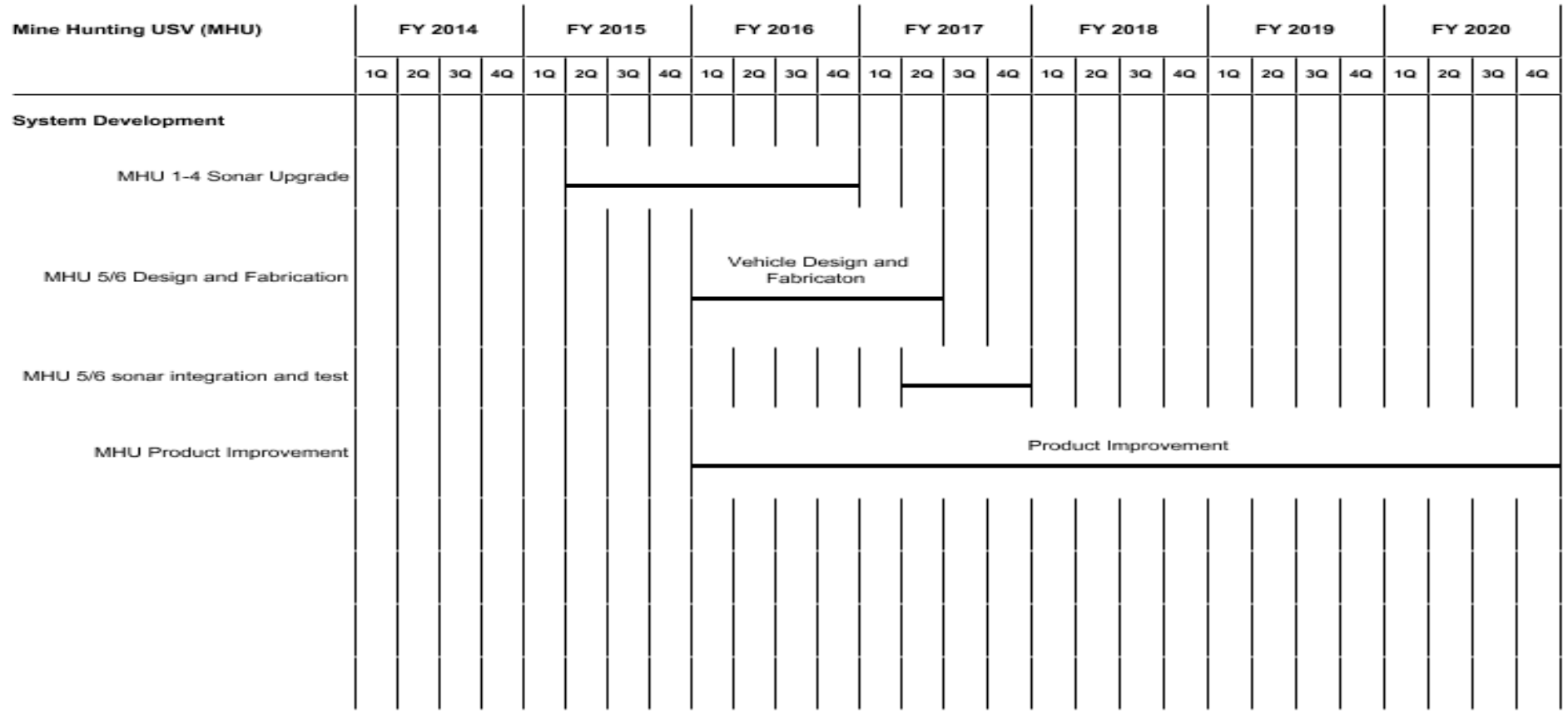
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1234 / *Unmanned Surface Vehicle (USV)* |




*2016PB - 0603502N - 1234*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1234 / *Unmanned Surface Vehicle (USV)* |




*2016PB - 0603502N - 1234*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1234 / *Unmanned Surface Vehicle (USV)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***UISS*** | | | | |
| Program Moved from Project 1233: Program Moved from Project 1233 | 1 | 2015 | 1 | 2015 |
| Acquisition Milestones: Milestone C Documentation | 2 | 2015 | 2 | 2017 |
| Acquisition Milestones: Milestones: Milestone C | 3 | 2017 | 3 | 2017 |
| Acquisition Milestones: Milestones: Initial Operational Capability | 4 | 2019 | 4 | 2019 |
| System Development: Engineering & Manufacturing Development Phase: Engineering & Manufacturing Development phase | 1 | 2015 | 2 | 2017 |
| System Development: Reviews: PDR Review | 2 | 2015 | 2 | 2015 |
| System Development: Reviews: CDR Decision | 4 | 2015 | 4 | 2015 |
| System Development: Test and Evaluation: DT Testing | 4 | 2016 | 2 | 2017 |
| System Development: Test and Evaluation: Initial Operational Test & Evaluation | 2 | 2019 | 3 | 2019 |
| Production Milestones: Low Rate Initial Production: LRIP Contract Award | 3 | 2017 | 3 | 2017 |
| Production Milestones: Low Rate Initial Production: LRIP phase | 3 | 2017 | 4 | 2020 |
| ***Mine Hunting USV (MHU)*** | | | | |
| System Development: MHU 1-4 Sonar Upgrade: Schedule Detail | 2 | 2015 | 4 | 2016 |
| System Development: MHU 5/6 Design and Fabrication: Schedule Detail | 1 | 2016 | 2 | 2017 |
| System Development: MHU 5/6 sonar integration and test: Schedule Detail | 2 | 2017 | 4 | 2017 |
| System Development: MHU Product Improvement: Schedule Detail | 1 | 2016 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1235 / *Mine Warfare Planning and Analysis* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1235: *Mine Warfare Planning and Analysis* | - | - | - | 9.064 | - | 9.064 | 9.267 | 7.513 | 6.823 | 6.964 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System - Maritime (GCCS-M). MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** MEDAL Product Development | - | - | 5.204 | - | 5.204 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A - Funded in PU 1233 | | | | | |
| ***FY 2015 Plans:***<br>N/A - Funded in PU 1233 | | | | | |
| ***FY 2016 Base Plans:***<br>MEDAL EA - Conduct Test & Evaluation of MINEnet Tactical. Continue EA integration activities with LCS Mission Package. Continue to develop Information Assurance documentation for Authority to Operate on Navy networks. MEDAL Next Generation development. Conduct Test & Evaluation of MINEnet Tactical (MEDAL Next Generation). Continue integration activities with LCS Mission Package. Continue to develop Information Assurance documentation for Authority to Operate on Navy networks. Conduct series of Devlopment tests (DTs). Conduct planning for the development of MEDAL Next Generation. Begin development of MEDAL Next Generation course curriculum. Conduct series of regression Tests. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MEDAL Support | - | - | 0.551 | - | 0.551 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1235 / *Mine Warfare Planning and Analysis* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A - Funded in PU 1233<br>***FY 2015 Plans:***<br>N/A - Funded in PU 1233<br>***FY 2016 Base Plans:***<br>Oversee technical integration of developed algorithms and models that have demonstrated their effectiveness with respect to their objectives. Support effort to include communication with activities such as applied labs, government activities, and designated contractors. Assist in providing the speed, agility, adaptability, and flexibility required for modern MCM operations. Achieve IOC and begin fielding to achieve FOC. Begin the introduction of MEDAL Next Generation capability and Planning on Risk (PoR) functionality via a limited fielding to Fleet Users including Mine Countermeasures Squadrons (MCMRONs) and Naval Mine and Anti Submarine Warfare Command (NMAWC).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MEDAL Test and Evaluation | - | - | 2.598 | - | 2.598 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A - Funded in PU 1233<br>***FY 2015 Plans:***<br>N/A - Funded in PU 1233<br>***FY 2016 Base Plans:***<br>MEDAL EA - Conduct series of Devlopment tests (DTs) and a series of regression tests. Continue System Integration testing activities wih multiple platforms. Conduct planning for subsequent OA events. Deliver to Fleet in accordance with the MEDAL Next Generation Fielding Plan.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MEDAL Management | - | - | 0.711 | - | 0.711 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1235 / *Mine Warfare Planning and Analysis* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A - Funded in PU 1233<br>***FY 2015 Plans:***<br>N/A - Funded in PU 1233<br>***FY 2016 Base Plans:***<br>Provide program management support and travel for MEDAL program. Program management shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. As part of the systems engineering element of PM, communicate and coordinate with MIW C4ISR, ICWS, Organic MCM, Mainstreaming MIEW, Expeditionary Warfare C4ISR, tactics development, long term planning, Naval Special Clearance Team (NSCT-1) Assault Breaching Systems of Systems (ABSoS), LCS, and other programs as they relate to MEDAL and MIW Mission Planning, Evaluation, and C4ISR. Other PM tasking to include briefings, demonstrations, and project planning as required.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | - | 9.064 | - | 9.064 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 2622/LV075: *Mine Sweeping Replacement (MEDAL).* | 0.995 | 1.855 | 2.973 | - | 2.973 | 4.349 | 3.673 | 1.135 | 0.798 | - | 15.778 |

**Remarks**

**D. Acquisition Strategy**

Mine Warfare and Environmental Decision Aids Library (MEDAL) - requirements for MEDAL Builds are generated through a formal requirements process. Requirements conferences gather a list of candidate functions based on a logical sequence to fully implement the overall software architecture. The fleet is presented with a recommended list of candidate capabilities based on this program plan, doctrine, fleet comments, and technology. These capability items are then prioritized by the fleet representatives (coordinated by Naval Mine Warfare and Anti-Submarine Command (NMAWC).The fleet inputs are then consolidated by COMINEWARCOM into an overall list which is then presented to Navy leadership for pricing and final selection. The selection is based on price, risk, available funding, and possibly by other program factors (e.g., ensure that MEDAL supports other program delivery schedules). Selection balances immediate needs, long term objectives, technical maturity and

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1235 / *Mine Warfare Planning and Analysis* |

other programmatic factors. A verification and validation process is applied to any algorithms, tactics, or models to be incorporated in the software. MEDAL development to include integration of data fusion techniques and incorporation of Data Access Layer (DAL) architecture to meet FORCEnet requirements.

**E. Performance Metrics**

Mine Warfare and Environmental Decision Aids Library (MEDAL) development to include integration of data fusion techniques and incorporation of Data Access Layer (DAL) architecture to meet FORCEnet requirements.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1235 / *Mine Warfare Planning and Analysis* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEDAL Next Generation | C/CPAF | SAIC : McLean, VA | 0.000 | - | | - | | 5.204 | Nov 2015 | - | | 5.204 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | - | | 5.204 | | - | | 5.204 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEDAL Next Generation | MIPR | NSWC PC : Panama City FL | 0.000 | - | | - | | 0.551 | Nov 2015 | - | | 0.551 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | - | | 0.551 | | - | | 0.551 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEDAL Next Generation | C/CPAF | SAIC : McLean, VA | 0.000 | - | | - | | 2.598 | Nov 2015 | - | | 2.598 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | - | | 2.598 | | - | | 2.598 | - | - | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEDAL EA | MIPR | NSWC PC : Panama City Fl | 0.000 | - | | - | | 0.711 | Nov 2015 | - | | 0.711 | - | 0.711 | - |
| | | **Subtotal** | 0.000 | - | | - | | 0.711 | | - | | 0.711 | - | 0.711 | - |

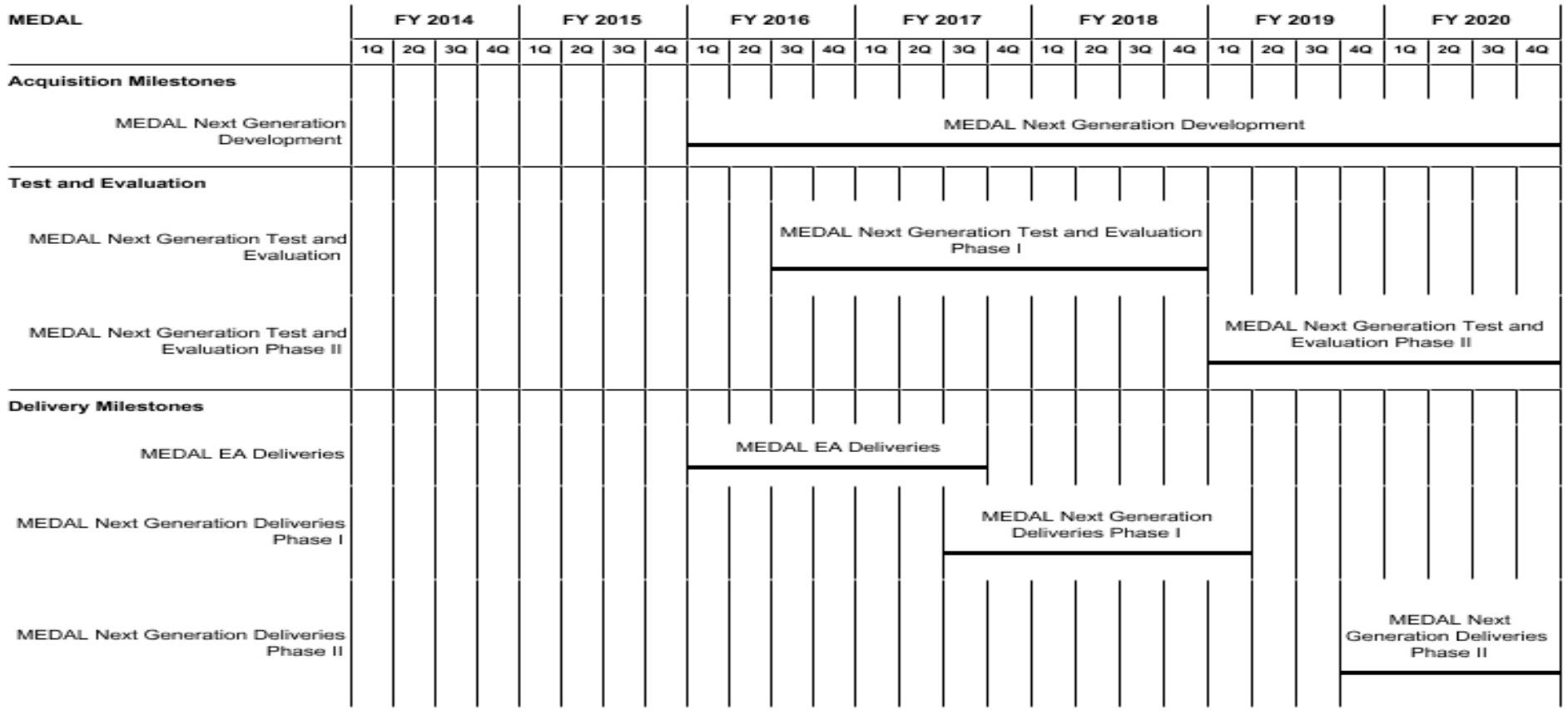
| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | - | | 9.064 | | - | | 9.064 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>1235 / *Mine Warfare Planning and Analysis* | |

| | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1235 / *Mine Warfare Planning and Analysis* |




*2016PB - 0603502N - 1235*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>1235 / *Mine Warfare Planning and Analysis* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***MEDAL*** | | | | |
| Acquisition Milestones: MEDAL Next Generation Development: MEDAL Next Generation Development | 1 | 2016 | 4 | 2020 |
| Test and Evaluation: MEDAL Next Generation Test and Evaluation: MEDAL Test and Evaluation | 3 | 2016 | 4 | 2018 |
| Test and Evaluation: MEDAL Next Generation Test and Evaluation Phase II: MEDAL Test and Evaluation | 1 | 2019 | 4 | 2020 |
| Delivery Milestones: MEDAL EA Deliveries: MEDAL EA Deliveries | 1 | 2016 | 3 | 2017 |
| Delivery Milestones: MEDAL Next Generation Deliveries Phase I: MEDAL Deliveries | 3 | 2017 | 1 | 2019 |
| Delivery Milestones: MEDAL Next Generation Deliveries Phase II: MEDAL Deliveries | 4 | 2019 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>2094. / *Unmanned Underwater Vehicle* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2094.: *Unmanned Underwater Vehicle* | 32.562 | 19.637 | 13.674 | 25.065 | - | 25.065 | 73.986 | 89.327 | 126.324 | 154.719 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Large Displacement Unmanned Undersea Vehicle (LDUUV) program will design and build a modular, reconfigurable Unmanned Undersea Vehicle (UUV) with Open Architecture (OA) software (SW) focused on introducing a new class (large displacement) of UUVs to the Navy to provide increased endurance, payload hosting, and delivery capability. The LDUUV will be modular in design and include hotel functionality (guidance and control, navigation, autonomy, situational awareness, core communications, and power distribution), energy and power, propulsion and maneuvering, mission sensors, and communications links. It is intended that modules will have well defined interfaces for the purposes of implementing cost-effective upgrades in future increments to leverage advances in technology. In support of LDUUV Fleet introduction ONR Innovative Naval Prototype (INP) UUVs will be transitioned to be used as User Operational Evalutation Systems (UOES) for operator training, Fleet Exercises (FLEX), and technology risk reduction activities.

The Persistent Littoral Undersea Surveillance (PLUS) Innovative Naval Prototype (INP) Program provides Undersea Surveillance capability by employing mobile Unmanned Undersea Vehicle (UUV) technology. PLUS is being developed in response to an Urgent Operational Need (UON) identified by the Fleet. PLUS uses both conventionally powered UUVs with propellers and UUVs propelled by buoyancy engines (commonly called seagliders). PLUS INP S&T development program is planned to transition into a prototype User Operational Evaluation System (UOES).
The Persistent Littoral Undersea Surveillance (PLUS) program provides effective, adaptive and persistent undersea surveillance targets over large littoral areas.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** LDUUV Product Development | 2.622 | 2.268 | 19.505 | - | 19.505 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Developed acquisition documentation, Interface Control Documents (ICD), Capability Development Document(CDD), System Requirement Document (SRD), and Test and Evaluation Master Plan (TEMP) for LDUUV Engineering Development Model (EDM). | | | | | |
| ***FY 2015 Plans:***<br>Develop draft Request for Proposal (RFP) for EDM contracts. Complete Interface Control Documents (ICD), CDD, System Requirement Document (SRD), and Test and Evaluation Master Plan (TEMP). Continue risk reduction engineering efforts to include Battery Certification, Autonomy, Reliability, and Submarine integration tasking. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| .<br>***FY 2016 Base Plans:***<br>Release Request for Proposal (RFP) for EDM design and build contract. Conduct source selection for EDM Design and build contract. Prepare Source Selection Evaluation Board report and brief to Source Selection Authority. Complete Test and Evaluation Master Plan (TEMP).<br><br>Begin risk reduction engineering efforts with INP UUVs as UOES to include SG270 battery certification, advanced autonomy and reliability efforts to prove LDUUV can meet CDD targets for extended unmanned operation, submarine and ship integration efforts enabling LDUUV launch and recovery from submarines and ships, including participation in Fleet exercises to support Tactics, Techniques, Procedures (TTPs) and Concept of Operations (CONOPs) development. LDUUV UOES will also be used to develop operator familiarization training to facilitate LDUUV Developmental and Operational testing events.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** LDUUV Support | 4.411 | 7.896 | 4.101 | - | 4.101 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Developed statutory documents for Gate 3 Review and Milestone A. Prepared for Milestone A. Developed Technical Data Package for Draft RFP.<br>***FY 2015 Plans:***<br>Conduct Milestone A. Develop statutory documents for Gate 4 and 5 Reviews. Draft RFP release. Formulate proposal evaluation team to review bids. Conduct technology risk reduction efforts.<br>***FY 2016 Base Plans:***<br>Complete Gate 4/5 document preparation. Conduct Gate 4/5 review. Begin development of Milestone B documentation.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** LDUUV Management | 0.990 | 0.705 | 1.459 | - | 1.459 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Provided program management support and travel for the LDUUV program. Program management shall include overall technical guidance and leadership for the program. Oversaw financial and logistics efforts and coordinated with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. Travel and other PM tasking to include briefings, demonstrations, and project planning as required.<br>***FY 2015 Plans:***<br>Provide program management support and travel for the LDUUV program. Program management shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and coordination with Navy and other DOD organizations and contractors as required to ensure successful execution of the program. Travel and other PM tasking to include briefings, demonstrations, and project planning as required.<br>***FY 2016 Base Plans:***<br>Provide program management support and travel for the LDUUV program. Program management shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. Travel and other PM tasking to include briefings, demonstrations, and project planning as required.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** PLUS Product Development | 2.800 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed procurement of the PLUS system consisting of REMUS 600 UUVs, hydrophone towed arrays, SEAGLIDER communication and navigation vehicles. Completed system integration and all relevant certifications, incorporating any updates identified through system testing.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** PLUS Support | 1.321 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed the documentation of tailored UOES technical documentation to support transition of PLUS to the fleet. Completed Fleet training for operating and maintaining the system for exercises and demonstrations. Completed support plans, CONOPS, tactics techniques and procedure documents, and completed the logistics packages for fleet introduction.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** PLUS Test and Evaluation | 4.077 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Participated in tests, demonstrations and Fleet Exercises.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** PLUS Management | 0.550 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Provided program management support and travel for PLUS program. Program management included overall technical guidance and leadership for the program. Oversaw financial and logistics efforts and coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. Travel and other PM tasking to include briefings, demonstrations, and project planning as required.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Persistent Littoral Undersea Surveillance (PLUS) | 2.866 | 2.805 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Persistent Littoral Undersea Surveillance (PLUS): The Persistent Littoral Undersea Surveillance (PLUS) program provides effective, adaptive and persistent undersea surveillance targets over large littoral areas.<br>***FY 2014 Accomplishments:***<br>-Continued the testing of the updated communications throughout the system.<br>-Continued construction the Revised and Optimized PLUS Sensor Vehicle.<br>-Completed the User Interface for the Operator Consoles for the command and control functions.<br>-Completed the evaluation and implementation of the IA and Anti-Tamper on the PLUS system.<br>-Completed the construction of the optimized array (s) for the system; test integration with autonomy and signal processing.<br>-Completed testing of the USBL Navigation and Carina vehicle.<br>-Completed a Field Test and Evaluation with the Fleet.<br>***FY 2015 Plans:***<br>-Continue all efforts from FY14 unless noted as completed above.<br>-Complete the testing of the updated communications throughout the system | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Complete construction and the testing and evaluation of the Revised and Optimized PLUS Sensor Vehicle<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 19.637 | 13.674 | 25.065 | - | 25.065 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

PLUS will develop a prototype User Operational Evaluation System (UOES) in response to an Urgent Operational Need (UON) request from the Fleet. The PLUS UOES will be utilized in a fleet experimentation event to develop Concept of Employment (CONEMP) for a potential follow-on program of record.

LDUUV will award Engineering Development Model (EDM) contract(s) to design, build and test LDUUV EDM(s). ONR's LDUUV Innovative Naval Prototype (INP) program will transition prototype vehicles to PMS 406 LDUUV Program of Record (POR) as User Operational Evaluation Systems (UOES). The LDUUV UOES will be utilized in Fleet exercises for risk reduction, operator familiarization training to facilitate Devleopmental and Operational testing and CONOP development that feeds into LDUUV POR. First ONR LDUUV INP vehicles are expected to transition to UOES in FY 16.
This effort will transition to PEO-LCS / PMS406 as a User Operational Evaluation System (UOES) in FY 2013.

**E. Performance Metrics**

PLUS - Prototype Delivery
LDUUV - Achieve MS A
Performance metrics for this effort are classified.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>2094. / *Unmanned Underwater Vehicle* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDUUV Specification | WR | NUWC Newport : Newport, RI | 0.225 | 0.714 | Dec 2013 | 1.049 | Dec 2014 | - | | - | | - | - | 1.988 | - |
| LDUUV ICD | SS/CPFF | APL/JHU : Laurel, MD | 0.000 | 0.723 | Mar 2014 | 0.585 | Feb 2015 | - | | - | | - | - | 1.308 | - |
| LDUUV TEMP | Various | Various : Various | 0.000 | 0.685 | Dec 2013 | 0.634 | Dec 2014 | 0.746 | Dec 2015 | - | | 0.746 | - | 2.065 | - |
| LDUUV Source Selection | WR | Various : Various | 0.000 | - | | - | | 1.480 | Dec 2015 | - | | 1.480 | - | 1.480 | - |
| LDUUV Risk Reduction | WR | NUWC Newport : Newport, RI | 0.000 | - | | - | | 4.146 | Nov 2015 | - | | 4.146 | - | 4.146 | - |
| LDUUV Risk Reduction - Battery Certification | WR | NSWC Crane : Crane, IN | 0.000 | - | | - | | 2.786 | Dec 2015 | - | | 2.786 | - | 2.786 | - |
| LDUUV Risk Reduction - Autonomy | SS/CPFF | APL/JHU : Laurel, MD | 0.000 | - | | - | | 3.247 | Jan 2016 | - | | 3.247 | - | 3.247 | - |
| LDUUV Risk Reduction - Propulsion | SS/CPFF | ARL PSU : State College, PA | 0.000 | - | | - | | 3.658 | Jan 2016 | - | | 3.658 | - | 3.658 | - |
| LDUUV Risk Reduction - Sonar | SS/CPFF | ARL UT : Austin, TX | 0.000 | - | | - | | 3.442 | Mar 2016 | - | | 3.442 | - | 3.442 | - |
| PLUS Prototype Hardware | Various | Various : Various | 10.499 | 0.600 | Dec 2013 | - | | - | | - | | - | - | 11.099 | - |
| PLUS System Integration | TBD | Unknown : Unknown | 0.000 | 2.200 | Feb 2014 | - | | - | | - | | - | - | 2.200 | - |
| Arrays | C/CPFF | Ocean Acoustical Services and instrumentation : Lexington, MA | 0.500 | 0.186 | Oct 2013 | 0.102 | Oct 2014 | - | | - | | - | - | 0.788 | - |
| TDA's | C/CPFF | Ocean Acoustical Services and instrumentation : Lexington, MA | 0.300 | 0.111 | Oct 2013 | 0.050 | Oct 2014 | - | | - | | - | - | 0.461 | - |
| SP-Intergration | C/CPFF | Ocean Acoustical Services and instrumentation : Lexington, MA | 0.500 | 0.186 | Oct 2013 | 0.050 | Oct 2014 | - | | - | | - | - | 0.736 | - |
| TDA's | C/CPFF | METRON : Reston, VA | 0.300 | 0.111 | Oct 2013 | 0.050 | Oct 2014 | - | | - | | - | - | 0.461 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Navigation | C/FPRP | Woods Hole Oceanographic Institution : Woods Hole, MA | 0.400 | 0.148 | Oct 2013 | 0.200 | Oct 2014 | - | | - | | - | - | 0.748 | - |
| SP-Intergration | Reqn | NAVSEA : Baltimore, MD | 0.500 | 0.186 | Oct 2013 | 0.100 | Oct 2014 | - | | - | | - | - | 0.786 | - |
| TDA's | Reqn | NUWC : Newport, RI | 0.300 | 0.111 | Oct 2013 | 0.150 | Oct 2014 | - | | - | | - | - | 0.561 | - |
| SP Intergration | Reqn | NUWC : Newport, RI | 0.200 | 0.074 | Oct 2013 | 0.025 | Oct 2014 | - | | - | | - | - | 0.299 | - |
| Anti-Tamper | Reqn | Sandia Natl Lab : Livermore, CA | 0.500 | 0.186 | Oct 2013 | 0.150 | Oct 2014 | - | | - | | - | - | 0.836 | - |
| Vehicle | C/CPFF | Hydroid Kongsberg Marine : Pocasset, MA | 0.600 | 0.223 | Oct 2013 | 0.200 | Oct 2014 | - | | - | | - | - | 1.023 | - |
| | | **Subtotal** | 14.824 | 6.444 | | 3.345 | | 19.505 | | - | | 19.505 | - | 44.118 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDUUV Engineering Support | WR | NUWC Newport : Newport, RI | 2.014 | 1.175 | Dec 2013 | 2.817 | Dec 2014 | 0.654 | Nov 2015 | - | | 0.654 | - | 6.660 | - |
| LDUUV Engineering Support 2 | SS/CPFF | APL/JHU : Laurel, MD | 2.105 | 0.951 | Mar 2014 | 1.393 | Feb 2015 | 0.872 | Jan 2016 | - | | 0.872 | - | 5.321 | - |
| LDUUV Engineering Support 3 | SS/CPFF | ARL PSU : State College, PA | 0.130 | 0.550 | Mar 2014 | 0.366 | Feb 2015 | 0.423 | Jan 2016 | - | | 0.423 | - | 1.469 | - |
| LDUUV Engineering Support 4 | WR | NUWC Keyport : Keyport, WA | 0.230 | 0.100 | Dec 2013 | 0.100 | Dec 2014 | 0.237 | Nov 2015 | - | | 0.237 | - | 0.667 | - |
| LDUUV Engineering Support 5 | WR | VAR : VAR | 0.000 | 0.975 | Dec 2013 | 0.830 | Dec 2014 | 0.894 | Jan 2016 | - | | 0.894 | - | 2.699 | - |
| LDUUV Engineering Support 6 | C/CPFF | VAR : VAR | 0.000 | 0.785 | Mar 2014 | 1.667 | Jan 2015 | 0.492 | Jan 2016 | - | | 0.492 | - | 2.944 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>2094. / *Unmanned Underwater Vehicle* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDUUV ILS Support | WR | SSC Lant : Charleston, SC | 0.205 | - | | - | | - | | - | | - | - | 0.205 | - |
| LDUUV ILS Support 2 | WR | VAR : VAR | 0.277 | 0.375 | Dec 2013 | 0.723 | Jan 2015 | 0.529 | Dec 2015 | - | | 0.529 | - | 1.904 | - |
| PLUS ILS Support | WR | NUWC Newport : Newport, RI | 0.500 | 0.771 | Dec 2013 | - | | - | | - | | - | - | 1.271 | - |
| PLUS Engineering Support | WR | NUWC Newport : Newport, RI | 1.500 | 0.050 | Dec 2013 | - | | - | | - | | - | - | 1.550 | - |
| PLUS Engineering Support 2 | TBD | WHOI : Woods Hole, MA | 1.000 | 0.200 | Feb 2014 | - | | - | | - | | - | - | 1.200 | - |
| PLUS Engineering Support 3 | SS/CPFF | APL/JHU : Laurel, MD | 1.000 | 0.200 | Feb 2014 | - | | - | | - | | - | - | 1.200 | - |
| PLUS C2 Support | C/CPFF | APL/UW : Seattle, WA | 3.000 | 0.100 | Feb 2014 | - | | - | | - | | - | - | 3.100 | - |
| Test | Reqn | NUWC : Newport, RI | 0.030 | 0.011 | Oct 2013 | 0.150 | Oct 2014 | - | | - | | - | - | 0.191 | - |
| Test | Reqn | NSWD : Dahlgren, VA | 0.060 | 0.022 | Oct 2013 | 0.150 | Oct 2014 | - | | - | | - | - | 0.232 | - |
| Test | Reqn | NUWC : Patuxent, MD | 0.020 | 0.007 | Oct 2013 | 0.075 | Oct 2014 | - | | - | | - | - | 0.102 | - |
| IA | Reqn | NUWC : Newport, RI | 0.150 | 0.055 | Oct 2013 | 0.075 | Oct 2014 | - | | - | | - | - | 0.280 | - |
| | | **Subtotal** | 12.221 | 6.327 | | 8.346 | | 4.101 | | - | | 4.101 | - | 30.995 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PLUS Fleet Experimentation | Various | Various : Various | 1.000 | 4.077 | May 2014 | - | | - | | - | | - | - | 5.077 | - |
| Test | C/CPFF | Ocean Acoustical Services and instrumentation : Lexington, MA | 0.375 | 0.186 | Oct 2013 | 0.100 | Oct 2014 | - | | - | | - | - | 0.661 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test | C/FPRP | Woods Hole Oceanographic Institution : Woods Hole, MA | 0.851 | 0.372 | Oct 2013 | 0.150 | Oct 2014 | - | | - | | - | - | 1.373 | - |
| Testing | C/CPFF | Woods Hole Oceanographic Institution : Woods Hole, MA | 0.350 | 0.130 | Oct 2013 | 0.125 | Oct 2014 | - | | - | | - | - | 0.605 | - |
| Testing | Reqn | NUWC : Newport, RI | 0.400 | 0.037 | Oct 2013 | 0.175 | Oct 2014 | - | | - | | - | - | 0.612 | - |
| Testing | Reqn | NPS : Monterey, CA | 0.010 | 0.024 | Oct 2013 | 0.025 | Oct 2014 | - | | - | | - | - | 0.059 | - |
| Testing | Reqn | SPAWAR : San Diego, CA | 0.065 | 0.148 | Oct 2013 | 0.028 | Oct 2014 | - | | - | | - | - | 0.241 | - |
| | | **Subtotal** | 3.051 | 4.974 | | 0.603 | | - | | - | | - | - | 8.628 | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDUUV Program Management | WR | NUWC Newport : Newport, RI | 0.435 | 0.530 | Dec 2013 | 0.400 | Dec 2014 | 0.450 | Dec 2015 | - | | 0.450 | Continuing | Continuing | Continuing |
| LDUUV Program Management 2 | TBD | TBD : TBD | 0.475 | 0.360 | Mar 2014 | 0.240 | Feb 2015 | 0.824 | Dec 2015 | - | | 0.824 | - | 1.899 | - |
| LDUUV Travel | Various | NAVSEA : Washington, DC | 0.050 | 0.100 | Dec 2013 | 0.065 | Dec 2014 | 0.185 | Dec 2015 | - | | 0.185 | - | 0.400 | - |
| PLUS Program Management | Various | VAR : VAR | 0.739 | 0.500 | Dec 2013 | - | | - | | - | | - | - | 1.239 | - |
| PLUS Travel | Various | NAVSEA : Washington, DC | 0.111 | 0.050 | Dec 2013 | - | | - | | - | | - | - | 0.161 | - |
| Program | C/CPFF | Systems Planning & Analysis : Arlington, VA | 0.300 | 0.100 | Oct 2013 | 0.150 | Oct 2014 | - | | - | | - | - | 0.550 | - |
| Program | SS/BA | Kentco : Sterling, VA | 0.306 | 0.121 | Oct 2013 | 0.475 | Oct 2014 | - | | - | | - | - | 0.902 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>2094. / *Unmanned Underwater Vehicle* | |

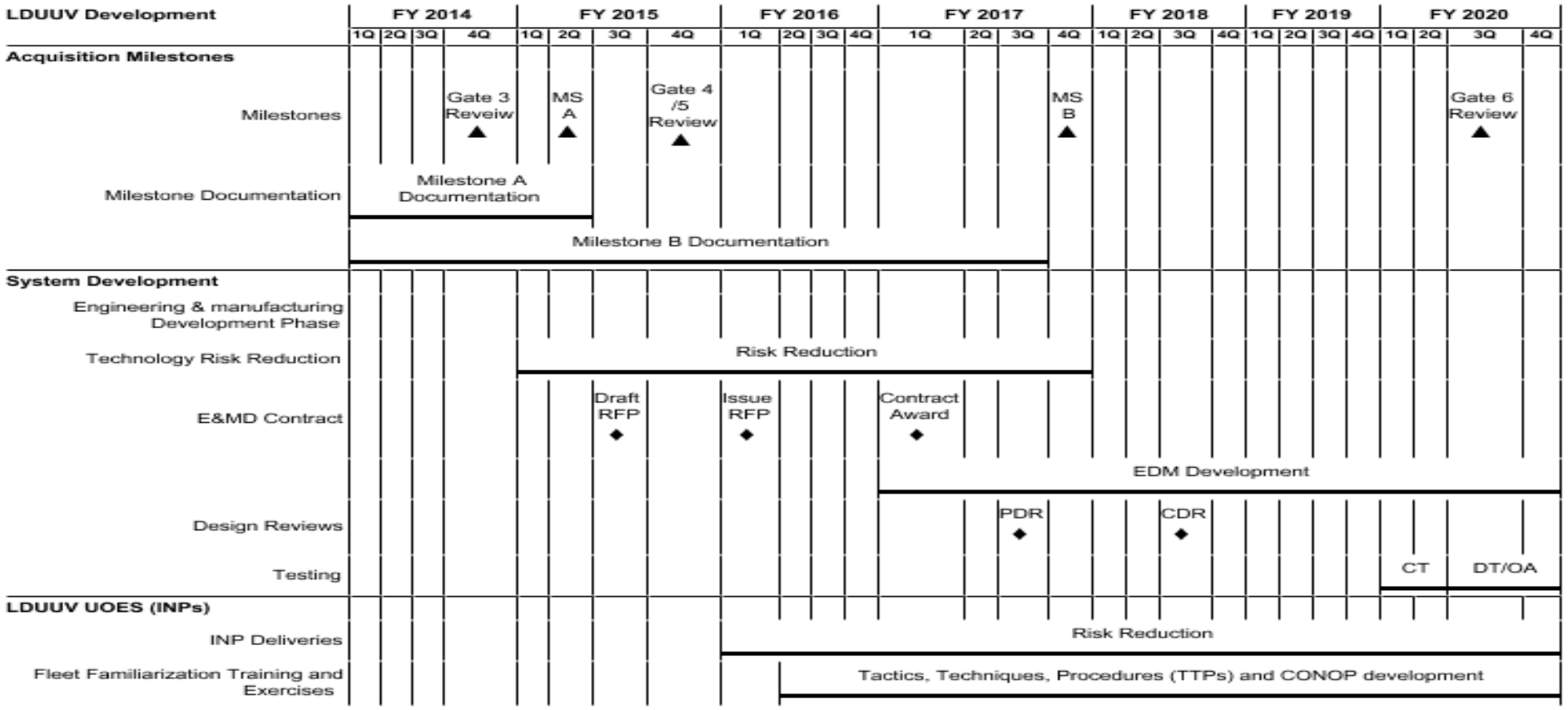
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program | SS/BA | Mandex : Fairfax, VA | 0.050 | 0.131 | Oct 2013 | 0.050 | Oct 2014 | - | | - | | - | - | 0.231 | - |
| | | **Subtotal** | 2.466 | 1.892 | | 1.380 | | 1.459 | | - | | 1.459 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 32.562 | 19.637 | | 13.674 | | 25.065 | | - | | 25.065 | - | - | - |

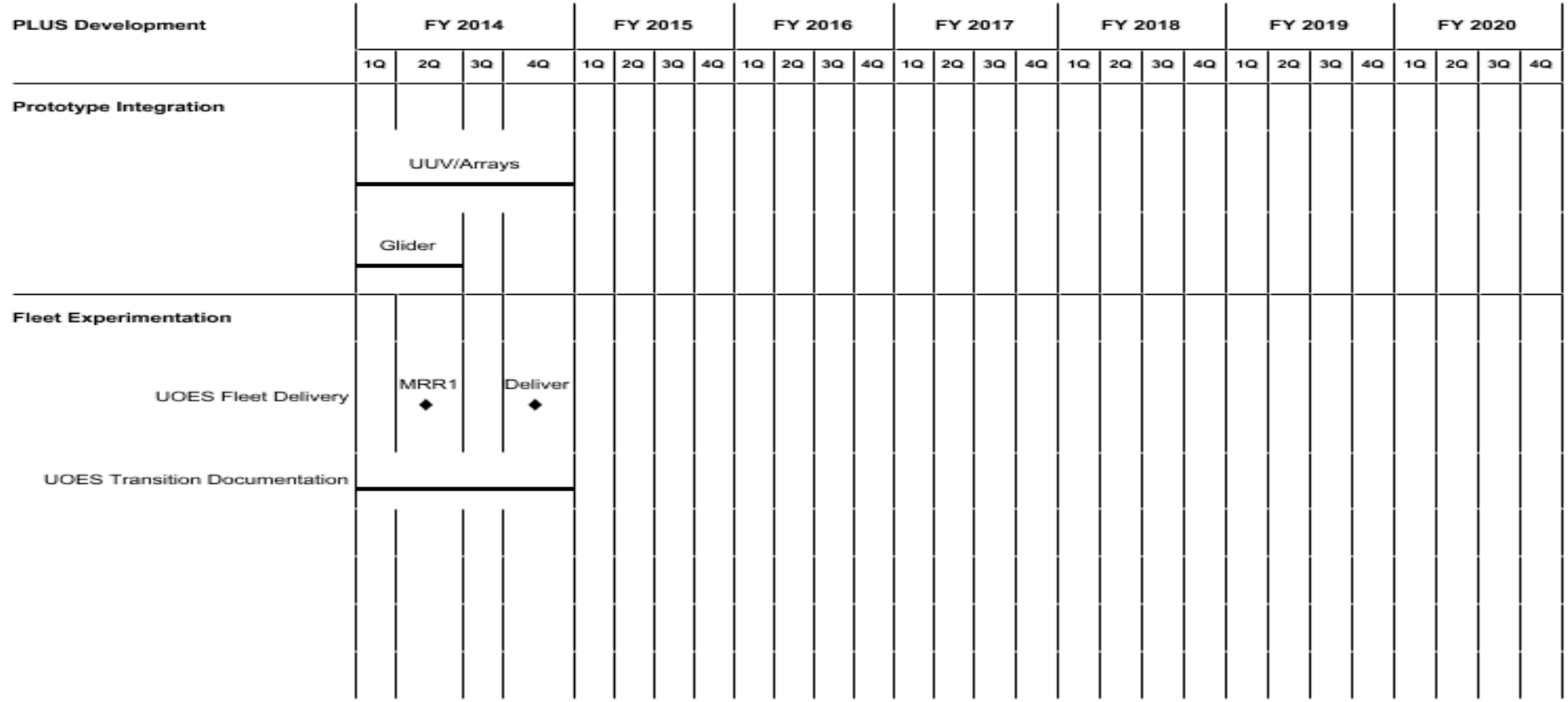
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |




*2016PB - 0603502N - 2094.L24*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |




2016PB - 0603502N - 2094.L24

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***LDUUV Development*** | | | | |
| Acquisition Milestones: Milestones: Gate 3 Review | 4 | 2014 | 4 | 2014 |
| Acquisition Milestones: Milestones: Milestone A | 2 | 2015 | 2 | 2015 |
| Acquisition Milestones: Milestones: Gate 4/5 Review | 4 | 2015 | 4 | 2015 |
| Acquisition Milestones: Milestones: Milestone B | 4 | 2017 | 4 | 2017 |
| Acquisition Milestones: Milestones: Gate 6 | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: Milestone Documentation: Milestone A Documentation | 1 | 2014 | 2 | 2015 |
| Acquisition Milestones: Milestone Documentation: Milestone B Documentation | 1 | 2014 | 3 | 2017 |
| System Development: Technology Risk Reduction: Technology Risk Reduction | 1 | 2015 | 4 | 2017 |
| System Development: E&MD Contract: Draft Request for Proposal | 3 | 2015 | 3 | 2015 |
| System Development: E&MD Contract: Issue RFP | 1 | 2016 | 1 | 2016 |
| System Development: E&MD Contract: E&MD Contract Award | 1 | 2017 | 1 | 2017 |
| System Development: E&MD Contract: EDM Development | 1 | 2017 | 4 | 2020 |
| System Development: Design Reviews: PDR | 3 | 2017 | 3 | 2017 |
| System Development: Design Reviews: CDR | 3 | 2018 | 3 | 2018 |
| System Development: Testing: Contractor Testing | 1 | 2020 | 2 | 2020 |
| System Development: Testing: Devlopemental Testing/Operational Assessment | 3 | 2020 | 4 | 2020 |
| LDUUV UOES (INPs): INP Deliveries: Risk Reduction | 1 | 2016 | 4 | 2020 |
| LDUUV UOES (INPs): Fleet Familiarization Training and Exercises: Schedule Detail | 2 | 2016 | 4 | 2020 |
| ***PLUS Development*** | | | | |
| Prototype Integration: UUV/Arrays Integration | 1 | 2014 | 4 | 2014 |
| Prototype Integration: Glider Integration | 1 | 2014 | 2 | 2014 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Fleet Experimentation: UOES Fleet Delivery: MRR1 | 2 | 2014 | 2 | 2014 |
| Fleet Experimentation: UOES Fleet Delivery: PLUS Delivery | 4 | 2014 | 4 | 2014 |
| Fleet Experimentation: UOES Transition Documentation: Schedule Detail | 1 | 2014 | 4 | 2014 |
| ***PE 0603502N PLUS SPEED TO FLEET R&D Initiative R-4*** | | | | |
| User Interface for the Operator consoles for the command and control functions: Development A: SRR | 1 | 2014 | 1 | 2015 |
| User Interface for the Operator consoles for the command and control functions: Development A: PDR | 3 | 2014 | 3 | 2014 |
| User Interface for the Operator consoles for the command and control functions: Development A: FDR | 4 | 2014 | 4 | 2014 |
| User Interface for the Operator consoles for the command and control functions: Development A: T&E | 1 | 2014 | 1 | 2014 |
| User Interface for the Operator consoles for the command and control functions: Development A: PLUS is headed to a User Operated Evaluation System,this sets the specifications of the system. | 4 | 2014 | 4 | 2014 |
| Evaluation of IA and Anti-Tamper on a test vehicle: Development B: SRR | 1 | 2014 | 1 | 2015 |
| Evaluation of IA and Anti-Tamper on a test vehicle: Development B: CDR | 3 | 2014 | 3 | 2014 |
| Evaluation of IA and Anti-Tamper on a test vehicle: Development B: PLUS is headed to a User Operated Evaluation System,this sets the specifications of the system. | 2 | 2014 | 2 | 2014 |
| Implementation of IA and Anti-Tamper on a test vehicle: Build A: FDR | 4 | 2014 | 4 | 2014 |
| Implementation of IA and Anti-Tamper on a test vehicle: Build A: T&E | 1 | 2014 | 1 | 2014 |
| Implementation of IA and Anti-Tamper on a test vehicle: Build A: PLUS is headed to a User Operated Evaluation System,this sets the specifications of the system. | 2 | 2014 | 2 | 2014 |
| Construction of the optimized array (s) for the system: Development C: CDR | 1 | 2014 | 1 | 2014 |
| Construction of the optimized array (s) for the system: Development C: T&E | 4 | 2014 | 4 | 2014 |
| Construction of the optimized array (s) for the system: Build B: CDR | 3 | 2014 | 3 | 2014 |
| Construction of the optimized array (s) for the system: Build B: T&E | 4 | 2014 | 4 | 2014 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Construction of the optimized array (s) for the system: Build B: PLUS is headed to a User Operated Evaluation System,this sets the specifications of the system. | 1 | 2014 | 1 | 2014 |
| Testing and integration of the array with autonomy and signal processing: Development D: ICD | 1 | 2014 | 1 | 2014 |
| Testing and integration of the array with autonomy and signal processing: Development D: TRR | 3 | 2014 | 3 | 2014 |
| Testing and integration of the array with autonomy and signal processing: Development D: T&E | 4 | 2014 | 4 | 2014 |
| Testing and integration of the array with autonomy and signal processing: Development D: PLUS is headed to a User Operated Evaluation System,this sets the specifications of the system. | 1 | 2014 | 1 | 2014 |
| ***Pg 2 PE 0603502N PLUS SPEED TO FLEET R&D Initiative R-4*** | | | | |
| Testing and evaluation of USBL Navigation: Development E: ICD | 1 | 2014 | 1 | 2014 |
| Testing and evaluation of USBL Navigation: Development E: TRR | 2 | 2014 | 2 | 2014 |
| Testing and evaluation of USBL Navigation: Development E: T&E | 4 | 2014 | 4 | 2014 |
| Testing and evaluation of USBL Navigation: Development E: PLUS is headed to a User Operated Evaluation System,this sets the specifications of the system. | 1 | 2014 | 1 | 2014 |
| Testing of the CARINA vehicle: Build C: CDR | 1 | 2014 | 1 | 2014 |
| Testing of the CARINA vehicle: Build C: TRR | 2 | 2014 | 2 | 2014 |
| Testing of the CARINA vehicle: Build C: T&E | 4 | 2014 | 4 | 2014 |
| Testing of the CARINA vehicle: Build C: PLUS is headed to a User Operated Evaluation System,this sets the specifications of the system. | 4 | 2014 | 4 | 2014 |
| Fleet Field Test and Evaluation: Development F: IPC | 1 | 2014 | 1 | 2014 |
| Fleet Field Test and Evaluation: Development F: MPC | 3 | 2014 | 3 | 2014 |
| Fleet Field Test and Evaluation: Development F: FPC | 4 | 2014 | 4 | 2014 |
| Construction of the Revised and Optimized PLUS Sensor Vehicle: Build D: CDR | 1 | 2014 | 1 | 2014 |
| Construction of the Revised and Optimized PLUS Sensor Vehicle: Build D: TRR | 4 | 2014 | 4 | 2014 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2094. / *Unmanned Underwater Vehicle* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Construction of the Revised and Optimized PLUS Sensor Vehicle: Build D: T&E | 1 | 2014 | 1 | 2014 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>2131 / *Assault Breaching System* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2131: *Assault Breaching System* | 528.358 | 49.432 | 17.908 | 15.598 | - | 15.598 | 21.400 | 16.424 | 16.007 | 17.354 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This program provides a combination of U.S. Navy systems to counter the threat to amphibious forces from obstacles and anti-landing/sea mines in the Beach Zone and Surf Zone (0-10 ft water). The Assault Breaching Systems (ABS) consist of a system of systems approach that includes the following programs: JABS - Joint Direct Attack Munition (JDAM) Assault Breaching System; CMS - Countermine System; COBRA - Coastal Battlefield Reconnaissance and Analysis; PNMS - Precision Navigation and Marking System; and C4I - Command, Control, Computers, Communications, and Intelligence. The Assault Breaching Systems enable the Navy-Marine Corps team to conduct Joint Forcible Entry Operations (JFEO), Ship-To-Objective Maneuver (STOM), and other combat operations to project power ashore.

The JDAM Assault Breaching System (JABS) is a currently fielded system that neutralizes surface mines and obstacles in the Beach Zone and Surf Zone. The ABS Tactical Decision Aid optimizes the Desired Points of Impact (DPI) for JDAM munitions to effectively neutralize mines and obstacles while minimizing the required number of munitions and friendly aircraft sorties. Continued testing is required to optimize the ABS Tactical Decision Aid database for the most common enemy mines and obstacles.

The Countermine System (CMS) is the far-term solution for neutralizing buried mines in the Beach Zone and Surf Zone. CMS transitioned from a 6.3 S&T Concept Demonstration effort to a 6.4 development program after a concept decision/AoA in FY06.

Coastal Battlefield Reconnaissance and Analysis (COBRA) is the ABS program to conduct ISR/T. This system provides Airborne Mine Countermeasures (AMCM) capability, and one system consists of two Airborne Payloads and one Post Mission Analysis Station. Under the umbrella of evolutionary acquisition, three increments of development are planned. Block I is a multispectral sensor capable of daytime detection of surface-laid minefields and obstacles in the Beach Zone. Block II adds a 3D LIDAR (Light Detection and Ranging) sensor that enables nighttime detection of mines and obstacles in the Beach Zone and the Surf Zone (0-10 ft of water). Block II also adds on-board near real-time processing of multispectral imagery data. Block III adds an interferometric sensor that is capable of detecting buried mines. Blocks II and III will incorporate technology being developed by 6.3 S&T. COBRA consists of a modular payload architecture that can be integrated onto the MQ-8B Fire Scout Vertical Takeoff and Landing Unmanned Aerial Vehicle (VTUAV) or USN manned helicopters like the SH-60. COBRA will serve as the "detect" mission module in the Surf Zone and Beach Zone for the Littoral Combat Ship (LCS) Mine Warfare mission package.

Precision Navigation & Marking System (PNMS) provides navigational upgrades for the Landing Craft, Air Cushion (LCAC); Landing Craft, Utility (LCU); and Amphibious Assault Vehicle (AAV). A system of virtual lane marking improves the navigation ability of these three assault craft which enables them to navigate safely through the neutralized assault lanes provided by JABS and CMS. OPN funds the CRAFTALTS to upgrade the navigation systems. LCU Navigation Upgrade: Modernized the navigation system to enable safe transit through the breached lane. LCAC Autopilot Upgrade: An integrated improvement to the LCAC Service Life Extension Program (SLEP) navigation system for craft control that allows precise navigation and hovering within the breached lane. These software upgrades and backfits occur during scheduled LCAC SLEPs. AAV Navigation Upgrade : Modernize the navigation system to enable precise transit through the breached lane.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2131 / *Assault Breaching System* |

Command, Control, Computers, Communications and Intelligence (C4I) system will tie all of the above systems together under an integrated ABS architecture that is compatible with the existing Mine Warfare architecture.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development: | 29.451 | 11.309 | 8.835 | - | 8.835 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>CMS - Continued HE neutralization design, development and testing with emphasis on aero-dynamics and structures. Continued CMS neutralizer lethality design and testing (100 darts)<br><br>COBRA - Continue Blk 1 integration Flight Tests with VTUAV. Design and development of COBRA Block II capability.<br><br>Precision Navigation/Marking (PN/M) - continued evaluation/assessment of EDMs supporting PN/M efforts. | | | | | |
| ***FY 2015 Plans:***<br>COBRA - Continue Blk 1 integration Flight Tests with VTUAV. Continue design and development of COBRA Block II capability.<br><br>JABS - Design and engineering of weapon effectivness for beach zones and surf zone.<br><br>Precision Navigation/Marking (PN/M) - continued evaluation/assessment of EDMs supporting PN/M efforts. | | | | | |
| ***FY 2016 Base Plans:***<br>COBRA - Continue design and development of COBRA Block II capability.<br><br>JABS - Design and engineering of weapon effectivness for beach zones and surf zone.<br><br>Precision Navigation/Marking (PN/M) - continue evaluation/assessment of EDMs supporting PN/M efforts. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Technical Support: | 0.926 | 1.053 | 1.105 | - | 1.105 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2131 / *Assault Breaching System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>CMS/COBRA - Provided mine magazine inventory management and shipping, contract and test/studies, C4I Data Fusion. Provided technical /acquisition support and documentation (ILS, training, data, drawings).<br>***FY 2015 Plans:***<br>COBRA - Provide mine magazine inventory management and shipping, contract and test/studies, C4I Data Fusion. Provide technical /acquisition support and documenttation (ILS, training, data, drawings).<br>***FY 2016 Base Plans:***<br>COBRA - Provide mine magazine inventory management and shipping, contract and test/studies, C4I Data Fusion. Provide technical /acquisition support and documenttation (ILS, training, data, drawings).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Test and Evaluation: | 16.664 | 4.427 | 4.523 | - | 4.523 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>CMS - Continued 100 shot for the HE Neutralizer.<br><br>COBRA - Advanced component Block II development testing. Conducted Block I Operational Assessment (OA).<br><br>PN/M - Continue to test the Precision Navigation and Marking design capability.<br>***FY 2015 Plans:***<br>COBRA - Conduct Block I Operational Assessment (OA). Advanced component Block II compnent Development Testing.<br><br>JABS - Surf Zone (SZ) and Beach Zone (BZ) characterization testing.<br><br>PN/M - Continue to test the Precision Navigation and Marking design capability.<br>***FY 2016 Base Plans:***<br>COBRA - Block I Development Testing (DT) and IOT&E. Continue Block II component Development Testing (DT). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2131 / *Assault Breaching System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| PN/M - Continue to test the Precision Navigation and Marking design capability<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Management: | 2.391 | 1.119 | 1.135 | - | 1.135 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Provided Mine magazine inventory management and shipping, contract management and tests/studies, C4I/ Data fusion.<br>***FY 2015 Plans:***<br>Mine magazine inventory management and shipping, contract management and tests/studies, C4I/Data fusion.<br>***FY 2016 Base Plans:***<br>Mine magazine inventory management and shipping, contract management and tests/studies, C4I/Data fusion.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 49.432 | 17.908 | 15.598 | - | 15.598 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2624: *SHALLOW WATER MCM SHIP* | 12.748 | - | 18.770 | - | 18.770 | 9.344 | 8.880 | 5.602 | 5.723 | - | 77.171 |

**Remarks**

**D. Acquisition Strategy**

Countermine/Counter Obstacle (CM/CO)is JDAM Assault Breaching System (JABS) and ABS Tactical Decision Aid testing is ongoing.

Intelligence/Surveillance/Reconnaissance/Targeting (ISR/T) - COBRA Block I achieved MS C in 3rd QTR FY09. COBRA Block II technology transferred from ONR and will achieve MS B in 2nd QTR FY17. COBRA Block III technology will transition in FY18.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2131 / *Assault Breaching System* |

Precision Navigation & Marking System (PNMS) - The navigation upgrades for the Landing Craft, Air Cushion (LCAC) and Landing Craft, Utility (LCU) are in progress. AAV enhancements will be achieved through an ECP (PMA AAV (Marine Corps)) in 2nd QTR FY15.

All of the above systems continue to meet or exceed their Key Performance Parameters and benefit from effective program management that efficiently allocates the funding it receives. Any delays in program timelines and increases in costs are due directly to previous year's budget cuts.

**E. Performance Metrics**

Successful COBRA integration, flight tests and Operational Assessment (OA) into the Vertical Take-off Unmanned Arial Vehicle (VTUAV).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2131 / *Assault Breaching System* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Dev, COBRA | C/CPAF | Arete : MELBOURNE, FL | 144.397 | 14.545 | Nov 2013 | 7.969 | Nov 2014 | 6.802 | Nov 2015 | - | | 6.802 | - | 173.713 | - |
| Primary Hardware Dev, CMS | C/CPAF | Boeing : St. Louis, MO | 98.024 | 1.950 | Nov 2013 | - | | - | | - | | - | - | 99.974 | - |
| Ancillary Hardware Dev, JABS | C/CPAF | Unknown : Unknown | 18.864 | 3.214 | Nov 2013 | - | Nov 2014 | - | | - | | - | - | 22.078 | - |
| Systems Engineering, COBRA | WR | NSWC, PC : PANAMA CITY, FL | 20.860 | - | | - | | - | | - | | - | - | 20.860 | - |
| Software Dev, COBRA | WR | NAVAIR : PANAMA CITY, FL | 12.958 | - | | - | | - | | - | | - | - | 12.958 | - |
| Systems Engineering, CMS | WR | NSWC, PC : PANAMA CITY, FL | 30.505 | 1.000 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| jABS | WR | NSWC PC : NSWC IH | 0.000 | 5.418 | May 2014 | 0.700 | Nov 2014 | - | | - | | - | - | 6.118 | - |
| Training Dev, COBRA | WR | NSWC, PC : PANAMA CITY, FL | 8.491 | 0.845 | Nov 2013 | 0.775 | Nov 2014 | 0.720 | Nov 2015 | - | | 0.720 | - | 10.831 | - |
| Tooling | WR | NSWC, PC : PANAMA CITY, FL | 0.860 | - | | - | | - | | - | | - | - | 0.860 | - |
| ABS IPT/Test Assets/Proj Eng | WR | NSWC, PC : PANAMA CITY, FL | 8.046 | 0.417 | Nov 2013 | 0.351 | Nov 2014 | 0.301 | Nov 2015 | - | | 0.301 | - | 9.115 | - |
| Precision Navigation & Marking | WR | NSWC, PC : PANAMA CITY, FL | 13.578 | 2.062 | Nov 2013 | 1.514 | Nov 2014 | 1.012 | Nov 2015 | - | | 1.012 | - | 18.166 | - |
| | | **Subtotal** | 356.583 | 29.451 | | 11.309 | | 8.835 | | - | | 8.835 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support Equipment | WR | NSWC, PC : PANAMA CITY, FL | 18.581 | 0.704 | Oct 2013 | 0.797 | Nov 2014 | 0.849 | Nov 2015 | - | | 0.849 | - | 20.931 | - |
| Software Development | WR | NSWC, PC : PANAMA CITY, FL | 8.037 | - | | - | | - | | - | | - | - | 8.037 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>2131 / *Assault Breaching System* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | NSWC, IH : NDIAN HEAD, MD | 2.712 | - | | - | | - | | - | | - | - | 2.712 | - |
| Configuration Management | WR | NSWC, PC : PANAMA CITY, FL | 3.744 | - | | - | | - | | - | | - | - | 3.744 | - |
| Technical Data | WR | NSWC, PC : PANAMA CITY, FL | 2.588 | - | | - | | - | | - | | - | - | 2.588 | - |
| Studies & Analysis | WR | NSWC, PC : PANAMA CITY, FL | 5.642 | 0.222 | Oct 2013 | 0.256 | Nov 2014 | 0.256 | Nov 2015 | - | | 0.256 | - | 6.376 | - |
| GFE | WR | NSWC, PC : PANAMA CITY, FL | 0.400 | - | | - | | - | | - | | - | - | 0.400 | - |
| | | **Subtotal** | 41.704 | 0.926 | | 1.053 | | 1.105 | | - | | 1.105 | - | 44.788 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | WR | NSWC, IH : NDIAN HEAD, MD | 42.894 | 13.106 | Nov 2013 | 2.424 | Nov 2014 | 2.474 | Nov 2015 | - | | 2.474 | - | 60.898 | - |
| Operational Test & Evaluation | WR | NSWC/ IH, PC : NDIAN HEAD, PANAMA CITY | 8.655 | - | | - | | - | | - | | - | - | 8.655 | - |
| Tooling | WR | NSWC/ IH, PC : NDIAN HEAD, PANAMA CITY | 0.700 | - | | - | | - | | - | | - | - | 0.700 | - |
| GFE | WR | NSWC/ IH, PC : NDIAN HEAD, PANAMA CITY | 0.400 | - | | - | | - | | - | | - | - | 0.400 | - |
| Development Test | C/FP | NSWC PC : Panama City, FL | 6.024 | 3.558 | Oct 2013 | 2.003 | Nov 2014 | 2.049 | Nov 2015 | - | | 2.049 | - | 13.634 | - |
| | | **Subtotal** | 58.673 | 16.664 | | 4.427 | | 4.523 | | - | | 4.523 | - | 84.287 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2131 / *Assault Breaching System* |

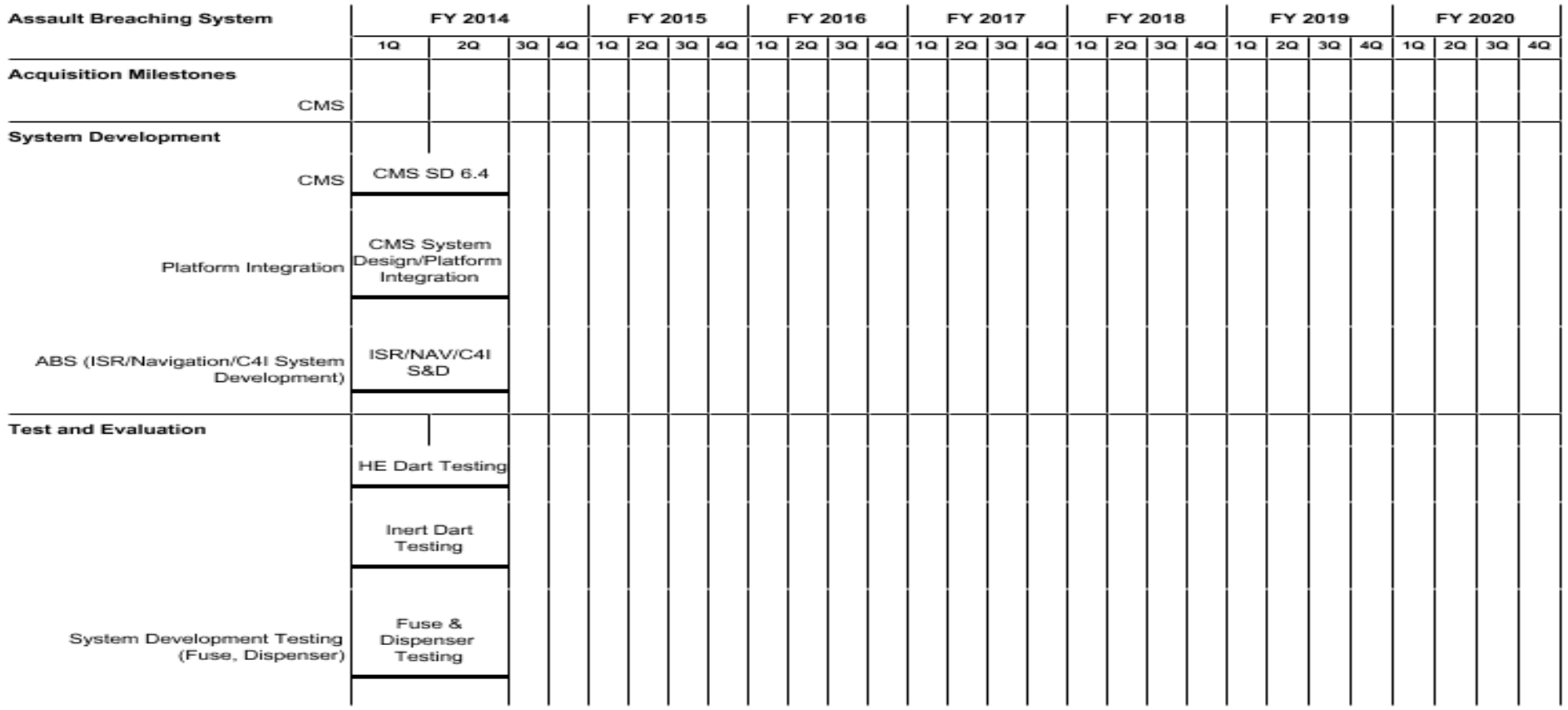
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | C/CPFF | CACI, Norhtrup Grumman : DC, FL | 10.575 | 0.120 | Oct 2013 | 0.120 | Nov 2014 | 0.136 | Nov 2015 | - | | 0.136 | - | 10.951 | - |
| Government Engineering Support | WR | NSWC, IH : NDIAN HEAD, MD | 33.144 | 1.947 | Oct 2013 | 0.488 | Oct 2014 | 0.498 | Nov 2015 | - | | 0.498 | - | 36.077 | - |
| Program Management Support | WR | NSWC/ IH, PC : NDIAN HEAD, PANAMA CITY | 24.525 | 0.250 | Oct 2013 | 0.441 | Nov 2014 | 0.441 | Nov 2015 | - | | 0.441 | - | 25.657 | - |
| Travel | WR | NAVSEA : WNY, DC | 1.509 | 0.074 | Oct 2013 | 0.070 | Nov 2014 | 0.060 | Nov 2015 | - | | 0.060 | - | 1.713 | - |
| Assessment/BTR | C/CPAF | VARIOUS : VARIOUS | 1.434 | - | | - | | - | | - | | - | - | 1.434 | - |
| Acquisition Workforce | Various | VARIOUS : VARIOUS | 0.211 | - | | - | | - | | - | | - | - | 0.211 | - |
| | | **Subtotal** | 71.398 | 2.391 | | 1.119 | | 1.135 | | - | | 1.135 | - | 76.043 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 528.358 | 49.432 | | 17.908 | | 15.598 | | - | | 15.598 | - | - | - |

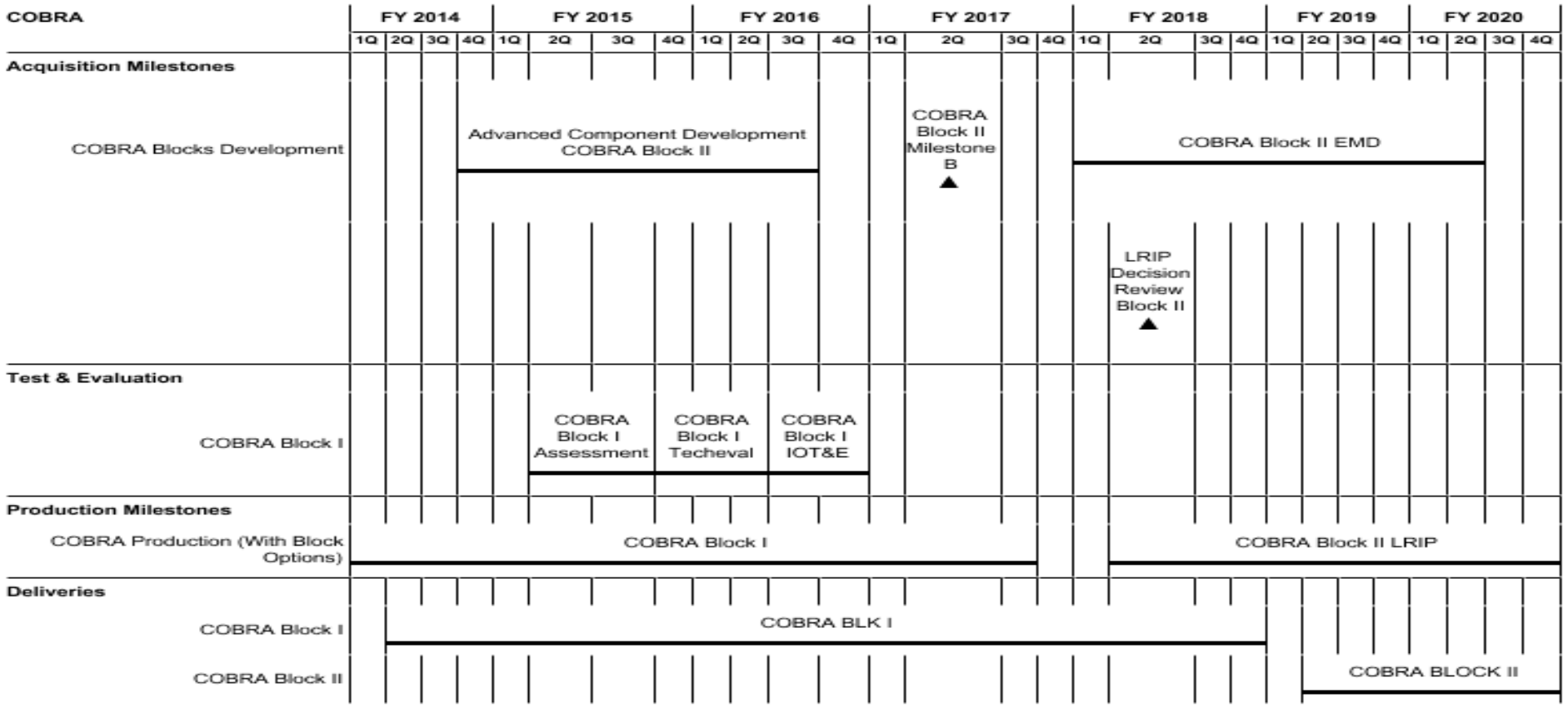
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2131 / *Assault Breaching System* |




*2016PB - 0603502N - 2131*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2131 / *Assault Breaching System* |




*2016PB - 0603502N - 2131*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>2131 / *Assault Breaching System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Assault Breaching System*** | | | | |
| System Development: CMS: CMS System Development 6.4 | 1 | 2014 | 2 | 2014 |
| System Development: Platform Integration: CMS System Design/Platform Integration | 1 | 2014 | 2 | 2014 |
| System Development: ABS (ISR/Navigation/C4I System Development): ISR/ Navigation/C4I System Development | 1 | 2014 | 2 | 2014 |
| Test and Evaluation: HE JABS Surf Zone (SZ) | 1 | 2014 | 2 | 2014 |
| Test and Evaluation: Inert JABS Beach Zone (BZ) | 1 | 2014 | 2 | 2014 |
| Test and Evaluation: System Development Testing (Fuse, Dispenser): System Development Testing (Fuse, Dispenser) | 1 | 2014 | 2 | 2014 |
| ***COBRA*** | | | | |
| Acquisition Milestones: COBRA Blocks Development: Advanced Component Development Block II | 4 | 2014 | 3 | 2016 |
| Acquisition Milestones: COBRA Blocks Development: COBRA Block II EMD | 1 | 2018 | 2 | 2020 |
| Acquisition Milestones: COBRA Blocks Development: COBRA Block II Milestone B | 2 | 2017 | 2 | 2017 |
| Acquisition Milestones: COBRA Blocks Development: LRIP Decision Review Block II | 2 | 2018 | 2 | 2018 |
| Test & Evaluation: COBRA Block I: COBRA Block I Assessment | 2 | 2015 | 3 | 2015 |
| Test & Evaluation: COBRA Block I: COBRA Block I Techeval | 4 | 2015 | 2 | 2016 |
| Test & Evaluation: COBRA Block I: COBRA Block I IOT&E | 3 | 2016 | 4 | 2016 |
| Production Milestones: COBRA Production (With Block Options): COBRA Block I | 1 | 2014 | 3 | 2017 |
| Production Milestones: COBRA Production (With Block Options): COBRA Block II LRIP | 2 | 2018 | 4 | 2020 |
| Deliveries: COBRA Block I: Block I | 2 | 2014 | 4 | 2018 |
| Deliveries: COBRA Block II: Block II | 2 | 2019 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>3123 / *SMCM UUV* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3123: *SMCM UUV* | 88.695 | 14.303 | 18.193 | 17.392 | - | 17.392 | 5.196 | 5.376 | 5.594 | 8.026 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Knifefish Surface Mine Countermeasure Unmanned Undersea Vehicle (SMCM UUV) program develops Unmanned Underwater Vehicles to support clandestine mine detection capability against volume and bottom mines including buried mine detection. Equipment includes vehicles and associated systems support equipment. Potential P3I candidates to start in FY17 include communications upgrades, on-board sonar processing and target recognition, command and control improvements, and other smaller tasks.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Knifefish SMCM UUV LFBB | 14.303 | 18.193 | 17.392 | - | 17.392 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued vehicle fabrication. Commence Development Testing preparations. | | | | | |
| ***FY 2015 Plans:***<br>Complete vehicle fabrication. Systems integration and environmental testing. Continue Engineering and Manufacturing Development (E&MD)phase. | | | | | |
| ***FY 2016 Base Plans:***<br>Continue Engineering and Manufacturing Development (E&MD)phase. Complete Developmental Testing/ Operational Assessment. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 14.303 | 18.193 | 17.392 | - | 17.392 |

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

N/A

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>3123 / *SMCM UUV* |

**D. Acquisition Strategy**

The Knifefish program was initiated in FY11 to develop Surface Mine Countermeasure Unmanned Undersea Vehicles (SMCM UUV) equipped with Low Frequency Broadband (LFBB) sonar that provides volume and bottom mine detection including buried mine detection capability. Initial procurement of the SMCM UUV with LFBB begins in FY17.

**E. Performance Metrics**

Successful Milestone C in Q1 FY17.
Reach Full Rate Production Decision in Q3 FY18.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603502N / *Surface & Shallow Water MCM* | Project (Number/Name)<br>3123 / *SMCM UUV* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMCM UOES Development | C/CPAF | BLUEFIN : CAMBRIDGE, MA | 15.142 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Knifefish Development | C/CPIF | Various : Various | 17.033 | - | | - | | - | | - | | - | - | 17.033 | - |
| Knifefish Development 2 | C/CPIF | General Dynamics AIS : McLeansville, NC | 32.165 | 11.345 | Dec 2013 | 13.484 | Dec 2014 | 11.589 | Dec 2015 | - | | 11.589 | Continuing | Continuing | Continuing |
| Software Development | WR | NSWC, PC : PANAMA CITY, FL | 0.805 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 65.145 | 11.345 | | 13.484 | | 11.589 | | - | | 11.589 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Support 1 | WR | NSWC, PC : PANAMA CITY, FL | 12.443 | 1.519 | Dec 2013 | 1.353 | Dec 2014 | 1.800 | Dec 2015 | - | | 1.800 | Continuing | Continuing | Continuing |
| Engineering Support 2 | WR | NUWC, Newport : NEWPORT, RI | 3.666 | 0.624 | Dec 2013 | 0.636 | Dec 2014 | 0.649 | Dec 2015 | - | | 0.649 | Continuing | Continuing | Continuing |
| Engineering Support 3 | WR | VARIOUS : VARIOUS | 2.384 | 0.695 | Feb 2014 | 1.830 | Dec 2014 | 1.293 | Dec 2015 | - | | 1.293 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 18.493 | 2.838 | | 3.819 | | 3.742 | | - | | 3.742 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NOMWC : STENNIS, MS | 0.526 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Government T&E Support | WR | VARIOUS : VARIOUS | 1.213 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>3123 / *SMCM UUV* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | COMOPTEVFOR : NORFOLK, VA | 0.391 | 0.090 | Feb 2014 | - | Dec 2014 | 0.280 | Dec 2015 | - | | 0.280 | Continuing | Continuing | Continuing |
| Government T&E Support | WR | NSWC, PC : PANAMA CITY, FL | 0.000 | - | | - | Dec 2014 | 0.853 | Dec 2015 | - | | 0.853 | - | 0.853 | - |
| | | **Subtotal** | 2.130 | 0.090 | | - | | 1.133 | | - | | 1.133 | - | - | - |

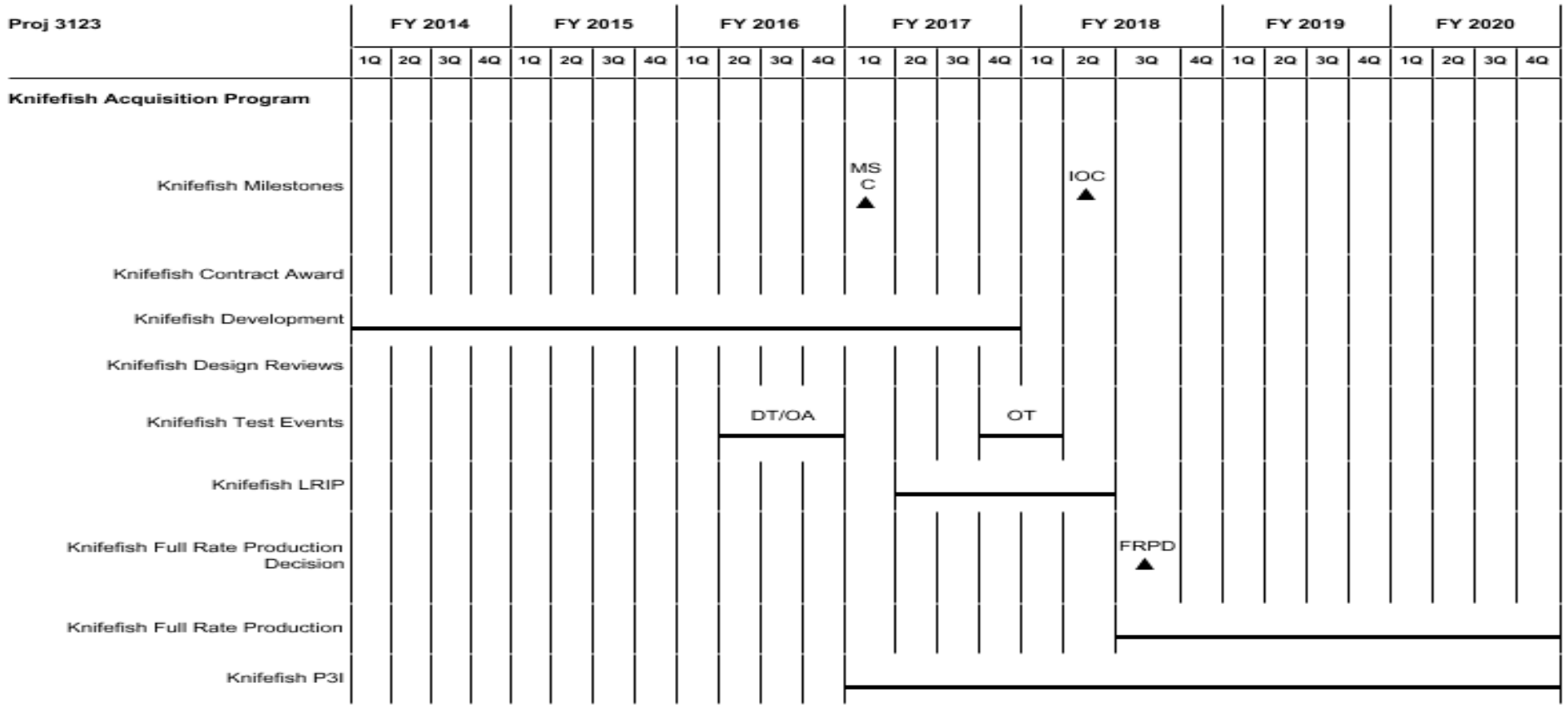
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Need Item Text | C/BA | Not Specified : Not Specified | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Program Management Support | C/CPFF | VARIOUS : WASHINGTON, DC | 2.650 | - | Feb 2014 | 0.840 | Jan 2015 | 0.878 | Dec 2015 | - | | 0.878 | Continuing | Continuing | Continuing |
| Travel | WR | NAVSEA : WNY, DC | 0.230 | 0.030 | Dec 2013 | 0.050 | Dec 2014 | 0.050 | Dec 2015 | - | | 0.050 | Continuing | Continuing | Continuing |
| Acquisition Workforce | WR | VARIOUS : VARIOUS | 0.047 | - | | - | | - | | - | | - | - | 0.047 | - |
| | | **Subtotal** | 2.927 | 0.030 | | 0.890 | | 0.928 | | - | | 0.928 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 88.695 | 14.303 | | 18.193 | | 17.392 | | - | | 17.392 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>3123 / *SMCM UUV* |




*2016PB - 0603502N - 3123*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603502N / *Surface & Shallow Water MCM* | **Project (Number/Name)**<br>3123 / *SMCM UUV* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3123*** | | | | |
| Knifefish Acquisition Program: Knifefish Milestones: Milestone C | 1 | 2017 | 1 | 2017 |
| Knifefish Acquisition Program: Knifefish Milestones: IOC | 2 | 2018 | 2 | 2018 |
| Knifefish Acquisition Program: Knifefish Development: | 1 | 2014 | 4 | 2017 |
| Knifefish Acquisition Program: Knifefish Test Events: DT/OA | 2 | 2016 | 4 | 2016 |
| Knifefish Acquisition Program: Knifefish Test Events: OT | 4 | 2017 | 1 | 2018 |
| Knifefish Acquisition Program: Knifefish LRIP: | 2 | 2017 | 2 | 2018 |
| Knifefish Acquisition Program: Knifefish Full Rate Production Decision: | 3 | 2018 | 3 | 2018 |
| Knifefish Acquisition Program: Knifefish Full Rate Production: | 3 | 2018 | 4 | 2020 |
| Knifefish Acquisition Program: Knifefish P3I: | 1 | 2017 | 4 | 2020 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603506N *I Surface Ship Torpedo Defense* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 469.695 | 83.366 | 50.781 | 77.385 | - | 77.385 | 76.221 | 78.373 | 71.772 | 51.013 | Continuing | Continuing |
| 0225: *Surface Ship Torpedo Defense (SSTD)* | 469.695 | 83.366 | 50.781 | 77.385 | - | 77.385 | 76.221 | 78.373 | 71.772 | 51.013 | Continuing | Continuing |

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

The Surface Ship Torpedo Defense (SSTD) program provides a detect-to-engage layered torpedo defense capability. It is comprised of four major efforts, the AN/SLQ-25 (NIXIE) system, Torpedo Warning System (TWS), the Countermeasure Anti-Torpedo (CAT) and Acoustic Device Countermeasure (ADC MK2 Mod4). There are two development programs, the CAT program develops a canisterized Anti-Torpedo Torpedo (ATT) and is planned to be a ACAT II program. The TWS develops the required torpedo detection, classification and localization (TDCL) ship systems an ACAT III program.

The program will develop and field six Surface Ship Torpedo Defense prototype (TWS/CAT) Engineering Design Model (EDM) systems on CVNs. Each prototype consists of one TWS and eight CATs. The six systems were accelerated due to the lack of hard-kill torpedo defense on HVUs which has been exacerbated by recent real-world events and evolving threats. The systems provide a hard-kill torpedo defense capability in advance of the IOC as part of the program of record. The program delivered one hybrid prototype system in FY13 on USS GHW BUSH. The next prototype was delivered in FY14; This system was delivered in a roll-on/roll-off (RO-RO) configuration and installed on USS Roosevelt. The program will build and deliver one additional RO-RO and one EDM in FY15 and 2 EDMs in FY16.

The program will focus on first providing torpedo defense capability to High Value Units (HVU). For the Initial Operational Capability (IOC) the system will be installed on one CVN and one Combat Logistics Force (CLF) ship (both HVUs) with IOC in FY22.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 85.649 | 52.781 | 30.063 | - | 30.063 |
| Current President's Budget | 83.366 | 50.781 | 77.385 | - | 77.385 |
| Total Adjustments | -2.283 | -2.000 | 47.322 | - | 47.322 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -2.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -2.282 | - | | | |
| • Program Adjustments | - | - | 47.322 | - | 47.322 |
| • Rate/Misc Adjustments | -0.001 | - | - | - | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603506N *I Surface Ship Torpedo Defense* |

**Change Summary Explanation**

The FY 2016 funding reflects program increases to accelerate and deliver the SALVO capability by the end of FY16 including 2 additional independent system integration at sea tests on CVNs. Continue successful fielding of the prototype systems to deploying CVNs and reduce the overall program risk. The CAT program will enter Milestone B in FY16, with a Milestone C decision in FY19.

The FY 2014 funding request include reduction for other rate/misc adjustments and SBIR transfer.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603506N / *Surface Ship Torpedo Defense* | Project (Number/Name)<br>0225 / *Surface Ship Torpedo Defense (SSTD)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0225: *Surface Ship Torpedo Defense (SSTD)* | 469.695 | 83.366 | 50.781 | 77.385 | - | 77.385 | 76.221 | 78.373 | 71.772 | 51.013 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Surface Ship Torpedo Defense (SSTD) program provides a layered torpedo defense capability with four efforts; two of which are currently in development. The Countermeasure Anti- Torpedo (CAT) program develops a canisterized Anti-Torpedo Torpedo (ATT). The Torpedo Warning System (TWS) develops the required TDCL systems.

The program will develop and field six Surface Ship Torpedo Defense prototype EDM systems on CVNs, two of which will be delivered in a RO-RO configuration and one hybrid prototype system on USS GHW BUSH.

SSTD system will be installed on one CVN and one Combat Logistics Force (CLF) ship (both HVUs) with IOC defined as FY22.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Countermeasure Anti-Torpedo (CAT) | 38.248 | 25.845 | 41.385 | - | 41.385 |
| ***Articles:*** | 20 | 12 | - | - | - |
| ***FY 2014 Accomplishments:***<br>Complete shipyard and AIT installation of one RO-RO EDM system on CVN-71. Continue land based and in water testing of EDM-2 ATT thermal engine variant. Build CATs for FY15 EDM systems. Conduct software development and testing for ATT SALVO capability. | | | | | |
| ***FY 2015 Plans:***<br>Continue land based and in-water testing of EDM-2 ATT thermal engine variant. Build CATs for FY15 EDM systems and procure long lead material for FY16 EDM systems. Conduct follow-on software development and testing for ATT SALVO capability. | | | | | |
| ***FY 2016 Base Plans:***<br>Complete land based software development and in-water testing of the EDM-2 thermal engine variant. Assemble and deliver CAT systems purchased in FY15. Accelerate ATT SALVO Capability. Complete follow-on software development and testing for ATT SALVO capability. Conduct 2 independent integrated in-water tests on CVNs | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603506N / *Surface Ship Torpedo Defense* | **Project (Number/Name)**<br>0225 / *Surface Ship Torpedo Defense (SSTD)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| with TWS systems for the acceleration of the ATT SALVO Capability. Deliver ATT SALVO capability at the end of FY16.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Torpedo Warning System (TWS) | 45.118 | 24.936 | 36.000 | - | 36.000 |
| ***Articles:*** | 2 | 2 | 1 | - | 1 |
| ***FY 2014 Accomplishments:***<br>Conduct Land-Based Integration of TWS prototype EDM system fabricated in FY13. Install one RO-RO EDM system on CVN-71 and commence fabrication of one RO-RO and one EDM system for install in FY15. Develop TWS active source software and hardware. Conduct initial active source testing.<br>***FY 2015 Plans:***<br>Buy 2 EDM systems to install in FY16 and install 2 systems from FY14. Continue land based and in-water integration testing of TWS and CAT. Follow-on TWS active source software and hardware development and testing. Conduct software development for TWS SALVO capability.<br>***FY 2016 Base Plans:***<br>Install 2 EDM systems that were purchased in FY 15. Continue land based and in-water integration testing of the TWS and CAT systems. Continue TWS active source software and hardware development and testing. Accelerate TWS SALVO Capability. Conduct 2 independent integrated in-water tests on CVNs with the CAT systems for the acceleration of the TWS SALVO capability. Deliver TWS SALVO capability at the end of FY16.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 83.366 | 50.781 | 77.385 | - | 77.385 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/221300: *SSTD* | - | 12.051 | 22.167 | - | 22.167 | 23.559 | 31.887 | 43.324 | 44.227 | Continuing | Continuing |
| • WPN/311300: *SSTD* | 3.978 | 6.562 | 22.768 | - | 22.768 | 24.520 | 26.725 | 36.502 | 37.232 | Continuing | Continuing |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603506N / *Surface Ship Torpedo Defense* | **Project (Number/Name)**<br>0225 / *Surface Ship Torpedo Defense (SSTD)* |

**D. Acquisition Strategy**

CAT Program: In FY09 and FY10, the CAT project completed a Systems Requirements Review (SRR) and Preliminary Design Review (PDR) on the second Engineering Development Model (EDM-2) design. Applied Research Lab (ARL) will complete the EDM-2 design and hold a Critical Design Review (CDR) in FY18. ARL will fabricate test articles and 40 total EDM-2 CATS in support of the prototype fielding. Integration testing began in FY13 and will continue through delivery of the prototype CATs. A complete Technical Data Package (TDP) will be prepared. Program will enter Milestone B in FY16, with a milestone C decision in FY19. A competitive fixed price contract will be awarded to build low rate initial production (LRIP) units starting in FY20. These units will support developmental testing beginning in FY19 with an FY22 IOC.

TWS Program: In FY09 and FY10, a towed sensor system specification was developed and 2 sea tests were conducted on Navy destroyers that demonstrated the ability of three different passive sonar ranging techniques and demonstrated the benefit of new torpedo detection sonar waveforms. Data from these tests is being applied to the HVU application, and the sensor specification is being modified to meet the increased capability required for HVU ships. Development and production of the new sensors is being conducted by 3Phoenix. A complete sensor set was delivered in 2nd QTR FY12 to support an at sea test in the 3rd QTR FY12. At the same time, a ready-stowage rack, and fire control systems are being developed by Pacific Engineering Incorporated (PEI) and In-Depth Engineering, respectively. All of these components were brought together for integration in FY13. This integration supported fabrication and fielding of the prototype systems. A Milestone C decision is planned in late FY18. A contract will be awarded for TWS LRIP systems to support Developmental Testing beginning in FY19, with an FY22 IOC.

**E. Performance Metrics**

Torpedo Effectiveness for the CAT
Torpedo Detection Classification and Localization (TDCL) False Alert Rate
TDCL probability of correct classification
TWS System Availability

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603506N / *Surface Ship Torpedo Defense* | Project (Number/Name)<br>0225 / *Surface Ship Torpedo Defense (SSTD)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NUWC : Newport, RI | 35.269 | 4.501 | Nov 2013 | 1.700 | Nov 2014 | 2.341 | Nov 2015 | - | | 2.341 | Continuing | Continuing | Continuing |
| Systems Engineering ATT Dev. | C/CPFF | PSU/ARL : State College, PA | 208.551 | 25.467 | Dec 2013 | 22.551 | Dec 2014 | 24.710 | Dec 2015 | - | | 24.710 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | JHU/APL : Baltimore , MD | 1.740 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Systems Engineering Warhead Dev. | WR | NSWC : Indian Head, MD | 56.255 | 8.700 | Nov 2013 | 3.200 | Nov 2014 | 5.545 | Nov 2015 | - | | 5.545 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NUWC : Keyport,WA | 36.882 | 6.100 | Nov 2013 | 2.300 | Nov 2014 | 9.470 | Nov 2015 | - | | 9.470 | Continuing | Continuing | Continuing |
| Systems Engineering TDCL | C/CPFF | Ultra : Braintree, MA | 11.640 | - | | - | | - | | - | | - | - | 11.640 | Continuing |
| Systems Engineering ATT | WR | ONR : Arlington, VA | 1.680 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Systems Engineering TDCL | C/CPFF | AAC : Hauppage, NY | 4.280 | 0.200 | Feb 2014 | - | | - | | - | | - | - | 4.480 | Continuing |
| Systems Engineering | WR | OPTEVFOR : Norfolk, VA | 1.513 | 0.100 | Feb 2014 | 0.100 | Feb 2015 | 0.377 | Feb 2016 | - | | 0.377 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | ArgonST : Manassas, VA | 0.800 | - | | - | | - | | - | | - | - | 0.800 | Continuing |
| Systems Engineering TDCL | WR | NSWC : Dahlgren, VA | 8.047 | 1.500 | Nov 2013 | 0.600 | Nov 2014 | 0.177 | Nov 2015 | - | | 0.177 | - | 10.324 | Continuing |
| Systems Engineering TDCL | WR | SPAWAR : San Diego, CA | 6.687 | 1.700 | Dec 2013 | 0.600 | Dec 2014 | 1.161 | Dec 2015 | - | | 1.161 | - | 10.148 | Continuing |
| Systems Engineering | C/CPFF | UT/ARL : Arlington, TX | 0.600 | - | | - | | - | | - | | - | - | 0.600 | Continuing |
| Systems Engineering | C/CPFF | Alion : Bridgeport, CT | 8.741 | 3.400 | Dec 2013 | 1.670 | Feb 2015 | 1.117 | Dec 2015 | - | | 1.117 | - | 14.928 | Continuing |
| Systems Engineering | WR | NUWC DET : Norfolk, VA | 12.263 | 9.600 | Dec 2013 | 4.160 | Dec 2014 | 7.158 | Dec 2015 | - | | 7.158 | - | 33.181 | - |
| Systems Development | C/CPFF | 3 Phoenix : Fairfax, VA | 54.744 | 17.450 | Dec 2013 | 10.400 | Dec 2014 | 21.300 | Dec 2015 | - | | 21.300 | - | 103.894 | Continuing |
| Integrated Logistic Spt | WR | NSWC Crane : Crane, IN | 0.534 | 0.300 | Dec 2013 | 0.100 | Mar 2015 | 0.130 | Dec 2015 | - | | 0.130 | - | 1.064 | Continuing |
| Systems Engineering | C/CPFF | PEI : Roca, NE | 1.844 | 0.750 | Dec 2013 | 0.300 | Dec 2014 | 0.851 | Dec 2015 | - | | 0.851 | - | 3.745 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603506N / *Surface Ship Torpedo Defense* | Project (Number/Name)<br>0225 / *Surface Ship Torpedo Defense (SSTD)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | CARDEROCK : Bethesda, MD | 0.577 | 0.400 | Dec 2013 | 0.100 | Dec 2014 | 0.258 | Dec 2015 | - | | 0.258 | - | 1.335 | - |
| Systems Engineering | C/CPFF | CGI : Washington, DC | 0.200 | - | | - | | - | | - | | - | - | 0.200 | - |
| Systems Engineering | C/BA | Dam Neck : Virginia Beach, VA | 0.022 | - | | - | | - | | - | | - | - | 0.022 | - |
| Systems Engineering | C/BA | NSWC Panama City : Panama City, FL | 0.255 | - | | - | | - | | - | | - | - | 0.255 | - |
| Systems Engineering | C/BA | Devron 26 : Not Specified | 0.139 | - | | - | | - | | - | | - | - | 0.139 | - |
| | | **Subtotal** | 453.263 | 80.168 | | 47.781 | | 74.595 | | - | | 74.595 | - | - | - |

**Remarks**

The key events driving the increase in funding between FY15 and FY16 are the following efforts: Assemble and deliver CAT systems purchased in FY15. Accelerate and delivery of SALVO capability in FY16 including 2 additional independent system integration at sea tests on CVNs with TWS systems for the accelerated ATT SALVO capability. FY16 will also complete the land based software development and in-water testing of the EDM-2 thermal engine variant, complete follow-on software development and testing for SALVO capability

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Earned Value Mgmt Spt | C/CPAF | Pioneer : Virigina | 0.050 | - | | - | | - | | - | | - | - | 0.050 | - |
| Program Management Support | C/FFP | EG&G : Gaithersburg, Md. | 2.846 | - | | - | | - | | - | | - | - | 2.846 | Continuing |
| DAWDF | Various | Not Specified : Not Specified | 0.237 | - | | - | | - | | - | | - | - | 0.237 | Continuing |
| Program Management Support | C/CPAF | Tech-Marine : Washington, DC | 9.930 | - | | - | | - | | - | | - | - | 9.930 | Continuing |
| Travel | Various | PMS 415 : Not Specified | 0.744 | 0.100 | Nov 2013 | 0.100 | Nov 2014 | 0.100 | Nov 2015 | - | | 0.100 | - | 1.044 | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603506N / *Surface Ship Torpedo Defense* | **Project (Number/Name)**<br>0225 / *Surface Ship Torpedo Defense (SSTD)* |

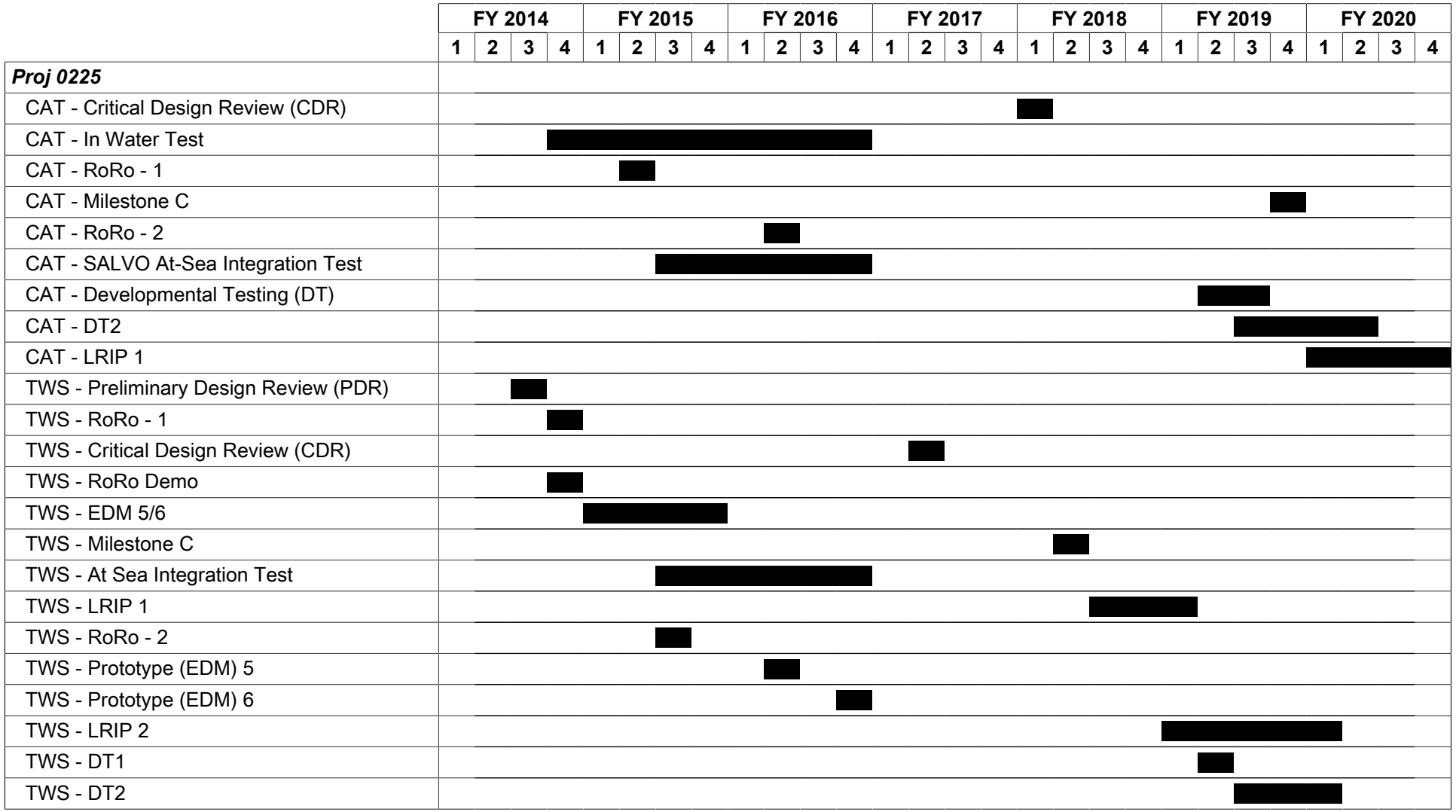
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | SPA : Alexandria, VA | 0.375 | 0.200 | Feb 2014 | - | | - | | - | | - | - | 0.575 | Continuing |
| Program Management Support | C/CPAF | Booz Allen : Washington, DC | 2.100 | 2.648 | Feb 2014 | 2.900 | Feb 2015 | 2.690 | Feb 2016 | - | | 2.690 | - | 10.338 | - |
| Program Management Support | C/CPAF | Alion : Washington, DC | 0.150 | 0.250 | Feb 2014 | - | | - | | - | | - | - | 0.400 | - |
| | | **Subtotal** | 16.432 | 3.198 | | 3.000 | | 2.790 | | - | | 2.790 | - | 25.420 | - |

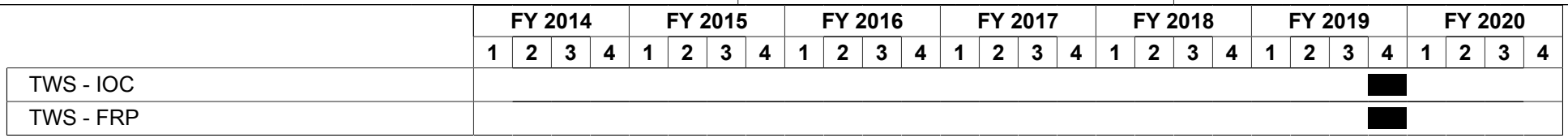
| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 469.695 | 83.366 | | 50.781 | | 77.385 | | - | | 77.385 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603506N / *Surface Ship Torpedo Defense* | **Project (Number/Name)**<br>0225 / *Surface Ship Torpedo Defense (SSTD)* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603506N / *Surface Ship Torpedo Defense* | **Project (Number/Name)**<br>0225 / *Surface Ship Torpedo Defense (SSTD)* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603506N / *Surface Ship Torpedo Defense* | **Project (Number/Name)**<br>0225 / *Surface Ship Torpedo Defense (SSTD)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0225*** | | | | |
| CAT - Critical Design Review (CDR) | 1 | 2018 | 1 | 2018 |
| CAT - In Water Test | 4 | 2014 | 4 | 2016 |
| CAT - RoRo - 1 | 2 | 2015 | 2 | 2015 |
| CAT - Milestone C | 4 | 2019 | 4 | 2019 |
| CAT - RoRo - 2 | 2 | 2016 | 2 | 2016 |
| CAT - SALVO At-Sea Integration Test | 3 | 2015 | 4 | 2016 |
| CAT - Developmental Testing (DT) | 2 | 2019 | 3 | 2019 |
| CAT - DT2 | 3 | 2019 | 2 | 2020 |
| CAT - LRIP 1 | 1 | 2020 | 4 | 2020 |
| TWS - Preliminary Design Review (PDR) | 3 | 2014 | 3 | 2014 |
| TWS - RoRo - 1 | 4 | 2014 | 4 | 2014 |
| TWS - Critical Design Review (CDR) | 2 | 2017 | 2 | 2017 |
| TWS - RoRo Demo | 4 | 2014 | 4 | 2014 |
| TWS - EDM 5/6 | 1 | 2015 | 4 | 2015 |
| TWS - Milestone C | 2 | 2018 | 2 | 2018 |
| TWS - At Sea Integration Test | 3 | 2015 | 4 | 2016 |
| TWS - LRIP 1 | 3 | 2018 | 1 | 2019 |
| TWS - RoRo - 2 | 3 | 2015 | 3 | 2015 |
| TWS - Prototype (EDM) 5 | 2 | 2016 | 2 | 2016 |
| TWS - Prototype (EDM) 6 | 4 | 2016 | 4 | 2016 |
| TWS - LRIP 2 | 1 | 2019 | 1 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603506N / *Surface Ship Torpedo Defense* | **Project (Number/Name)**<br>0225 / *Surface Ship Torpedo Defense (SSTD)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| TWS - DT1 | 2 | 2019 | 2 | 2019 |
| TWS - DT2 | 3 | 2019 | 1 | 2020 |
| TWS - IOC | 4 | 2019 | 4 | 2019 |
| TWS - FRP | 4 | 2019 | 4 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603512N *I Carrier Systems Development* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,680.409 | 78.929 | 5.959 | 8.348 | - | 8.348 | 7.539 | 7.531 | 5.668 | 5.787 | Continuing | Continuing |
| 2208: *CVN 21* | 978.823 | 31.081 | - | - | - | - | - | - | - | - | - | 1,009.904 |
| 3216.: *Tactical Support Center-Integration* | 24.919 | 4.484 | 4.185 | 6.131 | - | 6.131 | 6.286 | 6.270 | 4.367 | 4.456 | Continuing | Continuing |
| 4004: *EMALS* | 657.574 | 41.653 | - | - | - | - | - | - | - | - | - | 699.227 |
| 4005: *In-Service Carrier Systems Development* | 19.093 | 1.711 | 1.774 | 2.217 | - | 2.217 | 1.253 | 1.261 | 1.301 | 1.331 | Continuing | Continuing |
| **MDAP/MAIS Code:**<br>**Other MDAP/MAIS Code(s):** 223 | | | | | | | | | | | | |

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

This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:

- (2208) - Development of ship hull, mechanical, propulsion, electrical, aviation, and combat support systems, subsystems and components to significantly improve 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 existing and future aircraft carriers. Funding for this project continues in PE 0604112N in FY 15 and later.

- (3216) - The AN/SQQ-34 Aircraft Carrier Tactical Support Center (CV-TSC) contributes to Aircraft Carrier (CVN) self defense capabilities. The system provides shipboard support of multi-mission aircraft operating organic to the CVN or under control of the Carrier Strike Group (CSG), providing primary mission support for Anti-Submarine Warfare (ASW) and Surface Warfare (SUW). The AN/SQQ-34 also provides auxiliary support for secondary missions such as search and rescue. The system provides the capability to collect, process, analyze, display, and distribute sensor and tactical data in support of detection, classification, and localization of targets. The AN/SQQ-34 is incrementally upgraded to support new air platforms and their sensors, centrally integrate ASW capabilities on the CVN, transition maturing technologies, and maintain interoperability with interfacing systems. The system provides support for both rotary wing aircraft (MH-60R/S) and future support for fixed wing aircraft operating within the CSG (P-8, Triton Unmanned Aircraft System (UAS)).

Beginning in FY16 , Project 3216 will support the design and development of a multi-application, cross-platform boundary defense capability as directed by the Chief of Naval Operations (CNO) and Assistant Secretary of the Navy Research, Development & Acquisition (ASN (RDA)) via the Task Force Cyber Awakening (TFCA) Advisory Board.

- (4004) - Development of an advanced technology aircraft launch system in support of the CVN 78 Class design and construction schedule. The Electro Magnetic Aircraft Launch System (EMALS) will replace the current steam catapult on CVN 78 Class ships. EMALS provides better control of applied forces, both peak and transient dynamic, improved

reliability and maintainability, increased operational availability and reduced operator and maintainer workload. Funding for this project continues in PE 0604112N in FY 15 and later.

- (4005) - The In-Service Carrier Systems Development Demonstration and Validation program exploits available technologies to deliver an affordable, robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment. The program provides the system architecture, requirements/specification development, technology selection, software development (including software baseline), as well as land-based and shipboard testing of new technologies to improve shipboard operations and to reduce workload, manpower requirements, and Total Ownership Costs (TOC).

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 80.899 | 5.959 | 6.368 | - | 6.368 |
| Current President's Budget | 78.929 | 5.959 | 8.348 | - | 8.348 |
| Total Adjustments | -1.970 | - | 1.980 | - | 1.980 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.971 | - | | | |
| • Program Adjustments | - | - | 2.000 | - | 2.000 |
| • Rate/Misc Adjustments | 0.001 | - | -0.020 | - | -0.020 |

**Change Summary Explanation**

Project 3216: Added funding to support the design and development of a Boundary Defense Capability.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603512N / *Carrier Systems Development* | Project (Number/Name)<br>2208 / *CVN 21* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2208: *CVN 21* | 978.823 | 31.081 | - | - | - | - | - | - | - | - | - | 1,009.904 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**MDAP/MAIS Code:** 223

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

This project provides for the development of 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 transitions the most promising technologies from the Navy technology base, other government laboratories, and the private sector into specific advanced development efforts. 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 significantly improve 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 78 procurement, including, but not limited to engineering support, programmatic and program support, logistics support, modeling and simulation, test and evaluation, manpower and program related studies, and design support systems, such as the Integrated Digital Environment (IDE). Funding for this project continues in PE 0604112N in FY 15 and later.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** CVN 78 Class Advanced Technology Design & Development | 20.776 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** - CVN 78 Class Advanced Technology Design & Development: Continue development and transition of technologies to support CVN 78 Class Key Performance Parameters (KPPs): maintain sortie generation rate, reductions in manpower, and further recovery of weight and stability service life margins. Continue design activities to integrate the new technologies, such as the new propulsion plant and Electromagnetic Aircraft Launch System into the ship. | | | | | |
| ***FY 2014 Accomplishments:***<br>Continued design, development and transition of key technologies to support CVN 21 (CVN 78 Class) KPPs which included sortie generation rate, reductions in manpower, and further recovery of weight and stability service life margins. Continued design activities to integrate new technologies, such as the new propulsion plant and EMALS into the ship. Continued existing studies and commenced new studies required for integrated warfare system and C4I design, integration, test and validation efforts. Developed and reviewed Pre-Planned Product Improvement (P3I) Technical Data Packages. Continued engineering and technical support of aircraft | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>2208 / *CVN 21* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| launch and recovery systems. Developed ship integration side studies to support NAVSEA documented class baseline changes. Continued shipbuilder system and cost engineering support to assess ship impacts from selected Engineering Change Requests (ECRs) and changes to the GFE/CFE equipment split.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** CVN 21 - Test & Evaluation (T&E) | 10.305 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** - CVN 21 - Test & Evaluation (T&E)<br>***FY 2014 Accomplishments:***<br>Continued conducting the semi-annual Post Delivery Test & Trials (PDT&T) workshops and updating / maintaining the notional PDT&T schedule. Continued the Developmental Test Working Group (DTWG) efforts, focusing on the continued development / refinement of the Developmental Test Database (DTDB) and the collection / analysis of the DT metrics. Stood up the CVN 78 Integrated Test Team (CITT), which was co-chaired by the Program Office and Commander, Operational Test & Evaluation (COMOPTEVFOR). Completed DT/IT-2 and commenced DT/IT-3, which included: (1) completing Sortie Generation Rate Assessment (SGRA) 13; the analysis / report on the Aqueous Film Forming Foam (AFFF) land-based system performance test; the analysis / report on the Aircraft Fueling Station (AFS) land-based testing; and NAVAIR Production Integration Facility (PIF) testing; (2) conducting Combat System Test (CST) Phase 1; and Navigation Integration Testing; and (3) continuing DBR land-based testing; DBR to TPX-42 land-based integration testing; HII-NNS Production Integration Center (PIC) testing; IA testing on CFE during PIC testing; E3 testing; and spiral development of the VCVN Model.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>2208 / *CVN 21* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 31.081 | - | - | - | - |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN / 0604567N: *Project Units 3108, 3179, 4007* | 15.217 | 18.867 | 27.648 | - | 27.648 | 30.051 | 30.295 | 27.645 | 25.840 | Continuing | Continuing |
| • RDTEN / 0603570N: *Propulsion Plant Development (PU 2692)* | 57.499 | 60.459 | - | - | - | - | - | - | - | - | 1,526.813 |
| • SCN / 2001: *Carrier Replacement Program* | 917.553 | 1,219.425 | 2,509.359 | - | 2,509.359 | 2,955.056 | 3,530.762 | 2,075.957 | 873.334 | Continuing | Continuing |
| • SCN / 5300: *Completion of Prior Year Shipbuilding Programs* | 588.100 | 663.000 | 123.760 | - | 123.760 | - | - | - | - | - | 1,374.860 |
| • RDTEN / 0604112N: *Project Units 2208, 4004* | - | 43.613 | 48.105 | - | 48.105 | 45.386 | 33.890 | 25.418 | 25.951 | Continuing | Continuing |
| • OMN / 1B2B: *CVN 78 Ford Class Training (12BJ0)* | - | 4.907 | 38.389 | - | 38.389 | 35.600 | 3.878 | 3.880 | 3.956 | 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, 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 development of TEMP 1610, Rev C and route for signature. Successfully complete all PEO C4I TIF testing. Successfully execute SGRA 12 and SGRA 13. Gain acceptance of the FSST Alternative Process as a technically-feasible and cost-effective alternative to the traditional FSST. Successfully complete

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>2208 / *CVN 21* |

the NAVAIR PIF testing and the Consolidated Afloat Networks and Enterprise Services (CANES) testing. Successfully conduct and support feasibility and tradeoff studies and data packages on new and modified shipboard systems, technologies and proposed modification. Data packages shall include information to support program decisions to integrate these efforts into the whole ship design efforts. Successfully conduct IDC shock testing and reporting in order to finalize IDC R&D efforts. Successfully complete Advanced Weapons Elevator Shock and Electromagnetic Interference (EMI) Test qualifications. Successfully complete Plasma Arc Waste Destruction System (PAWDS) Land-Based Test. Successfully create and deliver 21 Decision Memorandums (DM) for Bents/Bays 1-21.on the 03 Level (Gallery Deck) with Layer 31 information. Successfully develop the baseline Technical Data Packages for 39 systems and mature packages in preparation for final GFI arrival.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603512N / *Carrier Systems Development* | Project (Number/Name)<br>2208 / *CVN 21* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Propulsion Plant Development | SS/CPFF | BETTIS : PA | 71.627 | - | | - | | - | | - | | - | - | 71.627 | - |
| Propulsion Plant Development | C/CPFF | HII : VA | 164.409 | - | | - | | - | | - | | - | - | 164.409 | - |
| Propulsion Plant Development | Various | MISCELLANEOUS : Various | 10.562 | - | | - | | - | | - | | - | - | 10.562 | - |
| Propulsion Plant Development | WR | NSWC CARDEROCK : MD | 0.050 | - | | - | | - | | - | | - | - | 0.050 | - |
| Advanced Design & Development | C/CPAF | HII : VA | 180.701 | 6.523 | Nov 2013 | - | | - | | - | | - | - | 187.224 | - |
| Advanced Design & Development | WR | NSWC CARDEROCK : MD | 86.544 | 4.796 | Nov 2013 | - | | - | | - | | - | - | 91.340 | - |
| Advanced Design & Development | C/CPFF | SAIC : NM | 49.703 | 0.196 | Dec 2013 | - | | - | | - | | - | - | 49.899 | - |
| Advanced Design & Development | WR | NAWCAD PATUXENT RIVER : MD | 55.715 | 2.099 | Nov 2013 | - | | - | | - | | - | - | 57.814 | - |
| Advanced Design & Development | WR | NAWC LAKEHURST : NJ | 8.445 | - | | - | | - | | - | | - | - | 8.445 | - |
| Advanced Design & Development | WR | NSWC DAHLGREN : VA | 29.095 | 1.630 | Nov 2013 | - | | - | | - | | - | - | 30.725 | - |
| Advanced Design & Development | C/CPAF | RAYTHEON : VA | 40.226 | 2.874 | Dec 2013 | - | | - | | - | | - | - | 43.100 | - |
| Advanced Design & Development | WR | NSWC PORT HUENEME : CA | 6.068 | - | | - | | - | | - | | - | - | 6.068 | - |
| Advanced Design & Development | WR | SPAWAR : CA | 11.660 | 0.270 | Nov 2013 | - | | - | | - | | - | - | 11.930 | - |
| Advanced Design & Development | C/CPFF | NAVSEA SEAPORT : DC | 54.920 | 2.030 | Dec 2013 | - | | - | | - | | - | - | 56.950 | - |
| Advanced Design & Development | WR | SSC ATLANTIC : SC | 0.531 | - | | - | | - | | - | | - | - | 0.531 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>2208 / *CVN 21* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Advanced Design & Development | Various | MISCELLANEOUS : Various | 44.165 | 0.358 | Dec 2013 | - | | - | | - | | - | - | 44.523 | - |
| Aircraft Launch, Recovery & Support | C/CPAF | GENERAL ATOMICS (PDRR) : CA | 82.719 | - | | - | | - | | - | | - | - | 82.719 | - |
| Aircraft Launch, Recovery & Support | C/CPAF | HIINC : VA | 3.126 | - | | - | | - | | - | | - | - | 3.126 | - |
| Aircraft Launch, Recovery & Support | C/CPAF | GENERAL ATOMICS (SDD) - AWARD FEE : CA | 3.557 | - | | - | | - | | - | | - | - | 3.557 | - |
| | | **Subtotal** | 903.823 | 20.776 | | - | | - | | - | | - | - | 924.599 | - |

**Remarks**

Funds for this project include dollars associated with 22208 (FY97-98, $15,920K) and 42208 (FY99-13, $962,903K). Project Unit 42208 has been transferred to Program Element 0604112N for FY15 out.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | C/CPAF | HII : VA | 12.169 | 1.497 | Nov 2013 | - | | - | | - | | - | - | 13.666 | - |
| Developmental Test & Evaluation | WR | NAWCAD PATUXENT RIVER : MD | 24.231 | 2.405 | Nov 2013 | - | | - | | - | | - | - | 26.636 | - |
| Developmental Test & Evaluation | WR | NSWC DALGREN : VA | 6.939 | 0.842 | Nov 2013 | - | | - | | - | | - | - | 7.781 | - |
| Developmental Test & Evaluation | WR | NSWC CARDEROCK : MD | 11.029 | 1.964 | Nov 2013 | - | | - | | - | | - | - | 12.993 | - |
| Developmental Test & Evaluation | WR | SPAWAR : CA | 3.301 | 0.517 | Nov 2013 | - | | - | | - | | - | - | 3.818 | - |
| Developmental Test & Evaluation | C/CPFF | NAVSEA SEAPORT : DC | 0.676 | - | | - | | - | | - | | - | - | 0.676 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603512N / *Carrier Systems Development* | Project (Number/Name)<br>2208 / *CVN 21* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | C/CPAF | RAYTHEON : VA | 3.436 | 0.374 | Dec 2013 | - | | - | | - | | - | - | 3.810 | - |
| Developmental Test & Evaluation | Various | MISCELLANEOUS : Various | 5.062 | 0.678 | Dec 2013 | - | | - | | - | | - | - | 5.740 | - |
| Developmental Test & Evaluation | WR | SSC ATLANTIC : SC | 0.424 | 0.109 | Nov 2013 | - | | - | | - | | - | - | 0.533 | - |
| Operational Test & Evaluation | WR | COMOPTEVFOR : VA | 7.458 | 1.919 | Dec 2013 | - | | - | | - | | - | - | 9.377 | - |
| | | **Subtotal** | 74.725 | 10.305 | | - | | - | | - | | - | - | 85.030 | - |

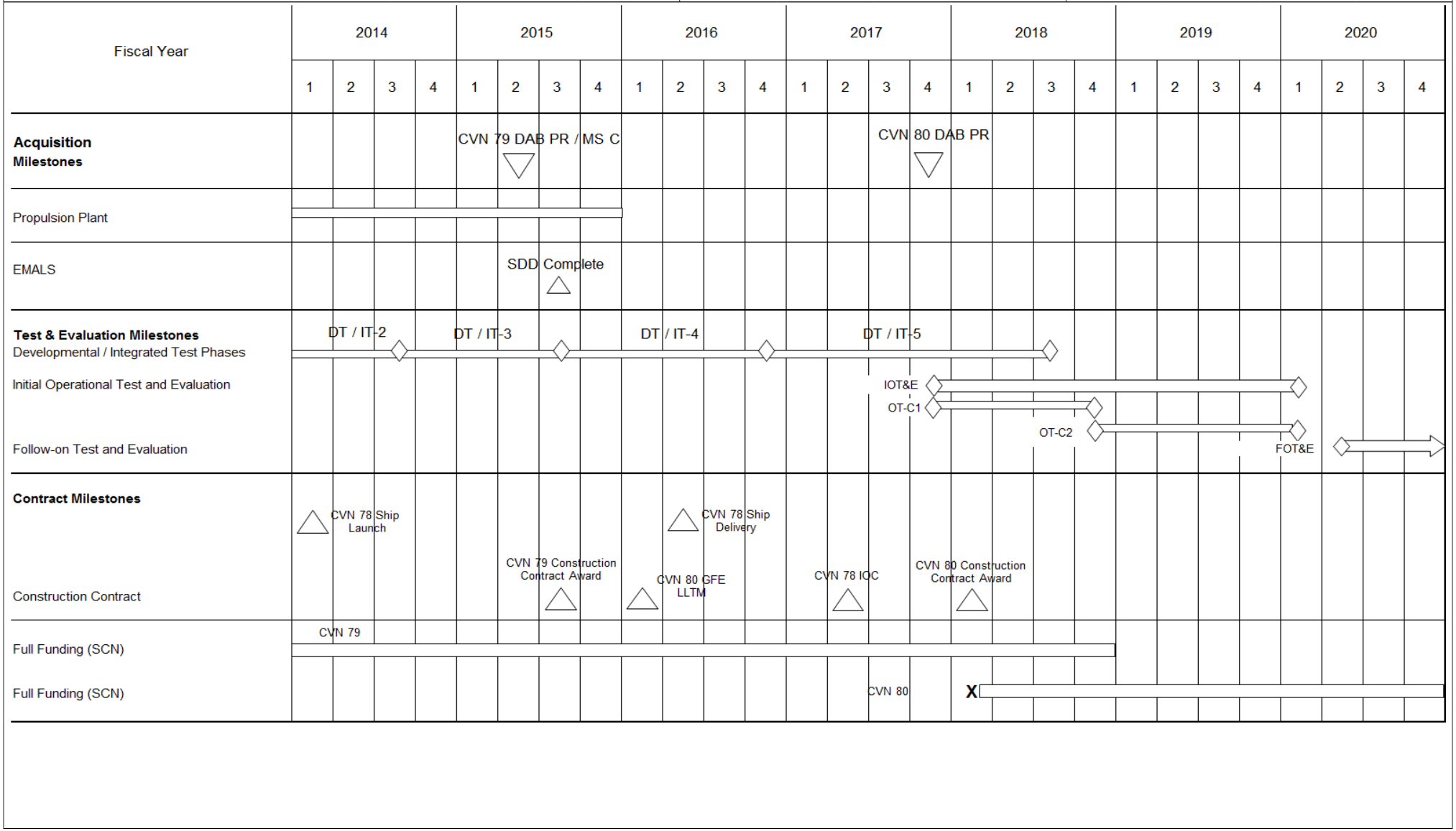
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Defense Acquisition Workforce | Various | VARIOUS : Various | 0.275 | - | | - | | - | | - | | - | - | 0.275 | - |
| | | **Subtotal** | 0.275 | - | | - | | - | | - | | - | - | 0.275 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 978.823 | 31.081 | | - | | - | | - | | - | - | 1,009.904 | - |

**Remarks**

| **Exhibit R-4, RDT&E Schedule Profile:** PB 2016 Navy | | **Date:** February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>2208 / *CVN 21* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>2208 / *CVN 21* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2208*** | | | | |
| CVN 79 DAB PR | 2 | 2015 | 2 | 2015 |
| CVN 80 DAB PR | 4 | 2017 | 4 | 2017 |
| Milestone C | 2 | 2015 | 2 | 2015 |
| Propulsion Plant | 1 | 2014 | 4 | 2015 |
| EMALS SDD Complete | 3 | 2015 | 3 | 2015 |
| DT/IT -2- Developmental Test / Integrated Test Phase 2 | 1 | 2014 | 3 | 2014 |
| DT/IT -3- Developmental Test / Integrated Test Phase 3 | 3 | 2014 | 3 | 2015 |
| DT/IT -4- Developmental Test / Integrated Test Phase 4 | 3 | 2015 | 4 | 2016 |
| DT/IT -5- Developmental Test / Integrated Test Phase 5 | 4 | 2016 | 3 | 2018 |
| Initial Operational Test & Evaluation | 4 | 2017 | 1 | 2020 |
| OT -C1 - Initial Operational Test & Evaluation - Phase C1 | 4 | 2017 | 4 | 2018 |
| OT -C2 - Initial Operational Test & Evaluation - Phase C2 | 4 | 2018 | 1 | 2020 |
| FOT&E - Follow-On Test & Evaluation | 2 | 2020 | 4 | 2020 |
| CVN 78 Ship Launch | 1 | 2014 | 1 | 2014 |
| CVN 78 Ship Delivery | 2 | 2016 | 2 | 2016 |
| CVN 78 Initial Operational Capability (IOC) | 2 | 2017 | 2 | 2017 |
| CVN 79 Construction Contract Award | 3 | 2015 | 3 | 2015 |
| CVN 80 GFE LLTM Contract Award | 1 | 2016 | 1 | 2016 |
| CVN 80 Construction Contract Award | 1 | 2018 | 1 | 2018 |
| CVN 79 SCN Full Funding | 1 | 2014 | 4 | 2018 |
| CVN 80 SCN Full Funding | 1 | 2018 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603512N / *Carrier Systems Development* | Project (Number/Name)<br>3216. / *Tactical Support Center-Integration* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3216.: *Tactical Support Center-Integration* | 24.919 | 4.484 | 4.185 | 6.131 | - | 6.131 | 6.286 | 6.270 | 4.367 | 4.456 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The AN/SQQ-34 Aircraft Carrier Tactical Support Center (CV-TSC) contributes to Aircraft Carrier (CVN) self defense capabilities. The system provides shipboard support of multi-mission aircraft operating organic to the CVN or under control of the Carrier Strike Group (CSG), providing primary mission support for Anti-Submarine Warfare (ASW) and Surface Warfare (SUW). The AN/SQQ-34 also provides auxiliary support for secondary missions such as search and rescue. The system provides the capability to collect, process, analyze, display, and distribute sensor and tactical data in support of detection, classification, and localization of targets. The AN/SQQ-34 is incrementally upgraded to support new air platforms and their sensors, centrally integrate ASW capabilities on the CVN, transition maturing technologies, and maintain interoperability with interfacing systems. The system provides support for both rotary wing aircraft (MH-60R/S) and future support for fixed wing aircraft operating within the CSG (P-8, Triton UAS).

Additionally, this project will mature the development of low-cost multi-beam Ku-Band planar phased arrays and associated integrated radio systems, and addresses the major cost drivers of planar arrays and their associated radios. This effort will be the first spiral of a major cost reduction effort for multi-beam arrays, with the goal of showing a path to a production cost of less than one third the cost of existing array technologies. This development will produce key integrated components needed to reduce the cost of arrays and will provide prototype multi-beam Ku-Band receiving and transmitting arrays/radios using these components. The effort will also emphasize advances in technologies associated with multi-path interference, scan angle losses and networking waveforms.
(Speed to Fleet) The CV-TSC program provides increased situational awareness to the Carrier Strike Group (CSG) in support of force protection, primarily in the area of Anti-Submarine Warfare (ASW). A portion of this program will focus on maturing low-cost multi-beam Ku-Band planar phased arrays and associated integrated radio systems that will be used to support data links to multiple MH-60Rs. This specific effort will address the need for low cost communications security (COMSEC) devices that are compatible with phased array systems, and that are needed to secure these data links.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** MH-60R Integration Development for CV-TSC | 3.549 | 4.185 | 4.131 | - | 4.131 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>- Continued development of software version 8.0 to include: acoustic signal processing and analysis improvements; sensor performance predictions and mission planning support for the MH-60R acoustic sensor suite; embedded training for shipboard operators; and interoperability changes to support the Ship Self-Defense System (SSDS) and Common Data Link(CDL). Focus was on transition and integration efforts associated with | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>3216. / *Tactical Support Center-Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| existing acoustic signal processing capabilities modified for CV-TSC supported sensors, and maturing science and technology efforts associated with data analysis automation/fusion and embedded training products.<br>- Conducted incremental requirements, design, and test reviews.<br>- Continued incremental software development engineering releases to support initial Combat System Test (CST) events for CVN-78.<br>***FY 2015 Plans:***<br>- Complete development of software version 8.0.<br>- Conduct final incremental requirements, design, and test reviews.<br>- Deliver final software version to CST facility to support certification events starting in 4Q15.<br>- Begin initial systems engineering and development efforts on software version 9.0.<br>***FY 2016 Base Plans:***<br>- Continue systems engineering efforts and development on software version 9.0.<br>- Conduct incremental requirements, design, and test reviews.<br>- Conduct CST events for CVN-78 (2Q16).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** NAVSEA Boundary Defense Capability | - | - | 2.000 | - | 2.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>Design and develop multi-application, cross-platform boundary defense equipment for control system enclaves, followed by engineering for CVN 68 Class integration.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Phased Array COMSEC | 0.935 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>3216. / *Tactical Support Center-Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Description:*** The CV-TSC program provides increased situational awareness to the Carrier Strike Group (CSG) in support of force protection, primarily in the area of Anti-Submarine Warfare (ASW). A portion of this program will focus on maturing low-cost multi-beam Ku-Band planar phased arrays and associated integrated radio systems that will be used to support data links to multiple MH-60Rs. This specific effort will address the need for low cost communications security (COMSEC) devices that are compatible with phased array systems, and that are needed to secure these data links.<br><br>***FY 2014 Accomplishments:***<br>- Complete development of low cost COMSEC suitable for use with phased array-based Ku-band data links to MH-60R.<br>- Initiate and complete testing and certification activities associated with COMSEC end units.<br><br>***FY 2015 Plans:***<br>N/A<br><br>***FY 2016 Base Plans:***<br>N/A<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.484 | 4.185 | 6.131 | - | 6.131 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2176: *Undersea Support Equipment (CV-TSC/CDL portion)* | 6.817 | 0.299 | 0.336 | - | 0.336 | 0.330 | 0.337 | 0.342 | 0.350 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

CV-TSC utilizes an incremental development approach that aims to deliver required capability updates on two-year intervals to the Fleet. This approach allows required capability to be delivered in a timely manner and provides frequent opportunities to ensure interoperability is synchronized with the Ship Self Defense System (SSDS) Advanced Capability Builds (ACBs). The acquisition strategy places heavy emphasis on the use of open architecture best practices to ensure ease of upgrades and to make developed products available to other platforms.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>3216. / *Tactical Support Center-Integration* |

In support of MH-60R, COMSEC development and certification will be conducted under the auspices of the Naval Center for High Assurance Computer Systems at the Naval Research Laboratory (NRL).

**E. Performance Metrics**

- Achieve Configuration Control Board (CCB) certification for installation of CV-TSC software version 8.0.
- Achieve Platform Information Technology (PIT) Information Assurance (IA) accreditation on CV-TSC software version 8.0.
- Achieve Consolidate Afloat Network Enterprise System (CANES) interoperability certification for CV-TSC software version 8.0.
- Achieve element certification on CV-TSC software version 8.0.
- Achieve Combat System test certification on CV-TSC software version 8.0.

Successfully complete Certification requirements for COMSEC being developed.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>3216. / *Tactical Support Center-Integration* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering / H/W & S/W Devel / Integration | WR | NAWC/Pax River : MD | 0.475 | 0.150 | Feb 2014 | 0.150 | Jan 2015 | 0.150 | Nov 2015 | - | | 0.150 | Continuing | Continuing | Continuing |
| Engineering / H/W & S/W Devel / Integration | WR | NRL : DC | 0.325 | - | | - | | - | | - | | - | - | 0.325 | - |
| Engineering / H/W & S/W Devel / Integration | WR | NSWC/Carderock : MD | 0.600 | 0.500 | Feb 2014 | 0.750 | Jan 2015 | 0.500 | Nov 2015 | - | | 0.500 | Continuing | Continuing | Continuing |
| Engineering / H/W & S/W Devel / Integration | WR | NSWC/Dahlgren : VA | 0.100 | - | | - | | - | | - | | - | - | 0.100 | - |
| Engineering / H/W & S/W Devel / Integration | WR | NUWC/Keyport : WA | 13.954 | 2.015 | Nov 2013 | 2.205 | Nov 2014 | 2.351 | Nov 2015 | - | | 2.351 | Continuing | Continuing | Continuing |
| System Eng / S/W Development | C/CPFF | Adaptive Methods : VA | 1.075 | 0.479 | Jan 2014 | 0.600 | Jan 2015 | 0.600 | Dec 2015 | - | | 0.600 | Continuing | Continuing | Continuing |
| System Eng / S/W Development | C/CPFF | JHU/APL : MD | 0.250 | - | | - | | - | | - | | - | - | 0.250 | - |
| System Eng / S/W Development | WR | SPAWAR : CA | 4.160 | - | | - | | - | | - | | - | - | 4.160 | - |
| Engineering / H/W & S/W Development | C/CPFF | VAR* : VAR* | 0.679 | - | | 0.200 | Feb 2015 | 0.250 | Dec 2015 | - | | 0.250 | Continuing | Continuing | Continuing |
| CVN 68 Boundary Defense Capability Design/ Development | TBD | VAR* : VAR* | 0.000 | - | | - | | 2.000 | Dec 2015 | - | | 2.000 | - | 2.000 | - |
| Advanced Design & Development | WR | NRL : DC | 1.795 | - | | - | | - | | - | | - | - | 1.795 | - |
| | | **Subtotal** | 23.413 | 3.144 | | 3.905 | | 5.851 | | - | | 5.851 | - | - | - |

**Remarks**

*Consists of multiple performing activities with funding for each not greater than $1M per year.
Engineering/H/W & S/W Development/Integration

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>3216. / *Tactical Support Center-Integration* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Certification | WR | NUWC//Keyport : WA | 1.205 | 0.225 | Nov 2013 | 0.225 | Nov 2014 | 0.225 | Nov 2015 | - | | 0.225 | Continuing | Continuing | Continuing |
| Test and Certification | WR | NUWC/Newport : RI | 0.000 | 0.125 | Feb 2014 | - | | - | | - | | - | - | 0.125 | - |
| Functional and Certification Testing | WR | NRL : DC | 0.000 | 0.935 | Oct 2013 | - | | - | | - | | - | - | 0.935 | - |
| | | **Subtotal** | 1.205 | 1.285 | | 0.225 | | 0.225 | | - | | 0.225 | - | - | - |

**Remarks**

Testing and Certification

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPAF | BAE Systems : MD | 0.301 | 0.055 | Jan 2014 | 0.055 | Feb 2015 | 0.055 | Dec 2015 | - | | 0.055 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.301 | 0.055 | | 0.055 | | 0.055 | | - | | 0.055 | - | - | - |

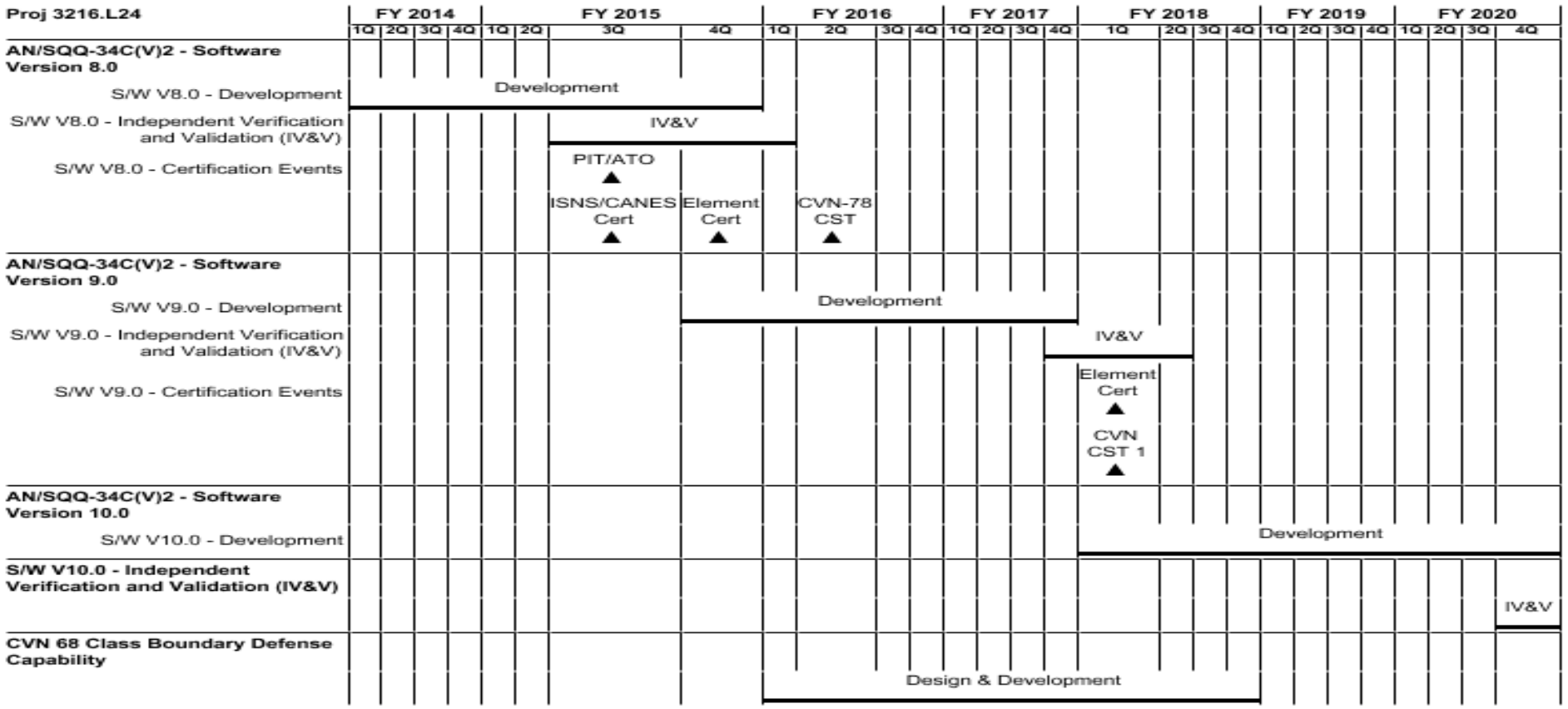
**Remarks**

N/A

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 24.919 | 4.484 | | 4.185 | | 6.131 | | - | | 6.131 | - | - | - |

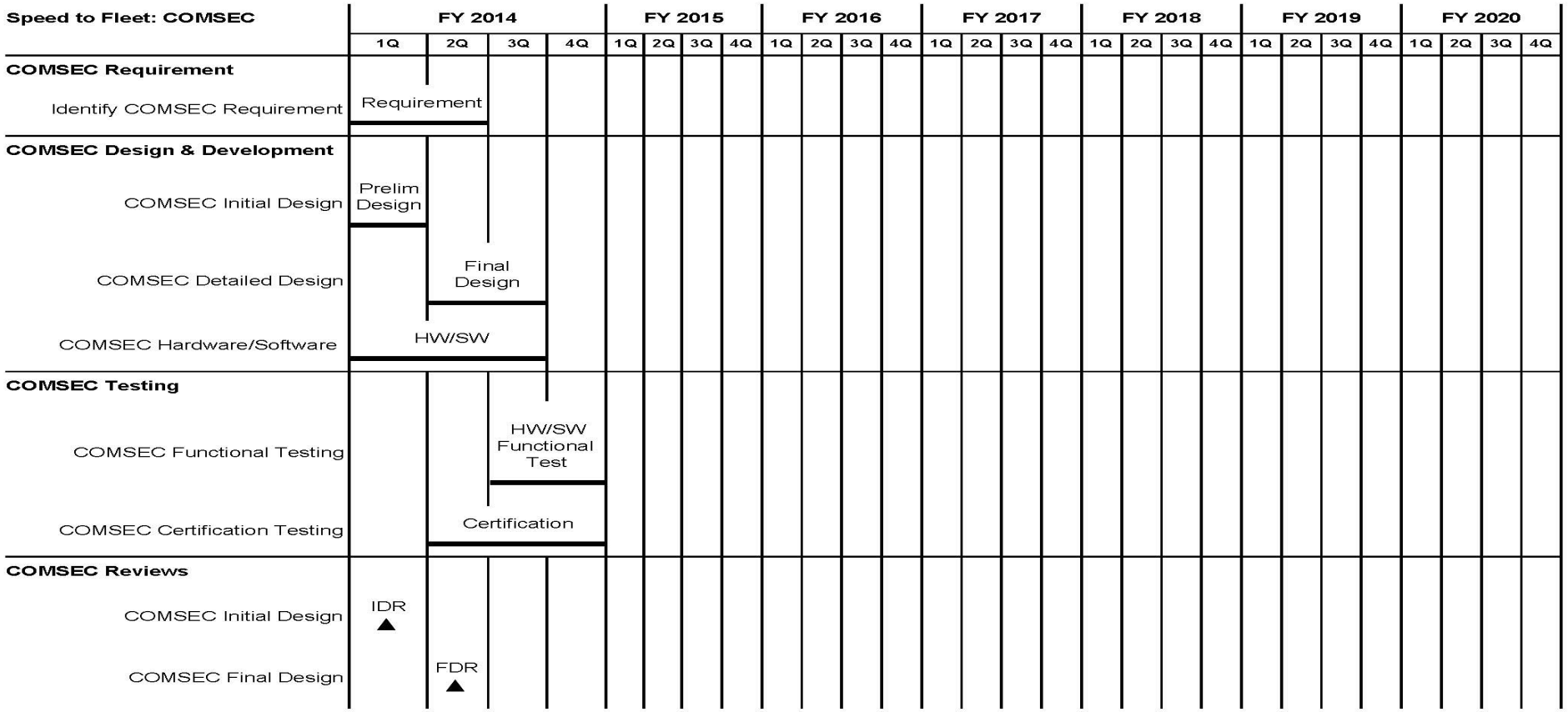
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>3216. / *Tactical Support Center-Integration* |




*2016PB - 0603512N - 3216.L24*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>3216. / *Tactical Support Center-Integration* |




*2016OSD - 0603512N - 3216.S14*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>3216. / *Tactical Support Center-Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3216.L24*** | | | | |
| AN/SQQ-34C(V)2 - Software Version 8.0: S/W V8.0 - Development: S/W V8.0 - Development (continued) | 1 | 2014 | 4 | 2015 |
| AN/SQQ-34C(V)2 - Software Version 8.0: S/W V8.0 - Independent Verification and Validation (IV&V): S/W V8.0 - IV&V | 3 | 2015 | 1 | 2016 |
| AN/SQQ-34C(V)2 - Software Version 8.0: S/W V8.0 - Certification Events: S/W V8.0 - Platform IT/Authority to Operate (PIT/ATO) Certification | 3 | 2015 | 3 | 2015 |
| AN/SQQ-34C(V)2 - Software Version 8.0: S/W V8.0 - Certification Events: S/W V8.0 - ISNS/CANES Certification | 3 | 2015 | 3 | 2015 |
| AN/SQQ-34C(V)2 - Software Version 8.0: S/W V8.0 - Certification Events: S/W V8.0 - Element Certification | 4 | 2015 | 4 | 2015 |
| AN/SQQ-34C(V)2 - Software Version 8.0: S/W V8.0 - Certification Events: S/W V8.0 - CVN-78 Combat System Test (CST) | 2 | 2016 | 2 | 2016 |
| AN/SQQ-34C(V)2 - Software Version 9.0: S/W V9.0 - Development: S/W V9.0 - Development | 4 | 2015 | 4 | 2017 |
| AN/SQQ-34C(V)2 - Software Version 9.0: S/W V9.0 - Independent Verification and Validation (IV&V): S/W V9.0 - IV&V | 4 | 2017 | 2 | 2018 |
| AN/SQQ-34C(V)2 - Software Version 9.0: S/W V9.0 - Certification Events: S/W V9.0 - Element Certification | 1 | 2018 | 1 | 2018 |
| AN/SQQ-34C(V)2 - Software Version 9.0: S/W V9.0 - Certification Events: S/W V9.0 - CVN Combat System Test (CST) 1 | 1 | 2018 | 1 | 2018 |
| AN/SQQ-34C(V)2 - Software Version 10.0: S/W V10.0 - Development: S/W V10.0 - Development | 1 | 2018 | 4 | 2020 |
| S/W V10.0 - Independent Verification and Validation (IV&V): S/W V10.0 - IV&V | 4 | 2020 | 4 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>3216. / *Tactical Support Center-Integration* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| CVN 68 Class Boundary Defense Capability: CVN 68 Class Boundary Defense Capability Design & Development | 1 | 2016 | 4 | 2018 |
| ***Speed to Fleet: COMSEC*** | | | | |
| COMSEC Requirement: Identify COMSEC Requirement: COMSEC Requirement | 1 | 2014 | 2 | 2014 |
| COMSEC Design & Development: COMSEC Initial Design: Preliminary Design | 1 | 2014 | 1 | 2014 |
| COMSEC Design & Development: COMSEC Detailed Design: Final Design | 2 | 2014 | 3 | 2014 |
| COMSEC Design & Development: COMSEC Hardware/Software: Hardware/Software Completion | 1 | 2014 | 3 | 2014 |
| COMSEC Testing: COMSEC Functional Testing: Hardware/Software Functional Testing | 3 | 2014 | 4 | 2014 |
| COMSEC Testing: COMSEC Certification Testing: Formal Certification Testing | 2 | 2014 | 4 | 2014 |
| COMSEC Reviews: COMSEC Initial Design: Initial Design Review | 1 | 2014 | 1 | 2014 |
| COMSEC Reviews: COMSEC Final Design: Final Design Review | 2 | 2014 | 2 | 2014 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603512N / *Carrier Systems Development* | Project (Number/Name)<br>4004 / *EMALS* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4004: *EMALS* | 657.574 | 41.653 | - | - | - | - | - | - | - | - | - | 699.227 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**MDAP/MAIS Code:** 223

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

This project provides for the development of an advanced technology aircraft launch system in support of the CVN 78 design and construction schedule, as well as Engineering and Life Cycle System (E&LCS) design. The Electromagnetic Aircraft Launch System (EMALS) will be the aircraft catapult for CVN 78 Class ships. EMALS provides better control of applied forces, both peak and transient dynamic, improved reliability and maintainability, increased operational availability, and reduced operator and maintainer workload. Funding for this project continues in PE 0604112N in FY 15 and later.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** EMALS | 41.653 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** EMALS | | | | | |
| ***FY 2014 Accomplishments:***<br>(1) EMALS SDD - Completed Aircraft Compatibility Testing (ACT) Phase 2. Conducted full system and risk mitigation testing at the System Functional Demonstration (SFD) site by conducting repeated cycles with deadload testing. Ran multiple cycles with deadloads and aircraft launches as part of the reliability growth program. Maintained and replenished test spares for the Lakehurst, NJ test site.<br><br>(2) EMALS BOA ILS Order - Continued the execution of the EMALS ILS Development Program. Conducted annual logistics reviews, training in-process review (IPR) and Organizational and Intermediate (O & I) Technical Manual (TM) IPRs. Based on the development and availability of engineering source data for each of the six (6) EMALS subsystems and allocated resources, developed / updated Failure Mode Effectiveness and Criticality Analyses (FMECAs), the Logistics Management Information (LMI) database, Calibration Analysis, Calibration/Measurements Requirements Summary / Instrument Calibration Procedures (CMRS/ICP), manpower analyses, O&I maintenance plans, provisioning documentation, Post Production Support Planning / Diminishing Manufacturing Sources & Material Shortages (PPSP/DMSMS) screening and analyses, and support equipment | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>4004 / *EMALS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| identification and technical data. Continued to develop training documents, the Navy Formal Training Course. Developed the Shipboard Facility Requirements Document (FRD) and the Training FRD.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 41.653 | - | - | - | - |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN / 0604567N: *Project Units 3108, 3179, 4007* | 15.217 | 18.867 | 27.648 | - | 27.648 | 30.051 | 30.295 | 27.645 | 25.840 | Continuing | Continuing |
| • RDTEN / 0603570N: *Propulsion Plant Development (PU 2692)* | 57.499 | 60.459 | - | - | - | - | - | - | - | - | 1,526.813 |
| • SCN / 2001: *Carrier Replacement Program* | 917.553 | 1,219.425 | 2,509.359 | - | 2,509.359 | 2,955.056 | 3,530.762 | 2,075.957 | 873.334 | Continuing | Continuing |
| • SCN / 5300: *Completion of Prior Year Shipbuilding Programs* | 588.100 | 663.000 | 123.760 | - | 123.760 | - | - | - | - | - | 1,374.860 |
| • RDTEN / 0604112N: *Project Units 2208, 4004* | - | 43.613 | 48.105 | - | 48.105 | 45.386 | 33.890 | 25.418 | 25.951 | Continuing | Continuing |
| • OMN / 1B2B: *CVN 78 Ford Class Training (12BJ0)* | - | 4.907 | 38.389 | - | 38.389 | 35.600 | 3.878 | 3.880 | 3.956 | 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

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>4004 / *EMALS* |

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 Highly Accelerated Life Test (HALT) Phase II. Successfully complete System Functional Demonstration (SFD) testing. Successfully complete Environmental Qualification Testing (EQT). Successfully complete Shipset Controls Lab testing.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>4004 / *EMALS* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Launch, Recovery & Support | C/CPAF | Northrop Grumman : VA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Aircraft Launch, Recovery & Support | C/CPAF | General Atomics (PDRR) : CA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Aircraft Launch, Recovery & Support | C/CPAF | General Atomics (SDD) : CA | 494.711 | 28.292 | Dec 2013 | - | | - | | - | | - | - | 523.003 | 421.098 |
| Aircraft Launch, Recovery & Support | C/CPFF | General Atomics (BOA) : CA | 14.083 | 8.415 | Nov 2013 | - | | - | | - | | - | - | 22.498 | 44.469 |
| Aircraft Launch, Recovery & Support | WR | NAWC Lakehurst : NJ | 44.704 | - | | - | | - | | - | | - | - | 44.704 | - |
| Aircraft Launch, Recovery & Support | C/CPAF | HIINC : VA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Aircraft Launch, Recovery & Support | C/CPAF | General Atomics (SDD) - Award Fee : CA | 10.696 | - | | - | | - | | - | | - | - | 10.696 | 10.696 |
| | | **Subtotal** | 564.194 | 36.707 | | - | | - | | - | | - | - | 600.901 | - |

**Remarks**

The All Prior Years figure has been adjusted to reflect only the funding allocated to 44004 from FY2003 - FY2013. Funds provided under 42208 have been incorporated into the All Prior Years figure for that project unit. Project Unit 4004 has been transferred to Program Element 0604112N for FY15 out.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Launch, Recovery & Support | WR | NAWC Lakehurst : NJ | 93.081 | 4.946 | Dec 2013 | - | | - | | - | | - | - | 98.027 | - |
| | | **Subtotal** | 93.081 | 4.946 | | - | | - | | - | | - | - | 98.027 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603512N / *Carrier Systems Development* | Project (Number/Name)<br>4004 / *EMALS* | |

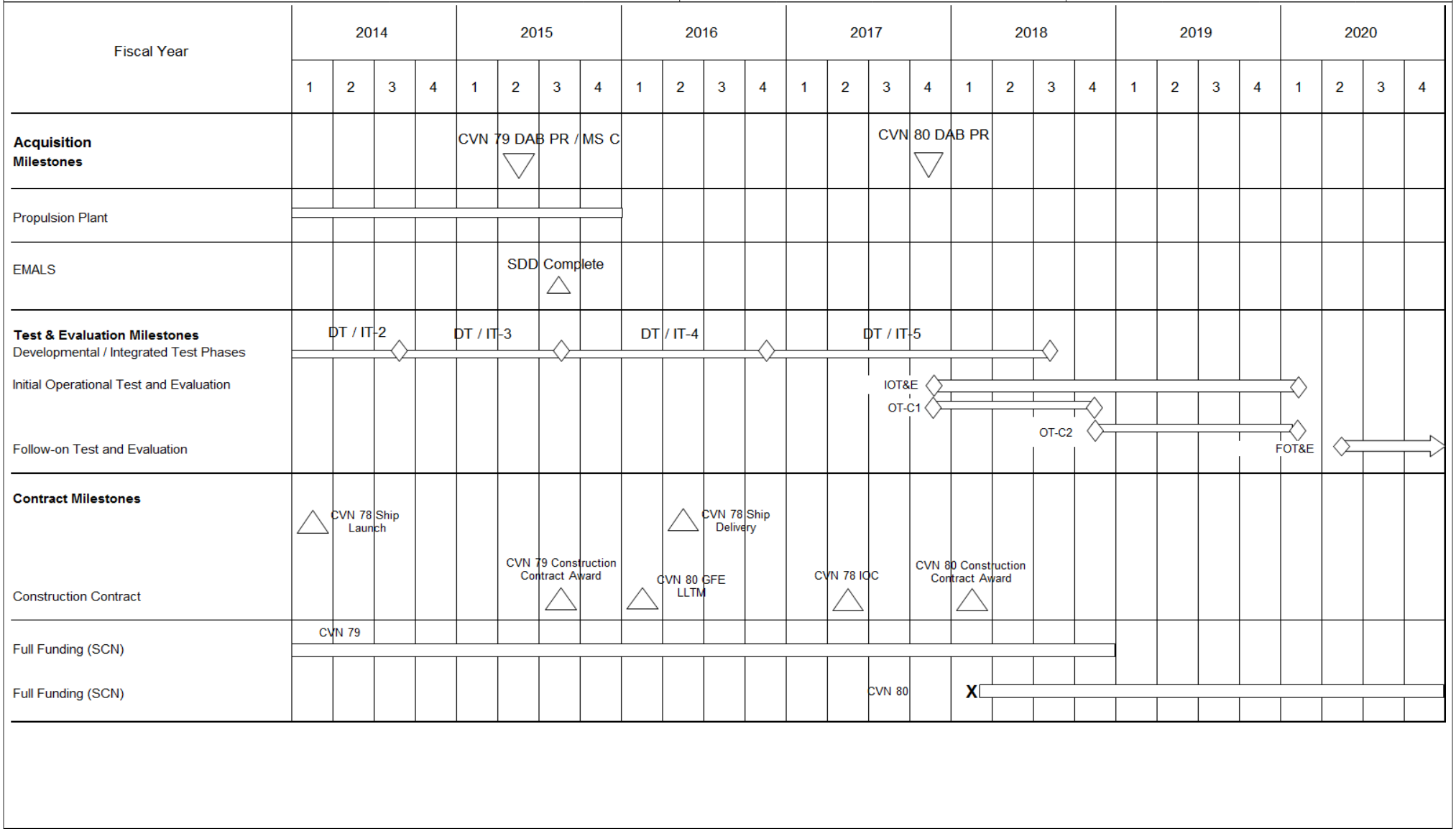
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Defense Acquisition Workforce | Various | Not Specified : Not Specified | 0.299 | - | | - | | - | | - | | - | - | 0.299 | - |
| | | **Subtotal** | 0.299 | - | | - | | - | | - | | - | - | 0.299 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 657.574 | 41.653 | | - | | - | | - | | - | - | 699.227 | - |

**Remarks**

| **Exhibit R-4, RDT&E Schedule Profile:** PB 2016 Navy | | **Date:** February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>4004 / *EMALS* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>4004 / *EMALS* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4004*** | | | | |
| CVN 79 DAB PR | 2 | 2015 | 2 | 2015 |
| CVN 80 DAB PR | 4 | 2017 | 4 | 2017 |
| Milestone C | 2 | 2015 | 2 | 2015 |
| Propulsion Plant | 1 | 2014 | 4 | 2015 |
| EMALS SDD Complete | 3 | 2015 | 3 | 2015 |
| DT/IT -2- Developmental Test / Integrated Test Phase 2 | 1 | 2014 | 3 | 2014 |
| DT/IT -3- Developmental Test / Integrated Test Phase 3 | 3 | 2014 | 3 | 2015 |
| DT/IT -4- Developmental Test / Integrated Test Phase 4 | 3 | 2015 | 4 | 2016 |
| DT/IT -5- Developmental Test / Integrated Test Phase 5 | 4 | 2016 | 3 | 2018 |
| Initial Operational Test & Evaluation | 4 | 2017 | 1 | 2020 |
| OT -C1 - Initial Operational Test & Evaluation - Phase C1 | 4 | 2017 | 4 | 2018 |
| OT -C2 - Initial Operational Test & Evaluation - Phase C2 | 4 | 2018 | 1 | 2020 |
| FOT&E - Follow-On Test & Evaluation | 2 | 2020 | 4 | 2020 |
| CVN 78 Ship Launch | 1 | 2014 | 1 | 2014 |
| CVN 78 Ship Delivery | 2 | 2016 | 2 | 2016 |
| CVN 78 Ship Initial Operational Capability (IOC) | 2 | 2017 | 2 | 2017 |
| CVN 79 Construction Contract Award | 3 | 2015 | 3 | 2015 |
| CVN 80 GFE LLTM Contract Award | 1 | 2016 | 1 | 2016 |
| CVN 80 Construction Contract Award | 1 | 2018 | 1 | 2018 |
| CVN 79 SCN Full Funding | 1 | 2014 | 4 | 2018 |
| CVN 80 SCN Full Funding | 1 | 2018 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603512N / *Carrier Systems Development* | Project (Number/Name)<br>4005 / *In-Service Carrier Systems Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4005: *In-Service Carrier Systems Development* | 19.093 | 1.711 | 1.774 | 2.217 | - | 2.217 | 1.253 | 1.261 | 1.301 | 1.331 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The In-Service Carrier Systems Demonstration and Validation program exploits available technologies to deliver an affordable, robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment. The program provides the system architecture, requirements/specification development, technology selection, software development (including software baseline), as well as land-based and shipboard testing of new technologies to improve shipboard operations and to reduce workload, manpower requirements, and Total Ownership Costs. Initial technologies include the Ship Control System Governor Software Development, Tank Preservation, Uninterruptible Power Supply (UPS) Replacements, Advanced Damage Control System (ADCS), Weapons Elevator Control Accumulator Replacement, and the Integrated Condition Assessment System, and On-Machine I/O development for LPAPs. Demonstration technologies include Advanced Damage Control System (ADCS) software improvements, A/C Plant Model, Input/Output Controller (IOC) Replacement, Fleet Wireless Personal digital Assistant (PDA), Weapons Elevator Laser Positioning System, Legacy Steering Interface upgrades, CVN Integrated Topside Design (ITD) location option evaluation tools, Antenna to Antenna coupling analysis tools. Wireless systems, smart sensors, lighting systems, knowledge-based systems, automated casualty control, automated technology for workload reduction, linked smart devices, common software tools for interoperability, and self-healing network are technologies being considered for future applications including the following: Integrated Bridge control Data Logger, C4I Network Performance Modeling and Analysis, NCDS Packet Filtering Device, Network Data Logger Device, Portable Communication System (PCS) proof of concept, Ship Control System (SCS) Onboard trainer, Universal Portable Command and Control Unit (PCCU), CVN78 CL Platform support for Joint Strike Fighter Integration.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** In-Service Carrier Systems Development | 1.711 | 1.774 | 2.217 | - | 2.217 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued support of technologies with modifications, upgrades and development of systems and software support of In-Service aircraft carrier modernization initiatives. | | | | | |
| ***FY 2015 Plans:***<br>Fiscal Year 2015 plans include support to Aircraft Carrier technologies. Modifications, upgrades and development of systems and software will be ongoing in support of In-Service aircraft carrier modernization initiatives and TOC reduction initiatives. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>4005 / *In-Service Carrier Systems Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Fiscal Year 2016 plans include support to Aircraft Carrier technologies. Modifications, upgrades and development of systems and software will be ongoing in support of In-Service aircraft carrier modernization initiatives and TOC reduction initiatives.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.711 | 1.774 | 2.217 | - | 2.217 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Investigate, demonstrate, and implement available technologies to deliver a robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment to reduce workload, manpower requirements, and Total Ownership Costs (TOC).

**E. Performance Metrics**

Successfully complete Ship Control System Governor Software Development, AC Plant Model Capacity Optimization, Uninterruptible Power Supply (UPS) Replacements, Advanced Damage Control System (ADCS) Software Improvements, Automatic Fire Sensing and Suppression System/Flooding and Casualty Control Software (AFSSS/FCCS) Software Development Test, Input/Output Controller (IOC) replacement demonstration, Tank Preservation models, Weapons Elevator Laser Positioning demonstration, Legacy Steering Interface Upgrades, CVN Integrated Topside Design (ITD) location option evaluation tool development, Antenna to Antenna coupling analysis tool development, Universal Portable Command and Control Unit (PCCU) development, Ship Control System (SCS) Trainer, Integrated Bridge Control Data Logger, Weapons Elevator Control Accumulator Replacement, and C4I Network Performance Requirements Modeling and Analysis.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603512N / *Carrier Systems Development* | Project (Number/Name)<br>4005 / *In-Service Carrier Systems Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ship Integration | WR | NAVSEA : Phil | 1.414 | 0.235 | Mar 2014 | 0.270 | Nov 2014 | 0.229 | Nov 2015 | - | | 0.229 | - | 2.148 | - |
| Ship Integration | WR | NAVSEA : Dahlgren | 0.177 | 0.020 | Mar 2014 | - | | - | | - | | - | - | 0.197 | - |
| Ship Integration | WR | Norfolk Naval Shipyard : Norfolk | 0.000 | - | | - | | 0.400 | Nov 2015 | - | | 0.400 | - | 0.400 | - |
| | | **Subtotal** | 1.591 | 0.255 | | 0.270 | | 0.629 | | - | | 0.629 | - | 2.745 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | WR | NAVSEA : Phil | 7.224 | 0.419 | Mar 2014 | 0.489 | Nov 2014 | 0.300 | Nov 2015 | - | | 0.300 | - | 8.432 | - |
| Program Management Support | WR | NAVSEA : Phil | 2.627 | 0.225 | Mar 2014 | 0.225 | Nov 2014 | 0.300 | Nov 2015 | - | | 0.300 | - | 3.377 | - |
| Training Development | WR | NAVSEA : Phil | 0.911 | 0.174 | Mar 2014 | 0.180 | Nov 2014 | 0.150 | Nov 2015 | - | | 0.150 | - | 1.415 | - |
| Integrated Logistics Support | WR | NAVSEA : Phil | 1.330 | 0.109 | Mar 2014 | 0.115 | Nov 2014 | 0.150 | Nov 2015 | - | | 0.150 | - | 1.704 | - |
| Software Development | WR | NAVSEA : Dahlgren | 0.297 | 0.011 | Mar 2014 | - | | - | | - | | - | - | 0.308 | - |
| Program Management Support | WR | NAVSEA : Dahlgren | 0.317 | - | | - | | - | | - | | - | - | 0.317 | - |
| Program Management Support | WR | Norfolk Naval shipyard : Norfolk | 0.000 | - | | - | | 0.192 | Nov 2015 | - | | 0.192 | - | 0.192 | - |
| | | **Subtotal** | 12.706 | 0.938 | | 1.009 | | 1.092 | | - | | 1.092 | - | 15.745 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | SPAWAR : Atlantic | 0.214 | - | | - | | - | | - | | - | - | 0.214 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603512N / *Carrier Systems Development* | Project (Number/Name)<br>4005 / *In-Service Carrier Systems Development* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAVSEA : Phil | 4.343 | 0.488 | Mar 2014 | 0.495 | Nov 2014 | 0.496 | Nov 2015 | - | | 0.496 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | NAVSEA : Dahlgren | 0.231 | 0.030 | Mar 2014 | - | | - | | - | | - | - | 0.261 | - |
| | | **Subtotal** | 4.788 | 0.518 | | 0.495 | | 0.496 | | - | | 0.496 | - | - | - |

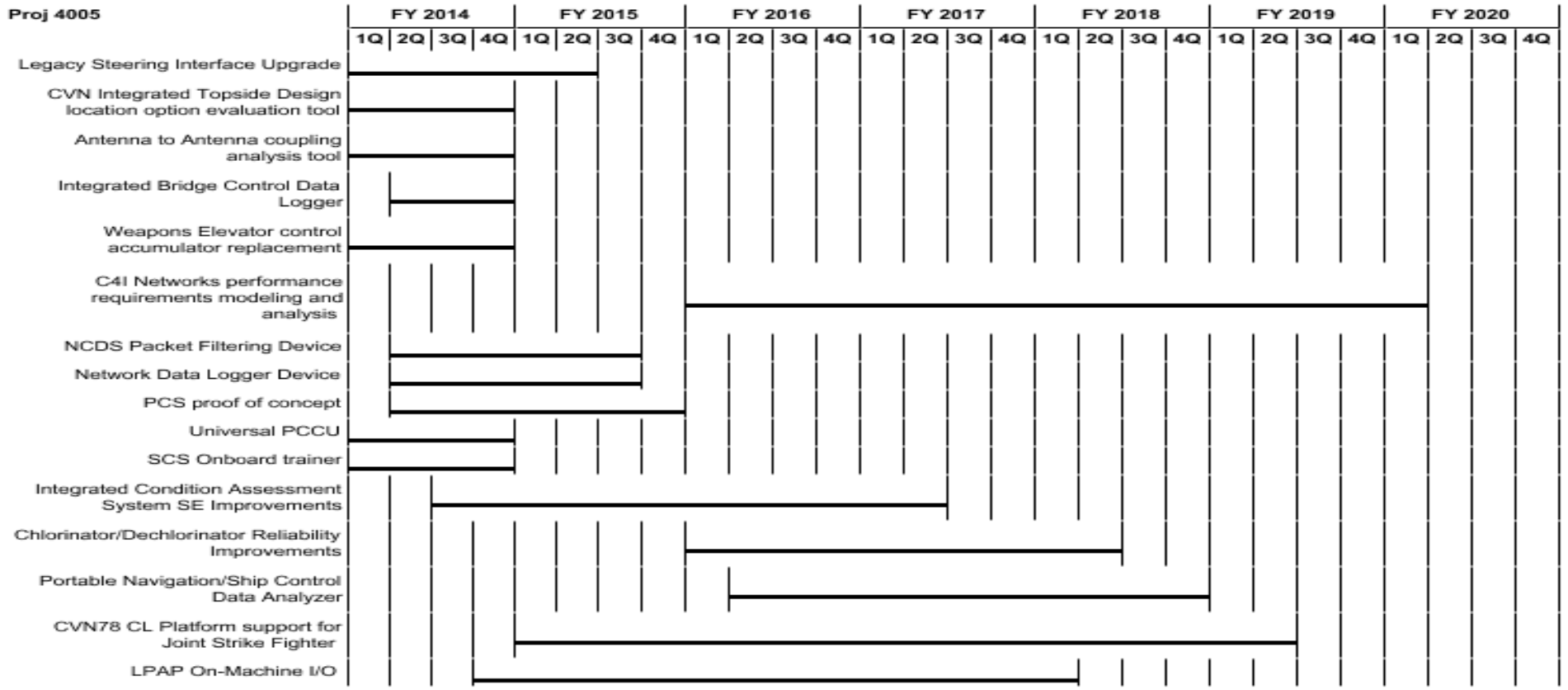
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAWF | Various | Various : Various | 0.008 | - | | - | | - | | - | | - | - | 0.008 | - |
| | | **Subtotal** | 0.008 | - | | - | | - | | - | | - | - | 0.008 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 19.093 | 1.711 | | 1.774 | | 2.217 | | - | | 2.217 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>4005 / *In-Service Carrier Systems Development* |




*2016DON - 0603512N - 4005*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603512N / *Carrier Systems Development* | **Project (Number/Name)**<br>4005 / *In-Service Carrier Systems Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4005*** | | | | |
| Legacy Steering Interface Upgrade: Legacy Steering Interface Upgrade | 1 | 2014 | 2 | 2015 |
| CVN Integrated Topside Design location option evaluation tool: CVN Integrated Topside Design location option evaluation tool | 1 | 2014 | 4 | 2014 |
| Antenna to Antenna coupling analysis tool: Antenna to Antenna coupling analysis tool | 1 | 2014 | 4 | 2014 |
| Integrated Bridge Control Data Logger: Integrated Bridge Control Data Logger | 2 | 2014 | 4 | 2014 |
| Weapons Elevator control accumulator replacement: Weapons Elevator control accumulator replacement | 1 | 2014 | 4 | 2014 |
| C4I Networks performance requirements modeling and analysis: C4I Networks performance requirements modeling and analysis | 1 | 2016 | 1 | 2020 |
| NCDS Packet Filtering Device: NCDS Packet Filtering Device | 2 | 2014 | 3 | 2015 |
| Network Data Logger Device: Network Data Logger Device | 2 | 2014 | 3 | 2015 |
| PCS proof of concept: PCS proof of concept | 2 | 2014 | 4 | 2015 |
| Universal PCCU: Universal PCCU | 1 | 2014 | 4 | 2014 |
| SCS Onboard trainer: SCS Onboard trainer | 1 | 2014 | 4 | 2014 |
| Integrated Condition Assessment System SE Improvements: Integrated Condition Assessment System SE Improvements | 3 | 2014 | 2 | 2017 |
| Chlorinator/Dechlorinator Reliability Improvements: Chlorinator/Dechlorinator Reliability Improvements | 1 | 2016 | 2 | 2018 |
| Portable Navigation/Ship Control Data Analyzer: Portable Navigation/Ship Control Data Analyzer | 2 | 2016 | 4 | 2018 |
| CVN78 CL Platform support for Joint Strike Fighter: CVN78 CL Platform support for Joint Strike fighter | 1 | 2015 | 2 | 2019 |
| LPAP On-Machine I/O: LPAP On-Machine I/O | 4 | 2014 | 1 | 2018 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603525N *I (U)PILOT FISH* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | 107.210 | 138.865 | 123.246 | - | 123.246 | 108.020 | 93.457 | 99.823 | 112.213 | Continuing | Continuing |
| 0428: *Pilot Fish* | 0.000 | 107.210 | 138.865 | 123.246 | - | 123.246 | 108.020 | 93.457 | 99.823 | 112.213 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 108.713 | 148.865 | 122.396 | - | 122.396 |
| Current President's Budget | 107.210 | 138.865 | 123.246 | - | 123.246 |
| Total Adjustments | -1.503 | -10.000 | 0.850 | - | 0.850 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -10.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.503 | - | | | |
| • Program Adjustments | - | - | -3.000 | - | -3.000 |
| • Rate/Misc Adjustments | - | - | 3.850 | - | 3.850 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603527N *I (U)RETRACT LARCH* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 11.797 | 25.365 | 28.819 | - | 28.819 | 7.562 | 7.697 | 7.933 | 8.168 | Continuing | Continuing |
| 2690: *Retract Larch* | 0.000 | 11.797 | 25.365 | 28.819 | - | 28.819 | 7.562 | 7.697 | 7.933 | 8.168 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 9.316 | 25.365 | 34.655 | - | 34.655 |
| Current President's Budget | 11.797 | 25.365 | 28.819 | - | 28.819 |
| Total Adjustments | 2.481 | - | -5.836 | - | -5.836 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 2.610 | - | | | |
| • SBIR/STTR Transfer | -0.129 | - | | | |
| • Program Adjustments | - | - | -4.600 | - | -4.600 |
| • Rate/Misc Adjustments | - | - | -1.236 | - | -1.236 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603536N *I (U)RETRACT JUNIPER* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 77.292 | 76.477 | 112.678 | - | 112.678 | 113.598 | 117.257 | 116.477 | 101.550 | Continuing | Continuing |
| 4016: *Retract Sycamore* | 0.000 | 77.292 | 76.477 | 112.678 | - | 112.678 | 113.598 | 117.257 | 116.477 | 101.550 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 77.108 | 80.477 | 97.752 | - | 97.752 |
| Current President's Budget | 77.292 | 76.477 | 112.678 | - | 112.678 |
| Total Adjustments | 0.184 | -4.000 | 14.926 | - | 14.926 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -4.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 1.250 | - | | | |
| • SBIR/STTR Transfer | -1.066 | - | | | |
| • Program Adjustments | - | - | 12.880 | - | 12.880 |
| • Rate/Misc Adjustments | - | - | 2.046 | - | 2.046 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603542N *I Radiological Control* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 14.836 | 0.757 | 0.669 | 0.710 | - | 0.710 | 0.725 | 0.736 | 0.753 | 0.767 | Continuing | Continuing |
| 1830: *RADIAC Development* | 14.836 | 0.757 | 0.669 | 0.710 | - | 0.710 | 0.725 | 0.736 | 0.753 | 0.767 | Continuing | Continuing |

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

Mission Description: The Radiation Detection, Indication and Computation (RADIAC) Program is responsible for providing radiation monitoring instruments that detect and measure ionizing radiation. These instruments are used on all Navy, Coast Guard and Military Sealift Command vessels, and at every Navy shore installation, in order to ensure the safety of personnel, continuity of operations in radiological contingencies, and protection of the environment.

Justification: Title 10 of the Code of Federal Regulations, Part 20 (10 CFR 20) requires RADIAC instruments be used to ensure the safety of personnel who work with or are exposed to radioactive materials in their work. Additionally, the Navy's mission requires personnel and ships to have the ability to operate in radiological environments and the ability to identify and interdict radiological Weapons of Mass Destruction (WMD). Navy programs that require RADIAC instruments for Occupational Safety & Health (OSH) reasons under the provisions of 10 CFR 20 include Naval Nuclear Propulsion, Nuclear Weapons, Medical, and Radiological Affairs Support. Non-OSH programs include Radiological Defense, Consequence Management, Training, Technical (RADIAC calibration, shielding evaluation, research, etc.) and Radiological Search (maritime interdiction and radiological search missions to locate or intercept WMD).

This budget item develops, tests and evaluates new, highly reliable, more easily calibrated, easy to care and maintain, light weight and modern RADIAC instruments in order to improve the effectiveness of radiation safety, to make instruments simpler to use, and to reduce life cycle costs. The ultimate goal is to replace old, bulky, costly to maintain and repair, unreliable and obsolete instrumentation with multifunction equipment that can be automatically calibrated at greatly reduced cost.

This budget item also provides for improvement to nuclear weapons intrinsic radiation (gamma and neutron) shielding calculations, mixed field (neutron and gamma) dosimetry, and in neutron measurement. The objective is to develop less costly and more effective integral shielding for better personnel protection and safety. Improvement in personnel dosimetry and neutron measurement is also a major emphasis.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | R-1 Program Element (Number/Name)<br>PE 0603542N *I Radiological Control* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | 0.762 | 0.669 | 0.713 | - | 0.713 |
| Current President's Budget | 0.757 | 0.669 | 0.710 | - | 0.710 |
| Total Adjustments | -0.005 | - | -0.003 | - | -0.003 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.005 | - | | | |
| • Rate/Misc Adjustments | - | - | -0.003 | - | -0.003 |

**Change Summary Explanation**

FY14 funding adjustment was for SBIR.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603542N / *Radiological Control* | Project (Number/Name)<br>1830 / *RADIAC Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1830: *RADIAC Development* | 14.836 | 0.757 | 0.669 | 0.710 | - | 0.710 | 0.725 | 0.736 | 0.753 | 0.767 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Mission: The Radiation Detection, Indication and Computation (RADIAC) Program is responsible for providing radiation monitoring instruments that detect and measure radiation in accordance with the provisions of Title 10 of the Code of Federal Regulations (10 CFR). These instruments are used on all vessels afloat and at every shore installation in order to ensure the safety of personnel and the environment. RADIACs are also required after an act of terrorism or war that involves nuclear material in order to enable continuing warfighting ability.

Justification: Many RADIAC instruments and dosimetry systems are decades old and approaching the end of their useful lives. In some cases the equipment and replacement parts are no longer manufactured, making the equipment logistically unsupportable. In other cases increasing failure rates due to age make replacements an economic efficiency
improvement. In all cases a technology refresh will make both economic sense in terms of lowering the total ownership costs, and will also provide increased operational capabilities.

Naval Nuclear Propulsion Program (NNPP): Instruments are developed to support the safe operation and maintenance of nuclear powered vessels and at nuclear maintenance facilities.

Non-NNPP: Instruments are developed to support other than NNPP end users, such as Explosive Ordnance Disposal, Nuclear Weapons, Medical, Industrial Radiography, Radiological Defense and Training.

Visit, Board, Search & Seizure (VBSS): The Navy has been tasked to intercept and board vessels at sea to search for nuclear or radiological materials that could be used for terrorist attacks. These instruments would have different characteristics than those used for NNPP and non-NNPP purposes and prototypes must be developed and/or tested and evaluated.

The AN/PDR-65 Ship Board Monitoring System is obsolete and will be replaced. The IM-239/WDQ Air Particle Detector (APD) and the HD-732, HD-1150 and HD-1151 Air Particle Samplers (APS) are obsolete and will be replaced.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Naval Academy Midshipman Summer Internship | 0.015 | 0.015 | 0.015 | - | 0.015 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Description:*** Every summer a Midshipman is selected to conduct laboratory studies in support of the Naval Dosimetry System to research various responses and issues with thermoluminescent dosimetry. Funds pay for materials and Midshipman's travel expenses to present his/her findings to the annual Health Physics Society conference.<br><br>***FY 2014 Accomplishments:***<br>Accomplish study assigned by Naval Academy instructor.<br><br>***FY 2015 Plans:***<br>Accomplish study assigned by Naval Academy instructor.<br><br>***FY 2016 Base Plans:***<br>Accomplish study assigned by Naval Academy instructor.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Visit, Board, Search & Seizure | 0.089 | 0.083 | 0.032 | - | 0.032 |
| ***Articles:*** | - | 3 | - | - | - |
| ***Description:*** The Visit, Board, Search & Seizure (VBSS) mission of the Navy includes the requirement to be able to board ships and be able to detect and identify potential radiological or nuclear Weapons of Mass Destruction (WMD). Such a sensitive mission requires leading edge technology and capabilities to ensure success. The AN/PDX-1 RADIAC Set was fielded in response to a Joint Urgent Operational Needs Statement to meet this requirement. It contains several instruments that serve different purposes, including the search detector, isotope identifier, and personal dosimeter. Current technology dictates that the sensitivity of the detector is directly proportional to the size of the detector element; i.e., the larger the detector, the more sensitive and capable it is. However, in VBSS there must be a tradeoff between size/weight and capability, since it is difficult and hazardous for boarding parties to carry a backpack-sized detector, along with their weapons and other gear, up a rope ladder to board a vessel on the high seas. This will be a continuing and growing effort to find smaller, lighter instruments with enhanced sensitivity, reach-back capability, and other enhancements to provide the Navy the best and most cost effective equipment possible for this critical mission.<br><br>***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continued testing of previously purchased units. Testing focused on performance of radioisotope identifiers (RIIDs) and their ability to detect and correctly identify radioactive material. Perform market research of newly developed RIIDs and their specifications. Gather end-user feedback on currently fielded VBSS instrumentation.<br>***FY 2015 Plans:***<br>Purchase multiple units for test and evaluation. Evaluate new RIIDs for gamma and neutron accuracy and precision, gamma and X-ray energy dependence and ability to correctly identify various types and quantities of radioisotopes. The test plan will be similar in size and scope to previous VBSS testing.<br>***FY 2016 Base Plans:***<br>Continue testing of previously purchased units. Continue market research on evolving technology applicable to VBSS, particularly in radioisotope identification. Develop a Technical Report on the latest VBSS technology based on the results from testing and evaluation to keep the Navy abreast of technological evolution in this area.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Radiological Shipboard Defense Monitor | 0.044 | 0.063 | 0.069 | - | 0.069 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** All surface combatants require an instrument to detect and measure radiological activity in the event of a nuclear detonation in order for the ship to avoid the radiological danger and continue its mission. The AN/PDR-65, at over 40 years of age, was the instrument used for this purpose, but it is obsolete and has been de-fielded. An interim replacement has been fielded while OPNAV finalizes updating the Cold War requirements under which the AN/PDR-65 was designed in order to include radiological (terrorist "dirty bomb") threats. The interim replacement is the IM-265 Survey Meter, which is already in the Navy inventory, but it was not designed for this requirement and cannot measure radiation external to the ship and is therefore not suitable as the permanent replacement. In light of Operation Tomodachi this requirement has taken on more significance.<br>***FY 2014 Accomplishments:***<br>Observed the operation of a RSDM system developed for a NATO Navy and performed market research on similar systems from U.S. manufacturers.<br>***FY 2015 Plans:***<br>NSWCCD will initiate discussions with the Surface Warfare Enterprise to determine the necessary detection capabilities, types of radiation to be detected, locations to be monitored and shipboard networking capabilities. NSWCCD, in conjunction with OPNAV will coordinate ship visits to witness the existing infrastructure and obtain | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| end user input on a new system. Information obtained during the ship visits will be submitted in a letter to NAVSEA 04ND with recommendations for next actions. Market research will be performed as requirements are provided by OPNAV and end users.<br>***FY 2016 Base Plans:***<br>Based on the information obtained during the discussions with OPNAV and ship visits, NSWCCD will formulate a preliminary system that meets the key requirements and features. The preliminary plan will be circulated to NAVSEA 04ND, OPNAV and end users for feedback. Additional ship visits may be necessary to clarify aspects of the preliminary system. A technical specification and implementation plan will be developed based on comments on the preliminary system. Market research will be performed as requirements are provided by OPNAV and end users.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Radiological Detection System | 0.077 | 0.076 | 0.119 | - | 0.119 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The Radiological Detection System (RDS) is a survey meter, its associated probes for detecting the various types of radiation, and ancillary equipment. This type of survey meter system has many applications and is the single most prevalent RADIAC instrument in the Navy inventory, utilized for every Navy end use but predominantly in the Naval Nuclear Propulsion Program (NNPP) and Radiological Defense (RD) end uses. The Joint Program Executive Office for Chemical, Biological and Nuclear Defense (JPEO-CBND) is currently developing an RDS for use by all the Services. If all the components could agree on a single system, it would lower the procurement cost for all the Services, and even more importantly enable Joint interoperability in the warfighter Radiological Defense arena that is currently lacking. However, the NNPP end use is unique amongst the Services, and while the Radiological Defense RDS solution should prove to be sufficient for all the Services, Navy must ensure the performance and specifications of a Joint solution would be sufficient for Naval Reactors and the NNPP application.<br>***FY 2014 Accomplishments:***<br>Continue testing previously purchased units. Provide product demonstrations to end users and capture feedback.<br>***FY 2015 Plans:***<br>Continue to collaborate with JPEO and assist OPNAV in clarifying technical requirements. As the JPEO acquisition moves forward, NSWCCD will aid in the evaluation of the proposals and initial prototypes. NSWCCD | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| will begin assessing the RDS capabilities in meeting the various end user needs. Product demonstration to the Navy end users will be given to the NNPP, RD and Radiological Affairs Support Office (RASO) end users. Information from NSWCCD evaluations and end user product demonstrations will be submitted in a technical memorandum to NAVSEA 04ND.<br>***FY 2016 Base Plans:***<br>Continue evaluating the RDS for Navy end uses. Additional product demonstrations will be provided as needed. Potential fielding strategies will be investigated for RASO and RD end users provided the RDS is acceptable. Additional research will be performed in assessing the RDS capability in meeting NNPP requirements. Site visits to the Corporate Radiation Health Branch at the Norfolk Naval Shipyard will aid in the NNPP assessment.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Air Particle Detector | - | 0.103 | 0.220 | - | 0.220 |
| ***Articles:*** | - | 1 | 1 | - | 1 |
| ***Description:*** The Surface Warfare Enterprise has requested an air sampling system be developed subsequent to the lessons learned from the Japanese Fukishima nuclear reactor accident. U.S. Navy ships sailed unknowingly into plumes of radioactive material released from the damaged nuclear reactors. The ships were widely contaminated and personnel were exposed to radioactive material. The Air Particle Detector (APD) would continuously monitor for airborne radioactive contaminants and provide a real-time measurement at designated locations on the ship with appropriate alarm indications when safe exposure thresholds have been surpassed.<br>***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>Initiate discussions with Surface Warfare Enterprise to determine the necessary air sampling capabilities, locations to be monitored and shipboard networking capabilities. NSWCCD, in conjunction with OPNAV will coordinate ship visits to witness the possible installation locations and obtain end user input on the system. Information obtained during the ship visits will be submitted in a letter to NAVSEA 04ND with recommendations for next actions. Concurrently, NSWCCD will investigate retrofitting an air sampling system into the space where the AN/PDR-65 control unit had been installed on surface ships prior to its de-fielding due to obsolescence. Additional market research will be performed as requirements are provided by OPNAV and end users.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Based on the information obtained during the discussions with OPNAV and ship visits, NSWCCD will formulate a preliminary air sampling system that meets the key performance parameters. The preliminary plan, along with retrofitting information, will be circulated to NAVSEA 04ND, OPNAV and end users for feedback. Additional ship visits may be necessary to clarify aspects of the preliminary system. A technical specification and implementation plan will be developed based on comments on the preliminary system. Market research will be performed as requirements are provided by OPNAV and end users.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Calibrators | 0.067 | 0.075 | 0.043 | - | 0.043 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Calibrators (also called irradiators) are the basic tool used to calibrate all Navy radiological detection equipment. Essentially they consist of a high energy radiological source (Cs-137) in a shielded container that is located in a specially constructed room, or "range." A technician places the instrument to be calibrated at a specific calibration point in the range and remotely operates the calibrator by raising the source out of its container so that it irradiates the object instrument. The instrument's response to the radiation is measured so that it can be calibrated to specific tolerances. The current suite of AN/UDM-1B calibrators is over 20 years old and the natural decay of the strength of the radioactive source over time restricts calibration effectiveness by limiting the scale of calibration points below American National Standards Institute (ANSI) requirements that are followed in accordance with Navy policy. Also due to the age of the calibrators, there are several parts no longer supported by the manufacturer, and a malfunctioning calibrator poses a very high safety risk. COTS equipment will be surveyed to find the best solution with which to equip the Navy's seven RADIAC Calibration Laboratories with modern calibrators.<br>***FY 2014 Accomplishments:***<br>Compare performance of Hopewell GC-60 irradiator with that of the AN/UDM-1B, the model currently used by the Navy. Evaluate results for possible replacement of current complement of aging Navy irradiators. A report will be generated that details results and recommendations.<br>***FY 2015 Plans:***<br>Evaluate the Hopewell GC-60 gamma irradiator for possible RADIAC calibration applicability. The NAVSEA 04ND RADIAC Calibrator Standardization Program (RCSP) will make two site visits to NSWCCD for the | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| evaluation. Technical memorandum detailing the results of the evaluation will be submitted to NAVSEA 04ND at the completion of the evaluation.<br>***FY 2016 Base Plans:***<br>In addition to making site visits to NSWCCD, the RCSP will visit Hopewell Designs, Inc. to gain a detailed engineering understanding of the GC-60 irradiator. The information obtained during the site visits will aid in determining the feasibility of the GC-60 as a suitable irradiator for RADIAC calibration purposes. The RCSP will submit a technical memorandum detailing the work performed to date and recommend follow-on actions and/or procurement options.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Primary Dosimetry | 0.075 | 0.081 | 0.089 | - | 0.089 |
| ***Articles:*** | - | 1 | 20 | - | 20 |
| ***Description:*** The need for primary dosimetry is inherent due to the Navy's operation of nuclear reactors and their emission of ionizing radiation. Title 10 of the Code of Federal Regulations, Part 20.1502, states "Each licensee shall monitor exposures to radiation and radioactive material at levels sufficient to demonstrate compliance with the occupational dose limits." A primary dosimeter must pass accreditation proficiency testing, allowing the reading obtained to become a part of an individual's permanent health record. This permanent record is used to protect the individual radiation worker's health, and also the Navy from future liability. The Navy's current primary device is the DT-702/PD, a Thermo Luminescence Dosimeter (TLD). Existing TLD and newer technologies, such as Optically Stimulated Luminescence (OSL), must be continually researched to determine on-going performance parameters, cost to field and cost to maintain.<br>***FY 2014 Accomplishments:***<br>In conjunction with the Naval Dosimetry Center (NDC), initiated testing of newly acquired TLD cards as a potential alternative supplier to the sole source vendor that currently supplies the Navy's equipment. OSL and DT-702s were also irradiated and tested for their respective response. Assisted in the irradiations of high energy photon mixture, photon/beta mixture, medium energy photon exposures and accident exposures. A test report will be developed by NDC.<br>***FY 2015 Plans:***<br>Re-initiate tests (Fade Study, Linearity Test, Shallow Dose) of the OSL dosimetry system and compare results to the Navy's DT-702. To do this task correctly, the OSL system (Readers and Annealers) acquired by NSWCCD will have to be conditioned/calibrated by the manufacturer. In addition, NSWCCD will need to stay current on the | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| latest dosimetry standards and technology. A Technical Memorandum will be developed and will be provided as a deliverable.<br>***FY 2016 Base Plans:***<br>Acquire a minimum 10 Instadose II Dosimeters and Reader. The Instadose II is the newest version of the Direct Ion Storage (DIS) Dosimeter that has the capability of detecting shallow dose and deep dose from photon (possibly neutrons). We would test this system to the ANSI-N13.11 Standard. The Instadose II would go through proficiency-type tests utilizing the sources located at NSWCCD. A Technical Memorandum will be developed and will be provided as a deliverable. In addition, will stay current on the latest dosimetry technology, such as the newly developed OSL crystal Beryllium Oxide.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Secondary Dosimetry | 0.120 | 0.087 | 0.074 | - | 0.074 |
| ***Articles:*** | 10 | 20 | 18 | - | 18 |
| ***Description:*** A secondary dosimeter provides an accurate, real-time readout of the radiation exposure being obtained in operational environments, and is utilized in conjunction with a primary dosimeter. The primary dosimeter does not provide real-time exposure information, so the secondary dosimeter is worn for that purpose. The Navy's secondary dosimeter is the Mk2 Electronic Personal Dosimeter (EPD). Evaluation of the current detector must be accomplished to establish a militarized environmental capability. Also, research is required to find a secondary dosimeter that can measure the type of radiation encountered with pulsed X-ray machines, and to see if this new capability can be incorporated into one device such as the existing Mk2.<br>***FY 2014 Accomplishments:***<br>Purchased test units for pulsed X-ray secondary dosimetry. Initiated and completed testing of secondary dosimetric devices capable of responding to pulsed X-ray radiation. Test pulsed X-ray dosimeters for dose accuracy and precision with the NSWCCD pulsed X-ray generator, continuous X-ray machine and gamma radiation sources. Report on the radiation energy dependence of the secondary dosimeter as well as capability of resolving short X-ray pulse widths. Determine overall acceptability of responding to Navy pulsed X-ray radiation sources.<br>***FY 2015 Plans:***<br>Initiate and complete testing of new Electronic Personal Dosimeters (EPD) as a precursor to possible replacement of the Navy Mk2 EPD. Use NSWCCD radiological sources to test EPD units with continuous gamma and X-ray radiation along a broad energy range. Report on the energy dependence using the accuracy | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| and precision of dose measurements taken at specific radiation energies. Compare the performance of the different EPDs tested and analyze which detection methods perform better than the others. Analyze the overall feasibility of replacing the Mk2 EPD with a new EPD, incorporating feedback from end-users.<br>***FY 2016 Base Plans:***<br>Initiate and complete testing of extremity and lens secondary dosimetry. Research applications and end-users of this type of secondary dosimetry within the Navy. Test acquired dosimetry for dose accuracy, precision and energy dependence. Analyze applicability to Navy operations and the potential to militarize this type of dosimetry.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Tritium Monitor | 0.140 | 0.086 | 0.049 | - | 0.049 |
| ***Articles:*** | 6 | - | - | - | - |
| ***Description:*** The AN/PDR-73 Tritium Monitor is used at nuclear weapons storage facilities and research laboratories to sample the air for the presence of Tritium. The current instrument is 30 years old and cannot be repaired due to obsolete components. At the current loss rate due to normal wear and tear there will be insufficient assets to meet operational requirements, so a replacement must be found.<br>***FY 2014 Accomplishments:***<br>Purchased two test units each from three vendors. Provide units to end user for field testing. Field testing to include analyzing accuracy and precision of tritium in air measurements. In addition, evaluate ease of calibration using software and without the need for tritium gas samples.<br>***FY 2015 Plans:***<br>Gather end user feedback from field testing. Perform an intercomparison in performance and specifications among the three units. Evaluate the pump design in each unit and determine life expectancy as compared to the existing AN/PDR-73. Continue coordination with the U.S. Air Force to leverage their development efforts for possible Joint procurement. Begin specification development.<br>***FY 2016 Base Plans:***<br>Finish gathering end user feedback and work with NAVSEA engineer staff to continue developing specification for procurement. Submit the specification to NAVSEA 04ND and end user for concurrence.<br>***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Telescoping Rate Meter | 0.130 | - | - | - | - |
| ***Articles:*** | 6 | - | - | - | - |
| ***Description:*** Telescoping rate meters play a vital role in the practice of radiation safety in the Naval Nuclear Propulsion Program. The detector is attached to the end of an extendable, telescoping pole, thus allowing the operator to maintain a safe distance for high exposure areas. This allows the Navy to comply with federal regulations that radioactive doses received by operators are As Low As Reasonably Achievable (ALARA).<br>***FY 2014 Accomplishments:***<br>Begin follow-on procurement specification development using results from testing and feedback received during product demonstrations.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.757 | 0.669 | 0.710 | - | 0.710 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN 2920: *RADIAC* | 9.842 | 10.285 | 9.553 | - | 9.553 | 8.296 | 8.443 | - | - | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Development efforts are focused on evaluation, modification (as required to meet operational requirements) and adaptation of commercial-off-the-shelf (COTS) technology in order to minimize total ownership costs. To the maximum extent possible new contracts are targeted for fixed price efforts to control development cost.

**E. Performance Metrics**

Program Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603542N / *Radiological Control* | Project (Number/Name)<br>1830 / *RADIAC Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | NSWCCD : West Bethesda, MD | 12.840 | - | | - | | - | | - | | - | - | 12.840 | - |
| | | **Subtotal** | 12.840 | - | | - | | - | | - | | - | - | 12.840 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | WR | U.S. Naval Academy : Annapolis, MD | 0.075 | 0.015 | Mar 2014 | 0.015 | Mar 2015 | 0.015 | Mar 2016 | - | | 0.015 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.075 | 0.015 | | 0.015 | | 0.015 | | - | | 0.015 | - | - | - |

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

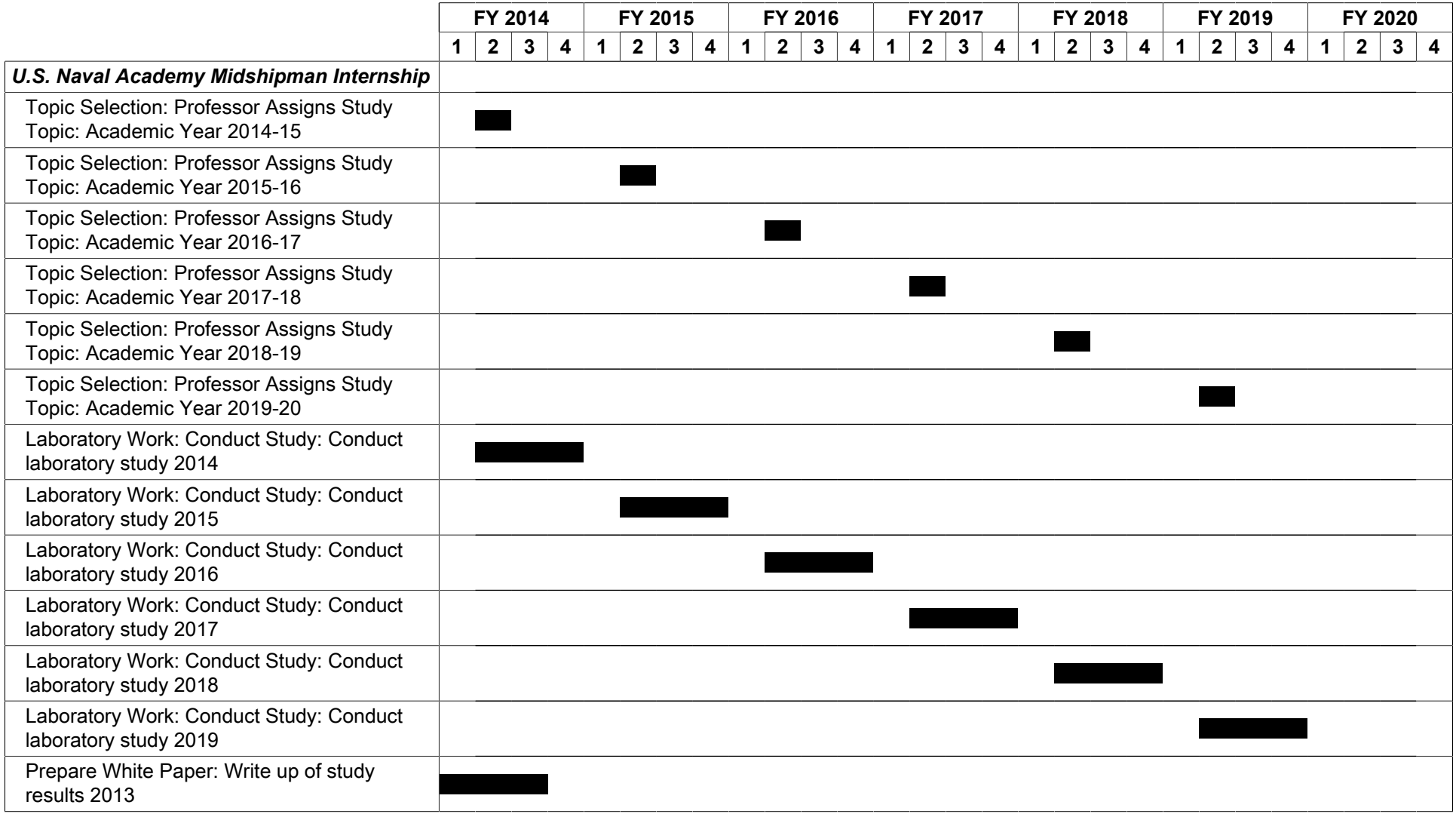
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation | WR | NSWCCD : West Bethesda, MD | 1.921 | 0.622 | Nov 2013 | 0.481 | Nov 2014 | 0.516 | Nov 2015 | - | | 0.516 | Continuing | Continuing | Continuing |
| VBSS | C/FFP | NSWCCD : West Bethesda, MD | 0.000 | - | | 0.061 | Jun 2015 | - | | - | | - | - | 0.061 | 0.061 |
| Primary Dosimetry | C/FFP | NSWCCD : West Bethesda, MD | 0.000 | - | | 0.003 | Mar 2015 | 0.021 | Mar 2016 | - | | 0.021 | - | 0.024 | 0.024 |
| Secondary Dosimetry | C/FFP | NSWCCD : West Bethesda, MD | 0.000 | 0.002 | Jun 2014 | 0.009 | Jul 2015 | 0.008 | Jul 2016 | - | | 0.008 | - | 0.019 | 0.019 |
| Air Particle Detector | C/FFP | NSWCCD : West Behtesda, MD | 0.000 | - | | 0.100 | Jun 2015 | 0.150 | Jun 2016 | - | | 0.150 | - | 0.250 | 0.250 |
| Tritium Monitors | C/FFP | NSWCCD : West Bethesda, MD | 0.000 | 0.118 | Apr 2014 | - | | - | | - | | - | - | 0.118 | 0.118 |
| | | **Subtotal** | 1.921 | 0.742 | | 0.654 | | 0.695 | | - | | 0.695 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603542N / *Radiological Control* | Project (Number/Name)<br>1830 / *RADIAC Development* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 14.836 | 0.757 | | 0.669 | | 0.710 | | - | | 0.710 | - | - | - |

**Remarks**

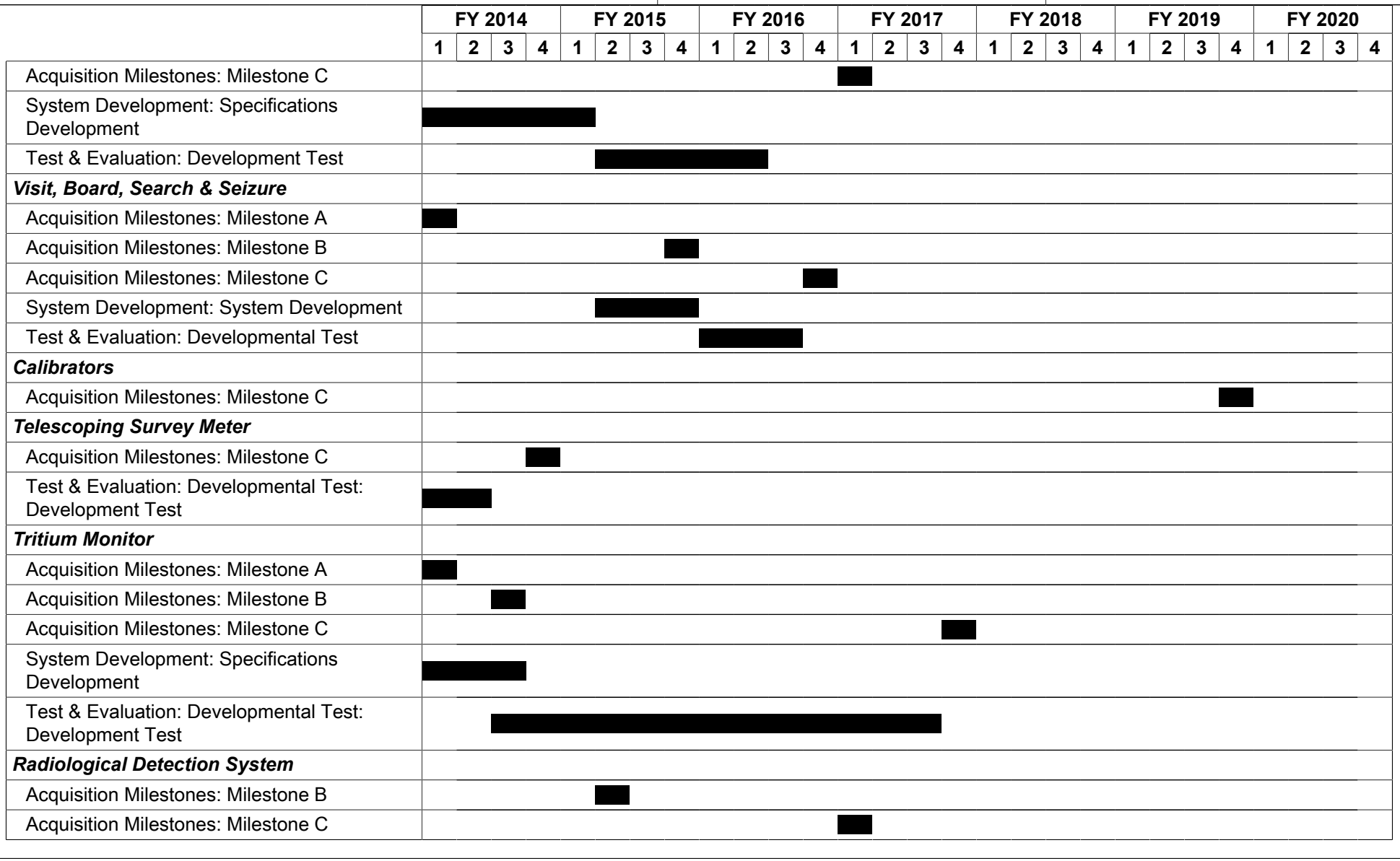
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |



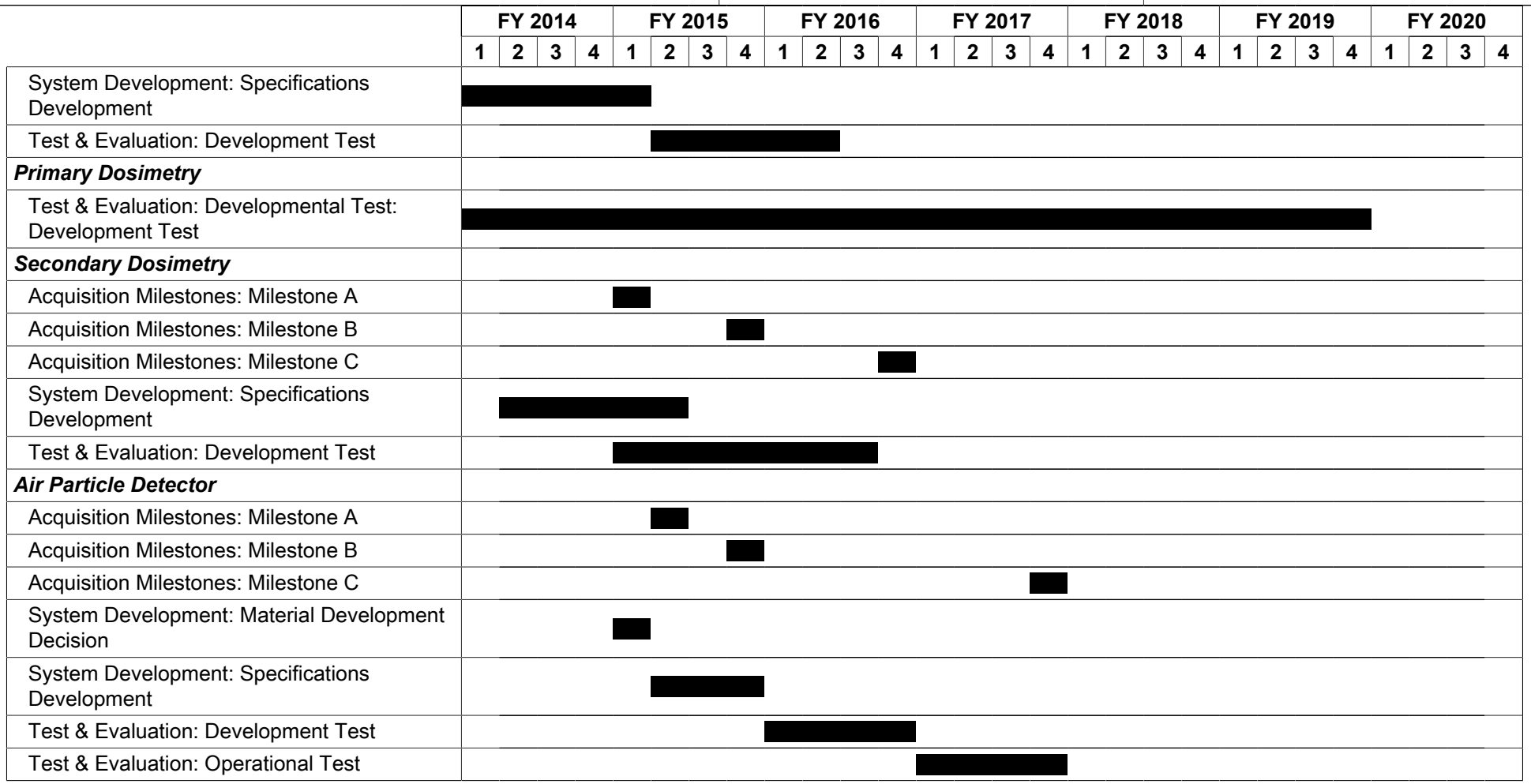
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***U.S. Naval Academy Midshipman Internship*** | | | | |
| Topic Selection: Professor Assigns Study Topic: Academic Year 2014-15 | 2 | 2014 | 2 | 2014 |
| Topic Selection: Professor Assigns Study Topic: Academic Year 2015-16 | 2 | 2015 | 2 | 2015 |
| Topic Selection: Professor Assigns Study Topic: Academic Year 2016-17 | 2 | 2016 | 2 | 2016 |
| Topic Selection: Professor Assigns Study Topic: Academic Year 2017-18 | 2 | 2017 | 2 | 2017 |
| Topic Selection: Professor Assigns Study Topic: Academic Year 2018-19 | 2 | 2018 | 2 | 2018 |
| Topic Selection: Professor Assigns Study Topic: Academic Year 2019-20 | 2 | 2019 | 2 | 2019 |
| Laboratory Work: Conduct Study: Conduct laboratory study 2014 | 2 | 2014 | 4 | 2014 |
| Laboratory Work: Conduct Study: Conduct laboratory study 2015 | 2 | 2015 | 4 | 2015 |
| Laboratory Work: Conduct Study: Conduct laboratory study 2016 | 2 | 2016 | 4 | 2016 |
| Laboratory Work: Conduct Study: Conduct laboratory study 2017 | 2 | 2017 | 4 | 2017 |
| Laboratory Work: Conduct Study: Conduct laboratory study 2018 | 2 | 2018 | 4 | 2018 |
| Laboratory Work: Conduct Study: Conduct laboratory study 2019 | 2 | 2019 | 4 | 2019 |
| Prepare White Paper: Write up of study results 2013 | 1 | 2014 | 3 | 2014 |
| Prepare White Paper: Write up of study results 2014 | 1 | 2015 | 3 | 2015 |
| Prepare White Paper: Write up of study results 2015 | 1 | 2016 | 3 | 2016 |
| Prepare White Paper: Write up of study results 2016 | 1 | 2017 | 3 | 2017 |
| Prepare White Paper: Write up of study results 2017 | 1 | 2018 | 3 | 2018 |
| Prepare White Paper: Write up of study results 2018 | 1 | 2019 | 3 | 2019 |
| Presentation: Annual Convention of the Health Physics Society: Present White Paper 2013 | 3 | 2014 | 3 | 2014 |
| Presentation: Annual Convention of the Health Physics Society: Present White Paper 2014 | 3 | 2015 | 3 | 2015 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Presentation: Annual Convention of the Health Physics Society: Present White Paper 2015 | 3 | 2016 | 3 | 2016 |
| Presentation: Annual Convention of the Health Physics Society: Present White Paper 2016 | 3 | 2017 | 3 | 2017 |
| Presentation: Annual Convention of the Health Physics Society: Present White Paper 2017 | 3 | 2018 | 3 | 2018 |
| Presentation: Annual Convention of the Health Physics Society: Present White Paper 2018 | 3 | 2019 | 3 | 2019 |
| ***Radiological Shipboard Defense Monitor*** | | | | |
| Acquisition Milestones: Milestone B | 2 | 2015 | 2 | 2015 |
| Acquisition Milestones: Milestone C | 1 | 2017 | 1 | 2017 |
| System Development: Specifications Development | 1 | 2014 | 1 | 2015 |
| Test & Evaluation: Development Test | 2 | 2015 | 2 | 2016 |
| ***Visit, Board, Search & Seizure*** | | | | |
| Acquisition Milestones: Milestone A | 1 | 2014 | 1 | 2014 |
| Acquisition Milestones: Milestone B | 4 | 2015 | 4 | 2015 |
| Acquisition Milestones: Milestone C | 4 | 2016 | 4 | 2016 |
| System Development: System Development | 2 | 2015 | 4 | 2015 |
| Test & Evaluation: Developmental Test | 1 | 2016 | 3 | 2016 |
| ***Calibrators*** | | | | |
| Acquisition Milestones: Milestone C | 4 | 2019 | 4 | 2019 |
| ***Telescoping Survey Meter*** | | | | |
| Acquisition Milestones: Milestone C | 4 | 2014 | 4 | 2014 |
| Test & Evaluation: Developmental Test: Development Test | 1 | 2014 | 2 | 2014 |
| ***Tritium Monitor*** | | | | |
| Acquisition Milestones: Milestone A | 1 | 2014 | 1 | 2014 |
| Acquisition Milestones: Milestone B | 3 | 2014 | 3 | 2014 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603542N / *Radiological Control* | **Project (Number/Name)**<br>1830 / *RADIAC Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Acquisition Milestones: Milestone C | 4 | 2017 | 4 | 2017 |
| System Development: Specifications Development | 1 | 2014 | 3 | 2014 |
| Test & Evaluation: Developmental Test: Development Test | 3 | 2014 | 3 | 2017 |
| ***Radiological Detection System*** | | | | |
| Acquisition Milestones: Milestone B | 2 | 2015 | 2 | 2015 |
| Acquisition Milestones: Milestone C | 1 | 2017 | 1 | 2017 |
| System Development: Specifications Development | 1 | 2014 | 1 | 2015 |
| Test & Evaluation: Development Test | 2 | 2015 | 2 | 2016 |
| ***Primary Dosimetry*** | | | | |
| Test & Evaluation: Developmental Test: Development Test | 1 | 2014 | 4 | 2019 |
| ***Secondary Dosimetry*** | | | | |
| Acquisition Milestones: Milestone A | 1 | 2015 | 1 | 2015 |
| Acquisition Milestones: Milestone B | 4 | 2015 | 4 | 2015 |
| Acquisition Milestones: Milestone C | 4 | 2016 | 4 | 2016 |
| System Development: Specifications Development | 2 | 2014 | 2 | 2015 |
| Test & Evaluation: Development Test | 1 | 2015 | 3 | 2016 |
| ***Air Particle Detector*** | | | | |
| Acquisition Milestones: Milestone A | 2 | 2015 | 2 | 2015 |
| Acquisition Milestones: Milestone B | 4 | 2015 | 4 | 2015 |
| Acquisition Milestones: Milestone C | 4 | 2017 | 4 | 2017 |
| System Development: Material Development Decision | 1 | 2015 | 1 | 2015 |
| System Development: Specifications Development | 2 | 2015 | 4 | 2015 |
| Test & Evaluation: Development Test | 1 | 2016 | 4 | 2016 |
| Test & Evaluation: Operational Test | 1 | 2017 | 4 | 2017 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603553N *I Surface ASW* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 186.242 | 8.543 | 1.053 | 1.096 | - | 1.096 | 1.126 | 1.148 | 1.174 | 1.198 | Continuing | Continuing |
| 1704.: *Undersea Warfare* | 186.242 | 2.262 | 1.053 | 1.096 | - | 1.096 | 1.126 | 1.148 | 1.174 | 1.198 | Continuing | Continuing |
| 3349: *Detection and Fusion of Remote Sensors* | 0.000 | 6.281 | - | - | - | - | - | - | - | - | - | 6.281 |

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

The CNO's ASW initiative is a focused effort to identify the most promising ASW technologies through a process of discovery, assessment, experimentation, and analysis. The CNO's ASW initiative will coordinate the development of technologies which move beyond incremental or marginal improvements in ASW effectiveness. The CNO's vision of "fundamentally changing the way ASW is currently conducted to render the enemy submarine irrelevant against US and coalition forces" necessitates a change in the calculus of how the US Navy conducts ASW. Central to the CNO's ASW initiatives achieving the CNO's vision are several innovative approaches which include using the art-of-the-technologically-possible; minimizing force-on-force; reducing the ASW end-to-end time line; supporting rapid maneuver; developing off-board and distributed ASW detection systems; and finding innovative weapons solutions. To achieve these key approaches, it is essential to develop new ASW technologies and conduct at-sea experiments to prove/disprove technology concepts and collect corroborating data.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 2.349 | 1.060 | 1.104 | - | 1.104 |
| Current President's Budget | 8.543 | 1.053 | 1.096 | - | 1.096 |
| Total Adjustments | 6.194 | -0.007 | -0.008 | - | -0.008 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 6.500 | - | | | |
| • SBIR/STTR Transfer | -0.306 | - | | | |
| • Rate/Misc Adjustments | - | -0.007 | -0.008 | - | -0.008 |

**Change Summary Explanation**

FY2014 reprogramming in Project 3349 is a USPACOM requirement for integration of tasking and collection efforts for national intelligence, surveillance and reconnaissance integrated with At-Sea Anti-Submarine Warfare data collection.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603553N / *Surface ASW* | Project (Number/Name)<br>1704. / *Undersea Warfare* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1704.: *Undersea Warfare* | 186.242 | 2.262 | 1.053 | 1.096 | - | 1.096 | 1.126 | 1.148 | 1.174 | 1.198 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The CNO's ASW initiative is a focused effort to identify the most promising ASW technologies through a process of discovery, assessment, experimentation, and analysis. The CNO's ASW initiative will coordinate the development of technologies which move beyond incremental or marginal improvements in ASW effectiveness. The CNO's vision of "fundamentally changing the way ASW is currently conducted to render the enemy submarine irrelevant against US and coalition forces" necessitates a change in the calculus of how the US Navy conducts ASW. Central to the CNO's ASW initiatives achieving the CNO's vision are several innovative approaches which include using the art-of-the-technologically-possible; minimizing force-on-force; reducing the ASW end-to-end time line; supporting rapid maneuver; developing off-board and distributed ASW detection systems; and finding innovative weapons solutions. To achieve these key approaches, it is essential to develop new ASW technologies and conduct at-sea experiments to prove/disprove technology concepts and collect corroborating data.

The detection and identification of underwater mines based on structural acoustic features has been successfully demonstrated. This structural acoustics (SA) approach offers significant increases in coverage rates together with higher probabilities of detection and lower false alarm rates against most of the threat mines the Navy is expected to encounter in the foreseeable future. Highly successful blind tests have been carried out demonstrating high performance detection and classification with low false alarm rates. This technology is now in transition to the fleet. The work proposed here, is to develop and demonstrate a long range/high coverage rate ASW systems concept based on the Low-Frequency Broadband (LFBB) technology using a fleet sonar AN/SQQ-89 on surface combatants.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** CNO ASW Initiatives | 1.074 | 1.053 | 1.096 | - | 1.096 |
| ***Articles:*** | - | - | - | - | - |

***FY 2014 Accomplishments:***
Collected systems and performance data during select Fleet exercises and at-sea testing events. Analyzed and distributed collected data. Conducted studies and analysis of alternatives in support of the CNO ASW initiative.

***FY 2015 Plans:***
Collect systems and performance data during select Fleet exercises and at-sea testing events. Analyze and distribute collected data. Conduct studies and analysis of alternatives in support of the CNO ASW initiative.

***FY 2016 Base Plans:***
Collect systems and performance data during select Fleet exercises and at-sea testing events. Analyze and distribute collected data. Conduct studies and analysis of alternatives in support of the CNO ASW initiative.

***FY 2016 OCO Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603553N / *Surface ASW* | **Project (Number/Name)**<br>1704. / *Undersea Warfare* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** AN/SQS-53C Structural Acoustics Sensor Program | 1.188 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The detection and identification of underwater mines based on structural acoustic features has been successfully demonstrated. This structural acoustics (SA) approach offers significant increases in coverage rates together with higher probabilities of detection and lower false alarm rates against most of the threat mines the Navy is expected to encounter in the foreseeable future. Highly successful blind tests have been carried out demonstrating high performance detection and classification with low false alarm rates. This technology is now in transition to the fleet. The Navy will develop and demonstrate a long range/high coverage rate ASW systems concept based on the LFBB technology using a fleet sonar AN/SQQ-89 on surface combatants. Specifically, using a standard AN/SQQ-53C as a source and the Multi-Function Towed Array (MFTA) as a receiver. In the Speed to Fleet effort, the Navy will build a special processor that will "roll on" the surface combatant and be able to be integrated into the existing AN/SQQ-89 system. The processor will run codes already developed in the ONR programs, but now adapted to the ASW problem. Ultimately, the demonstration will involve testing and documenting the ability of the approach to distinguish and correctly identify low Doppler bottom, near bottom, submarines and false targets as a function of speed and range from target fields.<br><br>***FY 2014 Accomplishments:***<br>- Continued processor build.<br>- Continued software build.<br>- Completed demonstration test planning.<br>- Complete system installation.<br><br>***FY 2015 Plans:***<br>N/A<br><br>***FY 2016 Base Plans:***<br>N/A<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.262 | 1.053 | 1.096 | - | 1.096 |

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

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603553N / *Surface ASW* | **Project (Number/Name)**<br>1704. / *Undersea Warfare* |

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

**Remarks**

**D. Acquisition Strategy**

Use competitively awarded contracts from Broad Agency Announcement (BAA) solicitations and University Affiliated Research Centers (UARCs).
N/A

**E. Performance Metrics**

Investigate promising ASW technologies via annual at-sea experiments.
Conduct Demonstration Sea Tests 3Q14 (Gray Ship).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603553N / *Surface ASW* | Project (Number/Name)<br>1704. / *Undersea Warfare* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technology Development | C/CPFF | AAC : NY | 1.134 | - | | - | | - | | - | | - | - | 1.134 | - |
| Technology Development | C/CPFF | Adaptive Methods : VA | 3.788 | - | | - | | - | | - | | - | - | 3.788 | - |
| Technology Development | C/CPFF | Alion Sciences : VA | 8.000 | - | | - | | - | | - | | - | - | 8.000 | - |
| Technology Development | C/CPAF | EG&G : VA | 2.050 | - | | - | | - | | - | | - | - | 2.050 | - |
| Technology Development | C/CPFF | In-Depth Engineering : VA | 3.635 | - | | - | | - | | - | | - | - | 3.635 | - |
| Technology Development | C/CPFF | JHU/APL : MD | 25.333 | - | | - | | - | | - | | - | - | 25.333 | - |
| Technology Development | C/CPFF | L-3 Communications : VA | 3.000 | - | | - | | - | | - | | - | - | 3.000 | - |
| Technology Development | C/CPFF | Lockheed Martin - ISS : NY | 7.110 | - | | - | | - | | - | | - | - | 7.110 | - |
| Technology Development | WR | NSWC/Carderock : MD | 3.201 | - | | - | | - | | - | | - | - | 3.201 | - |
| Technology Development | WR | NUWC/Keyport : WA | 0.790 | - | | - | | - | | - | | - | - | 0.790 | - |
| Technology Development | WR | NUWC/Newport : RI | 33.260 | - | | - | | - | | - | | - | - | 33.260 | - |
| Technology Development | C/CPFF | Northrop Grumman : VA | 4.684 | - | | - | | - | | - | | - | - | 4.684 | - |
| Technology Development | C/CPFF | UT/ARL : TX | 4.908 | - | | - | | - | | - | | - | - | 4.908 | - |
| Technology Development | C/CPFF | VAR : VAR* | 4.694 | - | | - | | - | | - | | - | - | 4.694 | - |
| Technology Development | WR | NFESC/PH : CA | 5.350 | - | | - | | - | | - | | - | - | 5.350 | - |
| Technology Development | MIPR | SSGC : MS | 3.253 | - | | - | | - | | - | | - | - | 3.253 | - |
| Detection/Classification Algorithms (LRS) | WR | NAWC/Pax River : MD | 2.400 | - | | - | | - | | - | | - | - | 2.400 | - |
| Detection/Classification Algorithms (LRS) | C/CPFF | VAR : VAR* | 8.600 | - | | - | | - | | - | | - | - | 8.600 | - |
| Technology Development (LRS) | WR | NRL : DC | 2.500 | - | | - | | - | | - | | - | - | 2.500 | - |
| Technology Development (LRS) | C/CPFF | VAR : VAR* | 14.950 | - | | - | | - | | - | | - | - | 14.950 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603553N / *Surface ASW* | Project (Number/Name)<br>1704. / *Undersea Warfare* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Processor Build | WR | NRL : District of Columbia | 1.544 | - | | - | | - | | - | | - | - | 1.544 | - |
| Software Build | WR | NRL : District of Columbia | 1.697 | - | | - | | - | | - | | - | - | 1.697 | - |
| System Install | WR | NRL : District of Columbia | 0.193 | 0.700 | Oct 2013 | - | | - | | - | | - | 0.250 | 1.143 | - |
| Demonstration Planning and Design | WR | NRL : District of Columbia | 0.097 | - | | - | | - | | - | | - | 0.100 | 0.197 | - |
| Demonstration/Test | WR | NRL : District of Columbia | 0.000 | - | | - | | - | | - | | - | 0.750 | 0.750 | - |
| Analysis and Documentation of Demonstration Tests | WR | NRL : District of Columbia | 0.000 | - | | - | | - | | - | | - | 0.150 | 0.150 | - |
| | | **Subtotal** | 146.171 | 0.700 | | - | | - | | - | | - | 1.250 | 148.121 | - |

**Remarks**

Note: Funds identified as LRS (Littoral Remote Sensing) were part of the 2011/2012 DoD Omnibus Reprogrammings for ASW/ISR Capability.
*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 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| At-Sea Test/Experiment | WR | ONR : VA | 5.500 | - | | - | | - | | - | | - | - | 5.500 | - |
| Developmental Test & Evaluation | C/CPFF | AAC : NY | 1.067 | - | | - | | - | | - | | - | - | 1.067 | - |
| Developmental Test & Evaluation | C/CPFF | JHU/APL : MD | 1.455 | 0.650 | Apr 2014 | 0.630 | Dec 2014 | 0.640 | Dec 2015 | - | | 0.640 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | NRL : DC | 0.537 | - | | - | | - | | - | | - | - | 0.537 | - |
| Developmental Test & Evaluation | WR | NSMA : VA | 0.907 | - | | - | | - | | - | | - | - | 0.907 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603553N / *Surface ASW* | Project (Number/Name)<br>1704. / *Undersea Warfare* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NSWC/Carderock : MD | 1.172 | - | | - | | - | | - | | - | - | 1.172 | - |
| Developmental Test & Evaluation | WR | NUWC/Newport : RI | 11.341 | 0.112 | Apr 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | SPAWAR : CA | 0.277 | - | | - | | - | | - | | - | - | 0.277 | - |
| Developmental Test & Evaluation | C/CPFF | UT/ARL : TX | 1.844 | - | | - | | - | | - | | - | - | 1.844 | - |
| Developmental Test & Evaluation | C/CPFF | VAR : VAR* | 4.580 | 0.187 | Apr 2014 | 0.303 | Feb 2015 | 0.336 | Dec 2015 | - | | 0.336 | Continuing | Continuing | Continuing |
| Enhanced Data Collection | C/CPFF | JHU/APL : MD | 4.462 | - | | - | | - | | - | | - | - | 4.462 | - |
| Enhanced Data Collection | C/CPFF | UT/ARL : TX | 2.000 | - | | - | | - | | - | | - | - | 2.000 | - |
| Demonstration Execution | Various | NRL : District of Columbia | 0.000 | 0.168 | Oct 2013 | - | | - | | - | | - | - | 0.168 | - |
| Demonstration Performance Analysis | Various | NRL : District of Columbia | 0.000 | 0.170 | Oct 2013 | - | | - | | - | | - | - | 0.170 | - |
| | | **Subtotal** | 35.142 | 1.287 | | 0.933 | | 0.976 | | - | | 0.976 | - | - | - |

**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 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPAF | BAE Systems : MD | 4.579 | 0.125 | Apr 2014 | 0.120 | Nov 2014 | 0.120 | Dec 2015 | - | | 0.120 | Continuing | Continuing | Continuing |
| Travel | Allot | NAVSEA PEO IWS 5 : DC | 0.300 | - | | - | | - | | - | | - | - | 0.300 | - |
| Travel (LRS) | Allot | ONR : DC | 0.050 | - | | - | | - | | - | | - | - | 0.050 | - |
| Demonstration Planning and Test Plan | Various | NRL : District of Columbia | 0.000 | 0.150 | Oct 2013 | - | | - | | - | | - | - | 0.150 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603553N / *Surface ASW* | Project (Number/Name)<br>1704. / *Undersea Warfare* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Subtotal** | | | 4.929 | 0.275 | | 0.120 | | 0.120 | | - | | 0.120 | - | - | - |

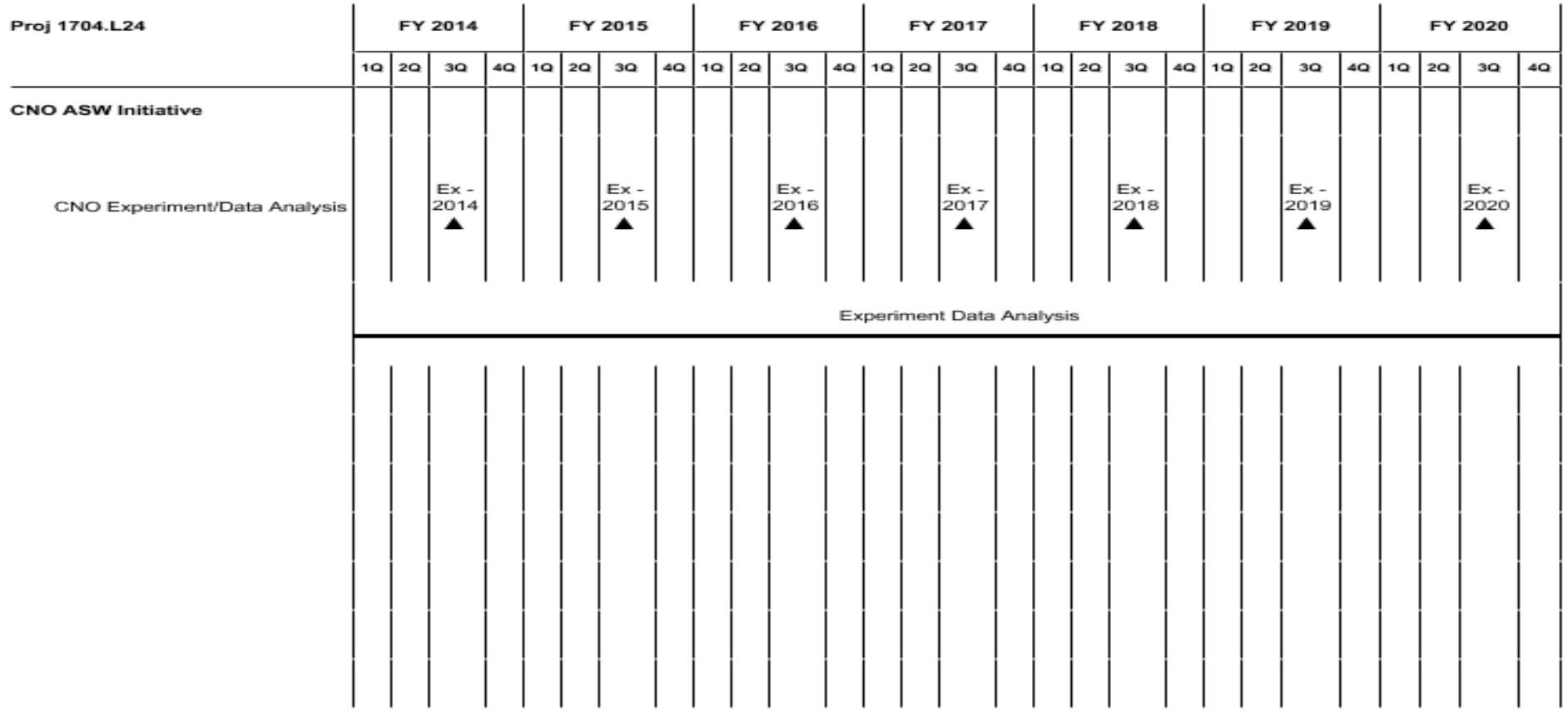
**Remarks**

Note: Funds identified as LRS (Littoral Remote Sensing) were part of the 2011/2012 DoD Omnibus Reprogrammings for ASW/ISR Capability.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 186.242 | 2.262 | | 1.053 | | 1.096 | | - | | 1.096 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603553N / *Surface ASW* | **Project (Number/Name)**<br>1704. / *Undersea Warfare* |




*2016PB - 0603553N - 1704.L24*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603553N / *Surface ASW* | **Project (Number/Name)**<br>1704. / *Undersea Warfare* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1704.L24*** | | | | |
| CNO ASW Initiative: CNO Experiment/Data Analysis: Conduct At-Sea Experiment (2014) | 3 | 2014 | 3 | 2014 |
| CNO ASW Initiative: CNO Experiment/Data Analysis: Conduct At-Sea Experiment (2015) | 3 | 2015 | 3 | 2015 |
| CNO ASW Initiative: CNO Experiment/Data Analysis: Conduct At-Sea Experiment (2016) | 3 | 2016 | 3 | 2016 |
| CNO ASW Initiative: CNO Experiment/Data Analysis: Conduct At-Sea Experiment (2017) | 3 | 2017 | 3 | 2017 |
| CNO ASW Initiative: CNO Experiment/Data Analysis: Conduct At-Sea Experiment (2018) | 3 | 2018 | 3 | 2018 |
| CNO ASW Initiative: CNO Experiment/Data Analysis: Conduct At-Sea Experiment (2019) | 3 | 2019 | 3 | 2019 |
| CNO ASW Initiative: CNO Experiment/Data Analysis: Conduct At-Sea Experiment (2020) | 3 | 2020 | 3 | 2020 |
| CNO ASW Initiative: CNO Experiment/Data Analysis: Analyze Experimental Data/ Studies | 1 | 2014 | 4 | 2020 |
| ***AN/SQS-53C SAS pg. 1*** | | | | |
| Phase B: Demonstration: Demonstration Test Planning | 2 | 2014 | 2 | 2014 |
| Phase B: Demonstration: Demonstration Tests | 3 | 2014 | 3 | 2014 |
| Phase B: Demonstration: Analysis and Documentation of Demonstration Tests | 4 | 2014 | 4 | 2014 |
| Phase B: Demonstration: Milestone C | 4 | 2014 | 4 | 2014 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603553N / *Surface ASW* | Project (Number/Name)<br>3349 / *Detection and Fusion of Remote Sensors* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3349: *Detection and Fusion of Remote Sensors* | - | 6.281 | - | - | - | - | - | - | - | - | - | 6.281 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Littoral Remote Sensing (LRS) project develops remote sensing algorithms for detection and classification of maritime targets.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** The Littoral Remote Sensing (LRS) | 6.281 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |

***Description:*** The Littoral Remote Sensing (LRS) project develops remote sensing algorithms for detection and classification of maritime targets.

Funding decreases from FY2014 to FY2015 due to the completion of the S&T protions of the project and transitions to RDTEN (starting FY15) PE 0603207N, 2363 - Remote Sensing Capability Development and then OMN (starting FY16) PE 0702207N, 1C5C - Op Meteorology and Oceanography.

***FY 2014 Accomplishments:***
- Implemented advanced development and testing of remote sensing algorithms for detection and classification for maritime targets.
- Developed and tested simultaneous retrieval of environmental parameters from imagery for use in reducing false alarms and improving classification of maritime targets.
- Developed and tested fusion of multiple remote sensing retrievals to enhance target exploitation.
- Prepared transition paths for operational evaluation and user training of LRS algorithms and conops.

***FY 2015 Plans:***
N/A

***FY 2016 Base Plans:***
N/A

***FY 2016 OCO Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603553N / *Surface ASW* | **Project (Number/Name)**<br>3349 / *Detection and Fusion of Remote Sensors* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 6.281 | - | - | - | - |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Competitively awarded contracts from Broad Agency Announcement (BAA) solicitations.

**E. Performance Metrics**

Conduct Detection and classification algorithm development and testing starting in 4QFY2014 and ending 3QFY2015.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603553N / *Surface ASW* | **Project (Number/Name)**<br>3349 / *Detection and Fusion of Remote Sensors* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detection and classification algorithms | WR | NRL : NRL-DC | 0.000 | 0.500 | Sep 2014 | - | | - | | - | | - | - | 0.500 | - |
| Detection and classification algorithms | C/CPFF | Various : Various | 0.000 | 2.500 | Sep 2014 | - | | - | | - | | - | - | 2.500 | - |
| Technology development | WR | NAWCAD : Pax River, MD | 0.000 | 0.300 | Oct 2014 | - | | - | | - | | - | - | 0.300 | - |
| Technology development | WR | SPAWAR : San Diego, CA | 0.000 | 0.200 | Oct 2014 | - | | - | | - | | - | - | 0.200 | - |
| Technology development | C/CPFF | Various : Various | 0.000 | 2.760 | Oct 2014 | - | | - | | - | | - | - | 2.760 | - |
| | | **Subtotal** | 0.000 | 6.260 | | - | | - | | - | | - | - | 6.260 | - |

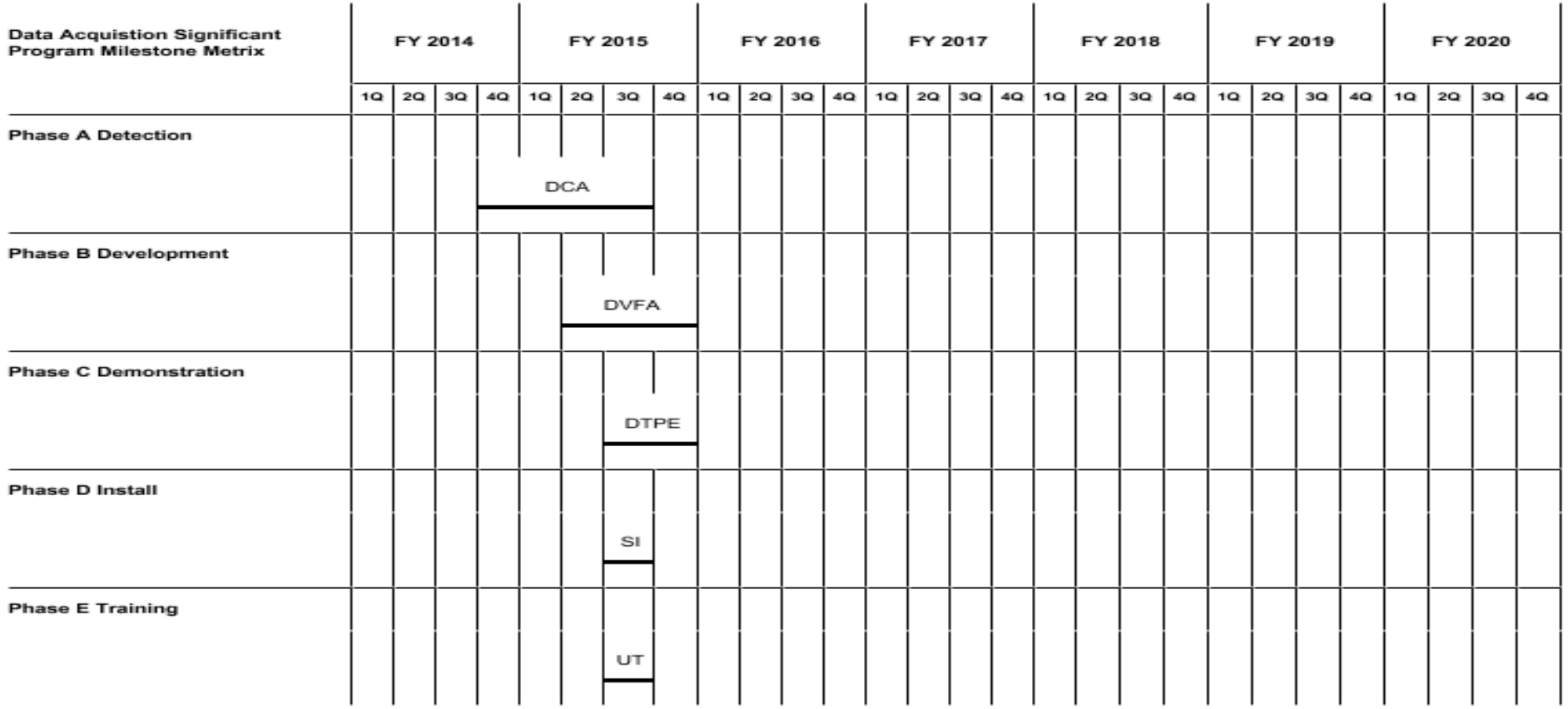
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | ONR : DC | 0.000 | 0.021 | Oct 2014 | - | | - | | - | | - | - | 0.021 | - |
| | | **Subtotal** | 0.000 | 0.021 | | - | | - | | - | | - | - | 0.021 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 6.281 | | - | | - | | - | | - | - | 6.281 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603553N / *Surface ASW* | **Project (Number/Name)**<br>3349 / *Detection and Fusion of Remote Sensors* |




*2016PB - 0603553N - 3349*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603553N / *Surface ASW* | **Project (Number/Name)**<br>3349 / *Detection and Fusion of Remote Sensors* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Data Acquistion Significant Program Milestone Metrix*** | | | | |
| Phase A Detection: Detection and classification algorithm development and testing | 4 | 2014 | 3 | 2015 |
| Phase B Development: Develop multi-sensor fusion algorithms and testing | 2 | 2015 | 4 | 2015 |
| Phase C Demonstration: Demonstration test planning and execution | 3 | 2015 | 4 | 2015 |
| Phase D Install: System install | 3 | 2015 | 3 | 2015 |
| Phase E Training: User training | 3 | 2015 | 3 | 2015 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603561N *I Advanced Submarine System Development* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 2,772.968 | 832.736 | 67.551 | 87.160 | - | 87.160 | 91.055 | 82.759 | 92.031 | 92.111 | Continuing | Continuing |
| 0223: *Sub Combat System Improvement (ADV)* | 383.293 | 31.734 | 34.787 | 41.392 | - | 41.392 | 44.925 | 41.482 | 51.903 | 51.154 | Continuing | Continuing |
| 2033: *Adv Submarine Systems Development* | 402.482 | 40.868 | 32.764 | 41.968 | - | 41.968 | 46.130 | 41.277 | 40.128 | 40.957 | Continuing | Continuing |
| 2096: *Payload Delivery Development* | 0.000 | - | - | 3.800 | - | 3.800 | - | - | - | - | - | 3.800 |
| 3220: *SBSD Advanced Submarine System Development* | 1,987.193 | 760.134 | - | - | - | - | - | - | - | - | - | 2,747.327 |
| **MDAP/MAIS Code:** P444 | | | | | | | | | | | | |

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

This program element supports innovative research and development in submarine Hull, Mechanical and Electrical (HM&E) and combat systems technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible. The program element also supports programs transitioning from Science and Technology (S&T), Defense Advanced Research Projects Agency (DARPA), Independent Research and Development, and Small Business Innovation Research (SBIR) projects.

Project Unit 0223:
The Advanced Submarine Combat Systems Development non-acquisition (NON-ACAT) Project supports Navy Submarine Acoustic Superiority and Technology Insertion Initiatives through the application of advanced development and testing of sensor processing and tactical control systems improvements. This Project transitions technologies developed by Navy technology bases, the private sector, Office of Naval Research (ONR), Future Naval Capabilities (FNC), and DARPA. The Project addresses technology challenges to improve tactical control in littoral and open ocean environments for a variety of operational missions including peacetime engagement, surveillance, battle space preparation, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware/software systems are developed to demonstrate technologically promising system concepts in laboratory and at-sea submarine environments. Specifically, the focus of the technology efforts will be Advanced Processing Build (APB) for acoustics, imaging, tactical control, Electronic Warfare (EW) and navigation; and Advanced Sonar Arrays. APBs develop and demonstrate improvements to current and future sensor processing/combat control systems. The Advanced Sonar Arrays program develops and tests new sensors and demonstrates large array configurations. This Project is funded under demonstration and validation, as it develops and integrates hardware for experimental tests related to specific platform applications. Technologies and/or capabilities developed under this program will be shared, as applicable, with surface and surveillance sensor processing/combat system development programs. In particular, development programs for surface ship sonar, Advanced Capability Build (ACB) and surveillance platforms, Advanced Surveillance Build (ASB), will work closely with the APB program to optimize software reuse. ACB, ASB and APB may co-develop capabilities and modular architecture technologies to maximize commonality and cost effectiveness.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603561N *I Advanced Submarine System Development* |

Project Unit 2033:
The Advanced Submarine Systems Development (ASSD) Program is a non-acquisition program that develops and matures technologies for successful integration into future and modernized submarine classes, thus lowering acquisition and life cycle program costs while improving mission capability. ASSD transitions Hull, Mechanical, and Electrical (HM&E) technologies and future naval concepts from Science & Technology (S&T) and Research and Development (R&D) to operational platforms; performs tests and demonstrates submarine design and naval architecture products destined for integration into future submarine classes or backfit into existing fleet assets; develops, initially integrates, and does test validation of leading payload concepts for submarine integration in support of the Design for Undersea Warfare; and operates unique R&D experimentation, modeling, testing and simulation facilities to enhance submarine stealth, maneuverability, capability, and affordability. The program also supports Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR), Office of Naval Research (ONR), Defense Advanced Research Projects Agency (DARPA) Programs and near and mid-term technology insertion to achieve future submarine class total ownership cost reductions, and influence future submarine concept designs and core technologies. Experimentation and demonstration is conducted in a joint warfighting context with other services, (i.e. the U.S. Marines, U.S. Army, and the U.S. Air Force), to enable early assessment of warfighting capabilities, and to contribute to smarter technology selection decisions for potential incremental development. This program also supports Information Exchange Programs and joint Project Agreements (PA) with the United Kingdom, Canada, Australia and other international partners.

Project 2033 is comprised of three budget categories: Stealth, Payloads & Sensors, and Innovative Technology Transition/Concept Development.

The major developmental efforts include:
Sustainment of Vital Submarine Stealth R&D Capabilities
- Large Scale Vehicle (LSV)
- Intermediate Scale Measurement System (ISMS)
- Submarine Signature Management/Acoustic Superiority
- SSN/SSGN Survivability Program (S3P)
- Advanced Hull Coatings

Development of Technologies for Innovative Technology Transition/Concept Development
- Hydraulic Elimination through Electrification
- Advanced CO2 Scrubber (completes in FY14)
- Corrosion Control (Ionic Current Monitoring System (ICMS), Advanced Active Shaft Grounding System (A-ASGS), Sprayable Acoustic Damping System (SADS))
- Advanced Submarine Control (Secondary Propulsion System)
- Advanced Material Propeller (AMP) Technology
- Hybrid Multi-Material Rotor Development (HMMR) (Completes in FY14)

Improved Payload & Sensor Capabilities
- Next Generation Towed Array Handler System
- Towed Array Reliability
- Payload Integration (Advanced Weapons Enabled by Submarine UAS against Mobile targets (AWESUM), Universal Launch and Recovery (ULRM)) and Lithium Ion Battery Certification on an Unmanned Undersea Vehicle

- Integrated Autonomous Undersea Warfare Sensor (IAUWS)

Project 2096:
The Universal Launch and Recovery Module (ULRM) supports the launch and recovery of the Large Diameter Unmanned Underwater Vehicle (LDUUV) from an SSGN for a large diameter open ocean interface.

Project Unit 3220:
The objective of the Sea Based Strategic Deterrent (SBSD) Advanced Submarine System Development project is to design and prepare for construction of the replacement of the OHIO Class SSBN.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 850.062 | 70.551 | 72.144 | - | 72.144 |
| Current President's Budget | 832.736 | 67.551 | 87.160 | - | 87.160 |
| Total Adjustments | -17.326 | -3.000 | 15.016 | - | 15.016 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -3.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 6.897 | - | | | |
| • SBIR/STTR Transfer | -24.222 | - | | | |
| • Program Adjustments | - | - | 19.053 | - | 19.053 |
| • Rate/Misc Adjustments | -0.001 | - | -4.037 | - | -4.037 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $3.466 million to account for the availability of prior year execution balances.

FY 2014: BTR supported efforts included ULRM and Acoustic Superiority.

Project 0223: FY 2016 Program Adjustments support Flank Array beam forming and signal processing improvements, and development of Electronic Warfare (EW) improvements.

Project 2033: FY 2016 Program Adjustments support SSN/SSGN Survivability (S3P) improvements.

Project 2096: Project established in FY16. Efforts previously funded under 2033.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603561N *I Advanced Submarine System Development* |

Note: Beginning in 2015, there is an administrative change that will shift efforts funded from PE 0603561N (Advanced Submarine System Development) / Project 3220 to PE 0603595N (Ohio Replacement) / Project 3220. This shift is consistent with Congressional intent identified in HR 933 (FY13).

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603561N / *Advanced Submarine System Development* | Project (Number/Name)<br>0223 / *Sub Combat System Improvement (ADV)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0223: *Sub Combat System Improvement (ADV)* | 383.293 | 31.734 | 34.787 | 41.392 | - | 41.392 | 44.925 | 41.482 | 51.903 | 51.154 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Project Unit 0223: The Advanced Submarine Combat Systems Development Non-ACAT program supports Navy Submarine Acoustic Superiority and Technology Insertion Initiatives by the application of advanced development and testing of sensor processing and tactical control systems improvements. This Project addresses technology challenges to improve tactical control in littoral and open ocean environments for a variety of operational missions including peacetime engagement, surveillance, battle space preparation, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. These technologies, developed by Navy technology bases, the private sector, ONR, FNC, and DARPA are then transitioned. Prototype hardware/software systems are developed to demonstrate technologically promising system concepts in laboratory and at-sea submarine environments. Specifically, the focus of the technology efforts are APBs for acoustics, imaging, electronic warfare, tactical control, navigation, and Advanced Sonar Arrays. APBs develop and demonstrate improvements to current and future sensor processing/combat control systems. The Advanced Sonar Arrays program develops and tests new sensors and demonstrates large array configurations. Technologies and/or capabilities developed here are shared to optimize re-use and cost effectiveness with surface and surveillance programs. ACB, ASB and APB may co-develop capabilities and modular architecture technologies to maximize commonality and cost effectiveness.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Advanced Processing Build (APB) | 29.834 | 31.587 | 36.117 | - | 36.117 |
| ***Articles:*** | - | - | - | - | - |

***FY 2014 Accomplishments:***

Continued development of APB-13 focusing on revitalizing Operator Machine Interfaces (OMI) to apply commercial industry design thinking and technologies to support ease of use and reduced training burden; continued improvement of new passive acoustic ranging techniques and automated contact tracking; enhanced software architecture to improve system reliability; improved periscope image clarity, image automation, and tracking; and continued refinement of technologies initiated in APB-11. Completed land-based testing of APB-13, including laboratory string testing, end-to-end system testing and Return On Investment (ROI) testing, using the Submarine Multi-Mission Team Trainer (SMMTT). Conducted at-sea testing of APB-13. Used the product of FY14 Return on Investment (ROI), Watch Station Task Analysis (WSTA) gaps and seams, and Broad Agency Announcement (BAA) evaluations along with direction from the Fleet, Submarine Tactical Requirements Group (STRG), COMSUBFOR, and N97 to establish content and continue the development of capabilities for APB-15. APB-15 development will include initial improvements to Electronic Warfare (EW) for Direction

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>0223 / *Sub Combat System Improvement (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Finding, Vulnerability Assessment and Open Systems Architecture; continued revitalization of User Interfaces through the application of commercial design thinking and common commercial user Geographical (GEO) User interfaces such as Google Earth; continued development of the Submarine Mission Planning capability; continued development of imaging improvements for integration/fusion of multi-spectral capability and automated tools for visual detection, tracking, classification and ranging; continued on-board combat system reconstruction, automated sonar detection capabilities, on-board adaptive training tools, adaptation of display technologies to multi-touch displays; improvements to Sonar Tactical Decision Aid (STDA); automated contact of concern determination and initial steps towards porting surface ship Mid-Frequency Active (MFA) sonar capability into the submarine tactical system. APB tactical scenarios and capability focus areas are provided by the Submarine Fleet via the STRG, COMSUBFOR and CNO N97.<br>***FY 2015 Plans:***<br>Continue the development of APB-15, integrate APB-15 for testing, and initiate the land-based testing of APB-15, including laboratory string testing. Initiate planning for APB-17 to include the establishment of the tactical scenario to guide development focus; conduct a WSTA gaps and seams test to inform system shortfalls in the context of the selected scenarios; and conduct an Industry Day and BAA solicitation to drive competition for future APB innovative technologies. Complete at-sea testing and the transition of APB-13.<br>***FY 2016 Base Plans:***<br>Use the product of FY15 ROI, WSTA gaps and seams, and BAA evaluations along with direction from the Fleet/ STRG/COMSUBFOR/N97 to establish content and continue the development of capabilities for APB-17. Initiate EW APB development program on PEO Submarines provided EW system. APB development will include the first two steps of the 4 Step APB process: Step 1 - algorithm assessment by peer review panels of Subject Matter Experts (SME) to down-select technologies and assist developers with technical guidance; Step 2 - algorithm/technology testing with open and closed data sets to further down-select and refine capabilities prior to integration and testing. Complete APB-15 land based testing and ROI and conduct at-sea testing and transition.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Flank Array Demonstration | - | - | 1.675 | - | 1.675 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>0223 / *Sub Combat System Improvement (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>Commence development of beamforming and signal processing improvements to maximize Low Frequency Active (LFA) capability as well as tactical/combat system updates making use of improved capabilities to perform target localization. Conduct at-sea testing and data analysis for the Large Vertical Aperture (LVA-2) array on USS Maryland in support of Acoustic Superiority goals.<br><br>Note: One at-sea test per year will be conducted FY16-19.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Advanced Sensors | 1.900 | 3.200 | 3.600 | - | 3.600 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Conducted Light Weight (LW) Low Cost Conformal Array (LCCA) sea test and transition to 688I program. Initiated studies for development of sensors for the Ohio Class Replacement Program (ORP). Conducted at-sea testing of Conformal Acoustic Velocity Sonar (CAVES) array and updated processor suite. Continued development and test of Advanced Towed Array technologies. Transitioned Compact Towed Array (CTA) technology and supported deployment of CTA 12X Advanced Development Model (ADM) array to PEO Submarines. Initiated development of 96-channel Fat Line VSTA prototype array. Developed open architecture Interface Control Document (ICD) for embedded sensors.<br>***FY 2015 Plans:***<br>Continue LWLCCA development and testing with extension of technology to VA class. Complete 96-channel Fat Line VSTA prototype array development. Conduct Factory Acceptance Testing (FAT), environmental testing and calibration of Fat Line VSTA prototype. Conduct lake test and data analysis.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>0223 / *Sub Combat System Improvement (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Evaluate options for next generation towed array based on analysis of performance, reliability, and affordability. Options to be evaluated include vector sensor and embedded sensor technologies. Initiate development of next generation towed array.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 31.734 | 34.787 | 41.392 | - | 41.392 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Use competitively awarded contracts from Broad Agency Announcement (BAA) solicitations and Small Business Innovative Research (SBIR) initiatives. Integration to fielded systems performed under contracts awarded by the recipient production program within PEO Submarines.

**E. Performance Metrics**

- APB: Deliver at-sea tested submarine capability improvements to PEO Submarines as prescribed by the Fleet every two years. Conduct milestone reviews with the Milestone Decision Authority (PEO Submarines) prior to delivery.
- Conducted Light Weight Low Cost Conformal Array (LWLCCA) Advanced Development Model (ADM) sea test.
- Deliver Next Generation TB-29(x) embedded sensor prototype evaluation report.
- Deliver Fat Line Vector Sensor Towed Array (VSTA) Lake Pend Oreille test reports.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>0223 / *Sub Combat System Improvement (ADV)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | C/CPFF | Adaptive Methods : VA | 0.925 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | Alion Sciences : VA | 3.267 | - | | - | | - | | - | | - | - | 3.267 | Continuing |
| Product Development | C/CPFF | Arete : CA | 0.000 | 0.150 | Feb 2014 | 0.400 | Jan 2015 | 0.900 | Dec 2015 | - | | 0.900 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | Chesapeake Science (L-3) : MD | 7.376 | 0.175 | Jan 2014 | - | | - | | - | | - | - | 7.551 | Continuing |
| Product Development | C/CPFF | Electric Boat : ME | 1.765 | - | | - | | - | | - | | - | - | 1.765 | Continuing |
| Product Development | C/CPFF | General Dynamics : VA | 15.997 | 2.100 | Dec 2013 | 2.500 | Dec 2014 | 2.500 | Dec 2015 | - | | 2.500 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | GA Tech Research Institute : GA | 2.916 | 0.050 | Jan 2014 | 0.050 | Dec 2014 | 0.100 | Dec 2015 | - | | 0.100 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | In Depth Engineering : VA | 3.900 | 0.600 | Jan 2014 | 0.750 | Dec 2014 | 1.000 | Dec 2015 | - | | 1.000 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | JHU/APL : MD | 71.476 | 7.357 | Jan 2014 | 8.710 | Dec 2014 | 6.550 | Dec 2015 | - | | 6.550 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | Lockheed Martin : VA | 43.127 | 4.650 | Dec 2013 | 5.700 | Dec 2014 | 8.185 | Dec 2015 | - | | 8.185 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | Lockheed Martin : NY | 8.914 | 0.650 | Feb 2014 | - | | - | | - | | - | - | 9.564 | Continuing |
| Product Development | C/CPFF | Metron : VA | 4.158 | 0.500 | Dec 2013 | 1.250 | Dec 2014 | 2.250 | Dec 2015 | - | | 2.250 | Continuing | Continuing | Continuing |
| Product Development | WR | NSWC/Carderock : MD | 24.550 | 0.650 | Nov 2013 | 1.000 | Nov 2014 | 1.800 | Nov 2015 | - | | 1.800 | Continuing | Continuing | Continuing |
| Product Development | WR | NUWC/Newport : RI | 77.144 | 3.900 | Nov 2013 | 4.334 | Nov 2014 | 4.996 | Nov 2015 | - | | 4.996 | Continuing | Continuing | Continuing |
| Product Development | C/CPAF | NSMA : VA | 9.844 | 0.650 | Feb 2014 | 0.650 | Jan 2015 | 0.650 | Dec 2015 | - | | 0.650 | Continuing | Continuing | Continuing |
| Product Development | WR | ONI : DC | 2.295 | - | | - | | - | | - | | - | - | 2.295 | Continuing |
| Product Development | WR | ONR : VA | 2.725 | - | | - | | - | | - | | - | - | 2.725 | Continuing |
| Product Development | C/CPFF | Progeny : VA | 5.918 | 0.850 | Dec 2013 | 0.280 | Dec 2014 | 0.700 | Dec 2015 | - | | 0.700 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | PSU/ARL : PA | 7.280 | 1.200 | Feb 2014 | 0.600 | Dec 2014 | 1.400 | Dec 2015 | - | | 1.400 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | SAIC : VA | 3.555 | - | | - | | - | | - | | - | - | 3.555 | Continuing |
| Product Development | C/CPFF | Sedna Digital : VA | 8.464 | 0.900 | Dec 2013 | 1.400 | Dec 2014 | 2.250 | Dec 2015 | - | | 2.250 | Continuing | Continuing | Continuing |
| Product Development | WR | SSC/San Diego : CA | 1.663 | 0.150 | Dec 2013 | 0.600 | Dec 2014 | - | | - | | - | - | 2.413 | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603561N / *Advanced Submarine System Development* | Project (Number/Name)<br>0223 / *Sub Combat System Improvement (ADV)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | MIPR | U.S. Army Research Lab : MD | 1.700 | - | | - | | - | | - | | - | - | 1.700 | Continuing |
| Product Development | MIPR | U.S. Army/MITRE : NJ | 4.595 | - | | - | | - | | - | | - | - | 4.595 | Continuing |
| Product Development | MIPR | U.S. Hanscom AFB/ MIT Lincoln Labs : MA | 13.184 | 1.000 | Dec 2013 | 1.500 | Jan 2015 | 3.500 | Dec 2015 | - | | 3.500 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | UT/ARL : TX | 24.366 | 1.960 | Feb 2014 | 1.860 | Feb 2015 | 1.000 | Dec 2015 | - | | 1.000 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | VAR : VAR* | 16.984 | 2.882 | Dec 2013 | 1.844 | Dec 2014 | 2.553 | Dec 2015 | - | | 2.553 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 368.088 | 30.374 | | 33.428 | | 40.334 | | - | | 40.334 | - | - | - |

**Remarks**

*Consists of multiple performing activities with funding for each not greater than $1M per year.

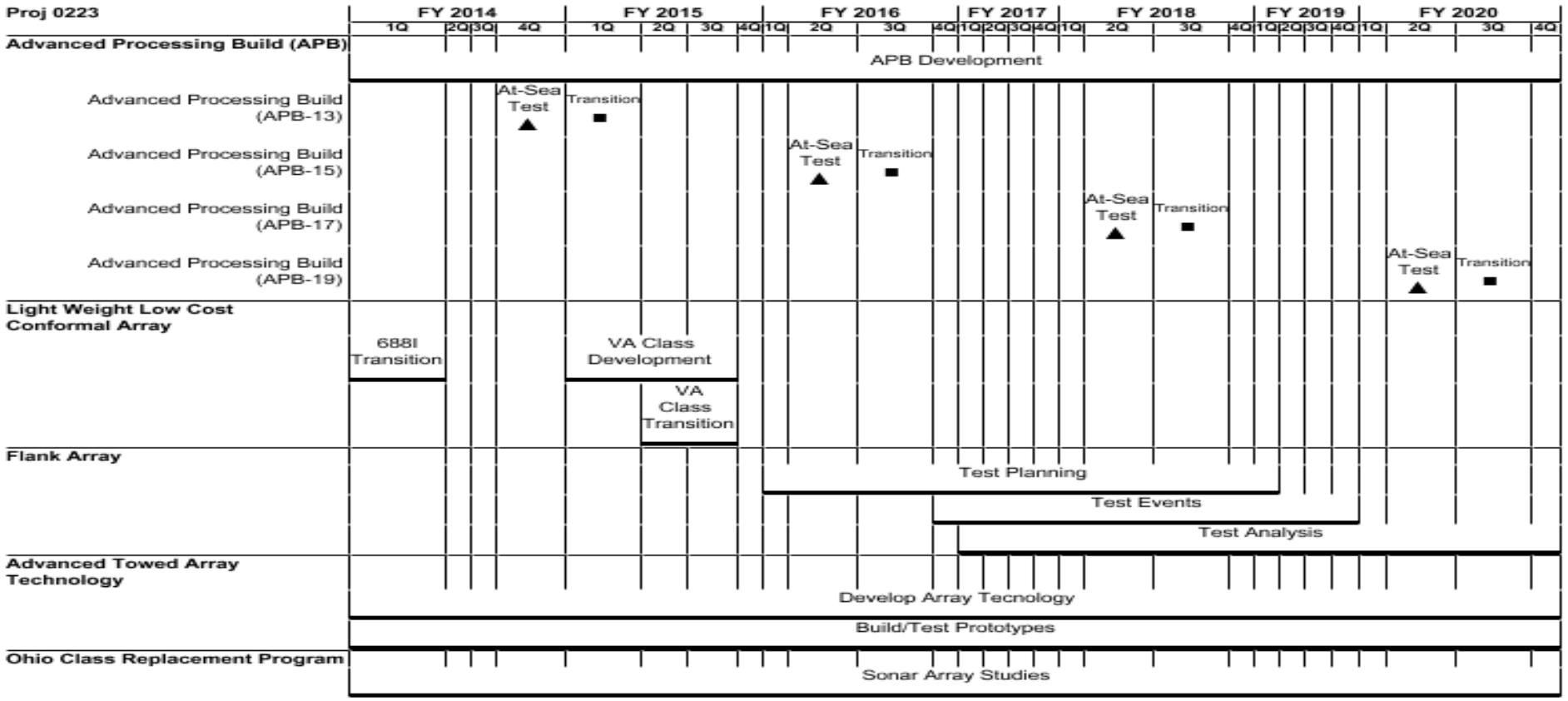
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPAF | BAE Systems : MD | 11.215 | 0.700 | Dec 2013 | 0.750 | Nov 2014 | 1.000 | Dec 2015 | - | | 1.000 | Continuing | Continuing | Continuing |
| Program Management Support | C/CPFF | EG&G (URS) : VA | 3.430 | 0.600 | Mar 2014 | 0.550 | Dec 2014 | - | | - | | - | - | 4.580 | Continuing |
| Travel | Allot | NAVSEA PEO IWS5 : DC | 0.560 | 0.060 | Feb 2014 | 0.059 | Nov 2014 | 0.058 | Oct 2015 | - | | 0.058 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 15.205 | 1.360 | | 1.359 | | 1.058 | | - | | 1.058 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 383.293 | 31.734 | | 34.787 | | 41.392 | | - | | 41.392 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>0223 / *Sub Combat System Improvement (ADV)* |




*2016PB - 0603561N - 0223*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>0223 / *Sub Combat System Improvement (ADV)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0223*** | | | | |
| Advanced Processing Build (APB): APB Development (continued) | 1 | 2014 | 4 | 2020 |
| Advanced Processing Build (APB): Advanced Processing Build (APB-13): APB-13 At-Sea Test | 4 | 2014 | 4 | 2014 |
| Advanced Processing Build (APB): Advanced Processing Build (APB-13): Transition APB-13 to PEO Submarines Production Programs | 1 | 2015 | 1 | 2015 |
| Advanced Processing Build (APB): Advanced Processing Build (APB-15): APB-15 At-Sea Test | 2 | 2016 | 2 | 2016 |
| Advanced Processing Build (APB): Advanced Processing Build (APB-15): Transition APB-15 to PEO Submarines Production Programs | 3 | 2016 | 3 | 2016 |
| Advanced Processing Build (APB): Advanced Processing Build (APB-17): APB-17 At-Sea Test | 2 | 2018 | 2 | 2018 |
| Advanced Processing Build (APB): Advanced Processing Build (APB-17): Transition APB-17 to PEO Submarines Production Programs | 3 | 2018 | 3 | 2018 |
| Advanced Processing Build (APB): Advanced Processing Build (APB-19): APB-19 At-Sea Test | 2 | 2020 | 2 | 2020 |
| Advanced Processing Build (APB): Advanced Processing Build (APB-19): Transition APB-19 to PEO Submarines Production Programs | 3 | 2020 | 3 | 2020 |
| Light Weight Low Cost Conformal Array: Transition to 688I (continued) | 1 | 2014 | 1 | 2014 |
| Light Weight Low Cost Conformal Array: VA Class Development Extension | 1 | 2015 | 3 | 2015 |
| Light Weight Low Cost Conformal Array: Transition to VA Class | 2 | 2015 | 3 | 2015 |
| Flank Array: Flank Array Test Planning | 1 | 2016 | 1 | 2019 |
| Flank Array: Flank Array Test Conduct | 4 | 2016 | 4 | 2019 |
| Flank Array: Flank Array Test Analysis | 1 | 2017 | 4 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>0223 / *Sub Combat System Improvement (ADV)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Advanced Towed Array Technology: Develop Array Technologies (continued) | 1 | 2014 | 4 | 2020 |
| Advanced Towed Array Technology: Build & Test Prototype Arrays (continued) | 1 | 2014 | 4 | 2020 |
| Ohio Class Replacement Program: Conduct Ohio Class Repacement Array Studies (Continued) | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603561N / *Advanced Submarine System Development* | Project (Number/Name)<br>2033 / *Adv Submarine Systems Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2033: *Adv Submarine Systems Development* | 402.482 | 40.868 | 32.764 | 41.968 | - | 41.968 | 46.130 | 41.277 | 40.128 | 40.957 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Advanced Submarine Systems Development (ASSD) Program is a non-acquisition program that develops and matures technologies for successful integration into future and modernized submarine classes, thus lowering acquisition and life cycle program costs while improving mission capability. ASSD transitions Hull, Mechanical, and Electrical (HM&E) technologies and future naval concepts from Science & Technology (S&T) and Research and Development (R&D) to operational platforms; performs tests and demonstrates submarine design and naval architecture products destined for integration into future submarine classes or backfit into existing fleet assets; develops, initially integrates, and does test validation of leading payload concepts for submarine integration in support of the Design for Undersea Warfare; and operates unique R&D experimentation, modeling, testing and simulation facilities to enhance submarine stealth, maneuverability, capability, and affordability. The program also supports Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR), Office of Naval Research (ONR), Defense Advanced Research Projects Agency (DARPA) Programs and near and mid-term technology insertion to achieve future submarine class total ownership cost reductions, and influence future submarine concept designs and core technologies. Experimentation and demonstration is conducted in a joint warfighting context with other services, (i.e. the U.S. Marines, U.S. Army, and the U.S. Air Force), to enable early assessment of warfighting capabilities, and to contribute to smarter technology selection decisions for potential incremental development. This program also supports Information Exchange Programs and joint Project Agreements (PA) with the United Kingdom, Canada, Australia and other international partners.

Project 2033 is comprised of three budget categories: Stealth, Payloads & Sensors, and Innovative Technology Transition/Concept Development.

The major developmental efforts include:
Sustainment of Vital Submarine Stealth R&D Capabilities
- Large Scale Vehicle (LSV)
- Intermediate Scale Measurement System (ISMS)
- Submarine Signature Management/Acoustic Superiority
- SSN/SSGN Survivability Program (S3P)
- Advanced Hull Coatings

Development of Technologies for Innovative Technology Transition/Concept Development
- Hydraulic Elimination through Electrification
- Advanced CO2 Scrubber (completes in FY14)
- Corrosion Control (Ionic Current Monitoring System (ICMS), Advanced Active Shaft Grounding System (A-ASGS), Sprayable Acoustic Damping System (SADS))
- Advanced Submarine Control (Secondary Propulsion System)
- Advanced Material Propeller (AMP) Technology

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

- Hybrid Multi-Material Rotor Development (HMMR) (Completes in FY14)
Improved Payload & Sensor Capabilities
- Next Generation Towed Array Handler System
- Towed Array Reliability
- Payload Integration (Advanced Weapons Enabled by Submarine UAS against Mobile targets (AWESUM), Universal Launch and Recovery (ULRM)) and Lithium Ion Battery Certification on an Unmanned Undersea Vehicle
- Integrated Autonomous Undersea Warfare Surveillance (IAUWS)

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Stealth/Subtotal Cost | 21.932 | 18.183 | 29.971 | - | 29.971 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** Develop technologies and tools to increase the survivability of submarines by recognizing and mitigating sources of acoustic and non-acoustic vulnerabilities to ensure submarines can penetrate contested waters and remain undetected in the littorals. Develop technologies and Tactics, Techniques, and Procedures (TTPs) that facilitate new or enhance existing warfighting concepts. Sustain Navy R&D capability for continued operations of the Large Scale Vehicle (LSV 2) and the Intermediate Scale Measurement System (ISMS) in support of VIRGINIA and OHIO Replacement Class Program of Records to conduct large model experiments for submarines focusing on stealth, maneuvering and control, affordability, and operational effectiveness. Address gaps in stealth and survivability for current and future SSN/SSGN force. Advanced coatings will develop methods to model and test existing US and UK coating materials as well as develop new coating materials for improved acoustic performance.

***FY 2014 Accomplishments:***
Continued Electromagnetic Silencing PA with the UK executing the fourth (four planned) scale stress magnetization and electric model experiments. Continued technology and sensors refresh at ISMS range. Conducted LSV core system maintenance, maintained crew qualification, maintained support systems, and operated and maintained LSV and ISMS acoustic test ranges. Supported Ohio Replacement time-critical Science and Technology (S&T) trials. Supported ship and system alterations to safely support OHIO Replacement signature and propulsor trials. Conducted VIRGINIA Improved Advanced Hybrid (IAH) test. Addressed gaps in stealth and survivability for current and future SSN/SSGN force to execute submarine tactical and strategic operations. Participated in Triumph v Dallas exercise. Signed Project Agreement for Advanced Hull Coatings.

***FY 2015 Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue Electromagnetic Silencing PA with the UK executing the follow-on efforts for scale stress magnetization and electric model experiments. Complete technology and sensors refresh at ISMS range. Conduct LSV core systems maintenance, maintain crew qualification, maintain support systems, and operate and maintain LSV and ISMS acoustic test ranges. Complete VIRGINIA Improved Advanced Hybrid (IAH) test. Continue supporting ship and system alterations to safely support OHIO Replacement signature and propulsor trials. Prepare for and conduct LSV program Independent Assessment. Conduct critical OHIO Replacement propulsor trials. Address gaps in stealth and survivability for current and future SSN/SSGN force to execute submarine tactical and strategic operations. Define US/UK requirements for coatings, initiate advanced coating configurations for analysis and modeling. Define requirements and initiate Treatment Configuration.<br>***FY 2016 Base Plans:***<br>Continue Electromagnetic Silencing PA with the UK executing the follow-on efforts for scale stress magnetization and electric model experiments. Conduct LSV core systems maintenance, maintain crew qualification, maintain support systems, and operate and maintain LSV and ISMS acoustic test ranges. Conduct system upgrades on ISMS. Continue critical OHIO Replacement propulsor trials. Support ship and system alterations to safely support OHIO Replacement signature and propulsor trials, including replacement of LSV acoustic array. Address gaps in stealth and survivability for current and future SSN/SSGN force to execute submarine tactical and strategic operations. Conduct advanced coating tests for US and UK materials. Finalize requirements and Treatment Configuration, procure materials and test.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Payloads and Sensors/Subtotal Cost | 12.574 | 8.693 | 6.726 | - | 6.726 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop promising advanced technologies and/or concepts capable of revolutionizing submarine design, improving payload flexibility, increasing capability, reducing weight and space requirements, exploring alternative payload launch mechanisms. Develop payload demonstrations targeted at improving flexible ocean interfaces, Intelligence, Surveillance, Reconnaissance (ISR) requirements, and payload and launch retrieval methods from undersea platforms. Conduct Navy and joint demonstrations in order to assess the operational value of the technologies and systems under consideration. The experiments support examination and assessment of potential new Fleet capabilities. | | | | | |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Completed 688 Class OA-9070B Handling System TEMPALT, install and monitor at-sea. Initiated Tools for Predicting Array Operational Loading and Distribution (FNC). Continued submarine integration CONOPs development in support of AWESUM. Demonstrated submarine launch Unmanned Aerial System (UAS) capability in support of AWESUM. Updated Universal Launch and Recovery Module (ULRM) TEMPALT data package, prepare test plan and Interface Control Document (ICD) and initiate vehicle testing. Commenced preparation of at-sea demonstration for ULRM. Initiated integration and testing of innovative payload concepts. Integrated Autonomous Undersea Warfare Surveillance (IAUWS) Coalition Warfare Program (CWP) Project Agreement (PA) between US and Australia.<br>***FY 2015 Plans:***<br>Continue monitoring 688 Class OA-9070B at-sea. Transition efforts to PMS401. Continued Tools for Predicting Array Operational Loading and Distribution (FNC). Towed Array Predicting Tooling FNC to develop and validate towed array predicting tool. Continue submarine integration CONOPs development in support of AWESUM. Demonstrate submarine launch UAS capability in support of AWESUM. Complete ULRM vehicle testing and commence preparation for at-sea demo test. Develop preliminary hazard analysis, design battery carriage and casualty container for the Lithium Ion Battery. Continue integration and testing of innovative payload concepts. Continue IAUWS PA between US and Australia.<br>***FY 2016 Base Plans:***<br>Continue Towed Array Predicting Tooling FNC to develop and validate towed array predicting tool. Initiate UAS integration (AWESUM) collaboration with UK and Australia. Commence and complete Lithium Ion Battery certification testing and prepare TEMPALT package. Continue integration and testing of innovative payload concepts.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Innovative Technology Transition/Concept Development | 6.362 | 5.888 | 5.271 | - | 5.271 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop submarine alternative propulsion, propeller designs, and stern configurations with potential to significantly reduce submarine acquisition costs. Demonstrate critical performance parameters through appropriate scale demonstrators in realistic environmental conditions. Evaluate integration of technologies and approaches for cost reduction in future submarines. Develop understanding of ship concept studies and submarine cost drivers and model analysis. Develop and demonstrate technologies for future submarines in areas of hull and platform technologies, propulsors, propellers, corrosion control, ship control, | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| electric actuation, sensors, and self-defense. This work will apply to future submarine designs including the long-lead concept work on the OHIO Replacement Program. Demonstrate technologies with potential to reduce total ownership costs of submarine systems by lowering construction costs, improving commonality of interfaces, extending the life of parts, and lowering life cycle maintenance requirements.<br><br>***FY 2014 Accomplishments:***<br>Commenced the Ball Valve Electric Actuation System (EAS) and Universal Modular Mast (UMM) EAS TEMPALT removal from USS MISSOURI and analyzed data. Removed CO2 SSN Shipboard Test Cube. Continued data collection of the CO2 shipboard test cube aboard SSBN platform. Completed Ionic Current Monitoring System (ICMS) engineering design. Completed Advanced Active Shaft Grounding System (AASGS) engineering design (Electronic Grounding Unit (EGU), Shaft Current Sensor (SCS) and Grounding Datalog Unit (GDU) subsystems). Established Sprayable Acoustic Damping System (SADS) material formulation, define performance requirements and perform ship integration studies and industrialization Test and Evaluation (T&E). Assemble Advanced Submarine Control (ASC) secondary propulsion system technology components and perform factory and land-based component testing. Continued partnership with ONR on the Advanced Material Propeller (AMP) Future Naval Capability (FNC) program. Executed AMP program between U.S. and AUS via a collaborative Project Arrangement (PA) to demonstrate a full scale AMP design on an Australian Collins Class. Completed the design, fabrication and testing of 1/4 scale AMP composite material blade plank and completed the design and fabrication of a full scale Generation 0 composite blade for testing. Tested DARPA Hybrid Multi-Material Rotor (HMMR) solution on LSV 2. Continued new design concept development/system improvements. Continued to leverage products between Small Business and Independent Research and Development (IRAD) efforts.<br><br>***FY 2015 Plans:***<br>Complete the Ball Valve Electric Actuation System (EAS) and Universal Modular Mast (UMM) EAS TEMPALT removal from USS MISSOURI and restore the shipboard hydraulic service systems. Perform Ball Valve EAS data acquisition analysis and actuator tear down assessment. Continue data collection of the CO2 shipboard test cube aboard SSBN platform. Remove CO2 SSBN Shipboard test cube. Plan and develop a TEMPALT to demonstrate ICMS. Plan and develop two TEMPALTs to demonstrate AASGS subsystem technologies (EGU and SCS with GDU). Complete AASGS subsystem Contact Technologies engineering design. Develop SADS Business Case Analysis (BCA) for VIRGINIA and Ohio Replacement. Perform shock and vibration tests and medium-scale damping tests. Perform on land and in-water barge functional testing of an integrated ASC pump jet SPS. Continue partnership with ONR on the AMP FNC program. Obtain AMP structural materials design | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| approval and complete full-scale Generation 0 composite blade testing. Complete the design and fabrication of a full scale Generation 1 AMP composite blade and metallic hub for structural testing. Initiate the design of a full scale Generation 2 AMP composite blade and metallic hub for structural and certification testing. Continue new concept development/system improvements. Continue to leverage products between Small Business and IRAD efforts.<br>***FY 2016 Base Plans:***<br>Install ICMS TEMPALT on a VIRGINIA Class hull. Install two AASGS subsystem TEMPALTs (EGU and SCS with GDU on a VIRGINIA hull). Plan and develop a third TEMPALT to demonstrate an additional AASGS subsystem (Contact Technology) . Complete SADS corrosion performance assessment and conduct large-scale damping performance test. Perform SADS assessment of restraint requirements and develop TEMPALT. Perform in-water barge and on land functional testing of an integrated ASC secondary propulsion system. Complete the design and fabrication of the full scale Generation 2 AMP composite blade and metallic hub. Continue new design concept development/system improvements. Continue to leverage products between Small Business and IRAD efforts.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 40.868 | 32.764 | 41.968 | - | 41.968 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

F2033: Sole source Concept Formulation (CONFORM) contracts with the only two submarine design/construction shipyards, General Dynamics Electric Boat (GDEB) and Huntington Ingalls Industries (HII). Engagement with industry to build vendor base and support development of R&D products for enhanced submarine capability via competitively awarded Small Business Innovation Research (SBIR) and Broad Agency Agreement (BAA) contracts to support Hull Mechanical & Electrical (HM&E) systems.

**E. Performance Metrics**

To enable transition of a minimum of three technology challenge solutions supporting emergent warfighter needs.
- Sustain critical one of a kind national R&D hydroacoustic infrastructure enabling the design and assessment of VIRGINIA Class and OHIO Replacement designs.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

- Refine the design of the Advanced Carbon Dioxide Removal System (ACRU) CO2 Scrubber System based on at-sea testing of new solid sorbent materials and the removal of liquid amine system from future submarines.
- At-sea demo of AWESUM.
- Assess as-built VIRGINIA and OHIO Class SSN/SSGN submarine for design drivers/design tools and model validation to define R&D needs for OHIO Class component development and technical design maturity.
- Develop and test innovative Towed Array Handler concept focused on improving system reliability and fleet operational availability.
- Conduct in depth assessment of SSN/SSGN Survivability (S3P) for peacetime and wartime operations in anti-access area denial environment.
- Develop future coatings to enable continued acoustic superiority of VA Class design.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603561N / *Advanced Submarine System Development* | Project (Number/Name)<br>2033 / *Adv Submarine Systems Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | MIPR | DARPA : Arlington, VA | 3.084 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Product Development | MIPR | CNA : Alex, VA | 0.200 | 0.490 | Feb 2014 | 0.200 | Feb 2015 | 0.200 | Feb 2016 | - | | 0.200 | - | 1.090 | - |
| Product Development | SS/CPFF | Lockheed Martin : Manassas, VA | 1.500 | - | | - | | - | | - | | - | - | 1.500 | - |
| Product Development | WR | NRL : Washington, DC | 0.000 | 0.933 | Mar 2014 | - | | - | | - | | - | - | 0.933 | - |
| Product Development | SS/CPFF | Rolls Royce, Marine North America : New Bedford, MA | 0.000 | 1.760 | Jul 2014 | 1.694 | Mar 2015 | 2.000 | Mar 2016 | - | | 2.000 | - | 5.454 | - |
| Product Development | SS/CPFF | HII : Newport News, VA | 5.226 | 2.415 | May 2014 | 3.517 | Mar 2015 | 3.419 | Apr 2016 | - | | 3.419 | Continuing | Continuing | Continuing |
| Product Development | WR | NSWC : Dahlgren, VA | 5.241 | 0.020 | Jun 2014 | - | | - | | - | | - | - | 5.261 | 5.241 |
| Product Development | SS/CPFF | Kollmorgen : N. Hampton, MA | 1.100 | - | | - | | - | | - | | - | - | 1.100 | 1.100 |
| Product Development | SS/CPFF | Oceaneering : Chesapeake, VA | 1.900 | - | | - | | - | | - | | - | - | 1.900 | 1.900 |
| Product Development | SS/CPFF | Boeing : St. Louis, MO | 0.925 | - | | - | | - | | - | | - | - | 0.925 | Continuing |
| Product Development | SS/CPFF | EB : Groton, CT | 45.387 | 7.191 | May 2014 | 4.882 | Mar 2015 | 2.371 | Apr 2016 | - | | 2.371 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | Raytheon : Portsmouth, RI | 16.034 | - | | - | | - | | - | | - | - | 16.034 | 16.340 |
| Product Development | WR | NSWC : Carderock, MD | 78.426 | 4.585 | May 2014 | 2.165 | Feb 2015 | 4.215 | Apr 2016 | - | | 4.215 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | ARL/PSU : State College, PA | 6.187 | 1.455 | Jun 2014 | 0.966 | Feb 2015 | 0.566 | Apr 2016 | - | | 0.566 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | UT/ARL : Austin, TX | 6.250 | 0.050 | Jun 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | JHU/APL : Laurel, MD | 15.794 | 1.504 | Jun 2014 | 2.874 | May 2015 | 10.202 | May 2016 | - | | 10.202 | Continuing | Continuing | Continuing |
| Product Development | Various | Various : Various | 33.492 | 0.767 | Jul 2014 | 0.980 | Mar 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Product Development | WR | NUWC : Newport, RI | 61.030 | 8.476 | Jul 2014 | 2.249 | Feb 2015 | 1.769 | Mar 2016 | - | | 1.769 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | WR | ONR : Arlington, VA | 8.066 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | Lockheed Martin : Bethesda, MD | 12.783 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Product Development | WR | SPAWAR : San Diego, CA | 5.850 | - | | - | | - | | - | | - | - | 5.850 | Continuing |
| Product Development | C/CPFF | Raytheon : TBD | 0.000 | 0.627 | Aug 2014 | 0.505 | Mar 2015 | - | | - | | - | - | 1.132 | - |
| Product Development | C/CPFF | Applied Mathematics : Gales Ferry CT | 0.000 | 0.510 | Jun 2014 | - | | - | | - | | - | - | 0.510 | - |
| Product Development | SS/CPFF | Progeny : Manassas VA | 0.000 | 0.337 | Jul 2014 | - | | - | | - | | - | - | 0.337 | - |
| | | **Subtotal** | 308.475 | 31.120 | | 20.032 | | 24.742 | | - | | 24.742 | - | - | - |

**Remarks**

Various/VAR is used to group multiple activities with small funding levels.
Activities will be incrementally funded. The award dates reflect the latest incremental portion funds will obligate.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | SS/CPFF | Various : Various | 10.132 | 0.872 | Jul 2014 | 1.300 | Jun 2015 | 1.313 | Jun 2016 | - | | 1.313 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | Various : Various | 5.833 | 0.330 | May 2014 | 0.350 | Mar 2015 | 0.350 | Mar 2016 | - | | 0.350 | Continuing | Continuing | Continuing |
| Travel | WR | NAVSEA HQ : Not Specified | 0.659 | 0.100 | Aug 2014 | 0.100 | Mar 2015 | 0.100 | Apr 2016 | - | | 0.100 | Continuing | Continuing | Continuing |
| Acquisition Workforce | Various | Not Specified : Not Specified | 0.293 | - | | - | | - | | - | | - | - | 0.293 | 0.293 |
| | | **Subtotal** | 16.917 | 1.302 | | 1.750 | | 1.763 | | - | | 1.763 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

Various/VAR is used to group multiple activities with small funding levels.
Activities will be incrementally funded. The award dates reflect the latest incremental portion funds will obligate.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | SS/CPFF | EB : Groton, CT | 11.314 | 0.469 | May 2014 | 0.215 | Jan 2015 | 2.200 | Mar 2016 | - | | 2.200 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | SS/CPFF | Raytheon : Portsmouth, VA | 9.104 | - | | - | | - | | - | | - | - | 9.104 | 9.104 |
| Developmental Test & Evaluation | WR | NAVAIR : Patuxent, MD | 2.593 | - | | - | | - | | - | | - | - | 2.593 | 2.593 |
| Developmental Test & Evaluation | Various | Various : Various | 6.722 | 0.200 | Jul 2014 | 0.465 | Mar 2015 | - | | - | | - | - | 7.387 | 6.372 |
| Developmental Test & Evaluation | WR | NUWC : Newport, RI | 19.258 | 1.625 | May 2014 | - | | 2.000 | Apr 2016 | - | | 2.000 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | NSWC : Carderock, MD | 22.471 | 4.641 | May 2014 | 7.802 | Feb 2015 | 9.263 | Apr 2016 | - | | 9.263 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | SS/CPFF | HII : Newport News, VA | 3.083 | 0.211 | Jun 2014 | 2.500 | Feb 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | SS/CPFF | JHU/ARL : Laurel, MD | 0.505 | 1.300 | Jun 2014 | - | | 2.000 | May 2016 | - | | 2.000 | - | 3.805 | 0.305 |
| Developmental Test & Evaluation | SS/CPFF | ARL/PSU : State College, PA | 0.720 | - | | - | | - | | - | | - | - | 0.720 | 0.720 |
| Developmental Test & Evaluation | WR | NSWC : Dahlgren, VA | 1.320 | - | | - | | - | | - | | - | - | 1.320 | 1.320 |
| | | **Subtotal** | 77.090 | 8.446 | | 10.982 | | 15.463 | | - | | 15.463 | - | - | - |

**Remarks**

Various/VAR is used to group multiple activities with small funding levels.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603561N / *Advanced Submarine System Development* | Project (Number/Name)<br>2033 / *Adv Submarine Systems Development* | |

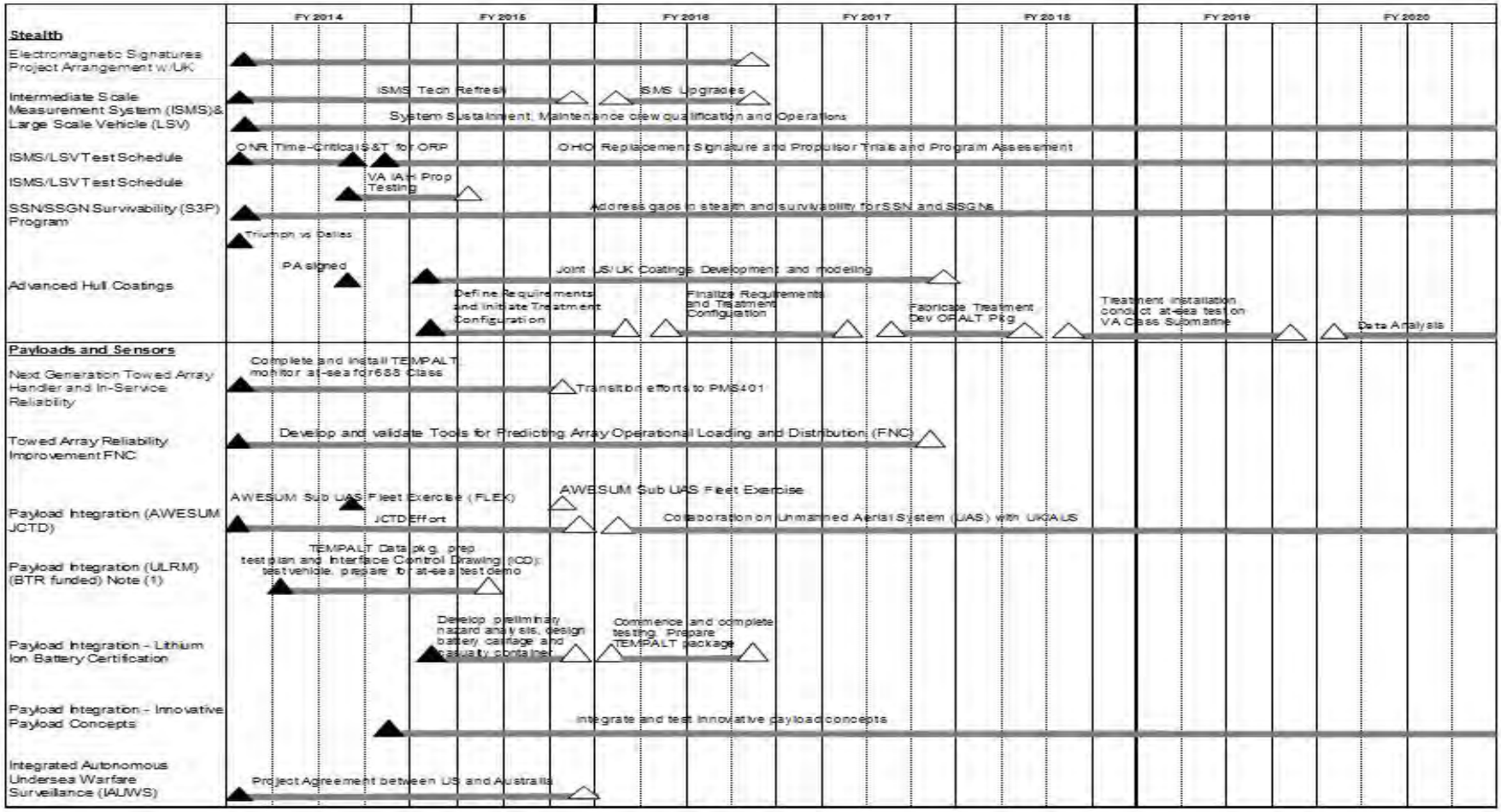
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Activities will be incrementally funded. The award dates reflect the latest incremental portion funds will obligate. | | | | | | | | | | | | | | | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 402.482 | 40.868 | | 32.764 | | 41.968 | | - | | 41.968 | - | - | - |

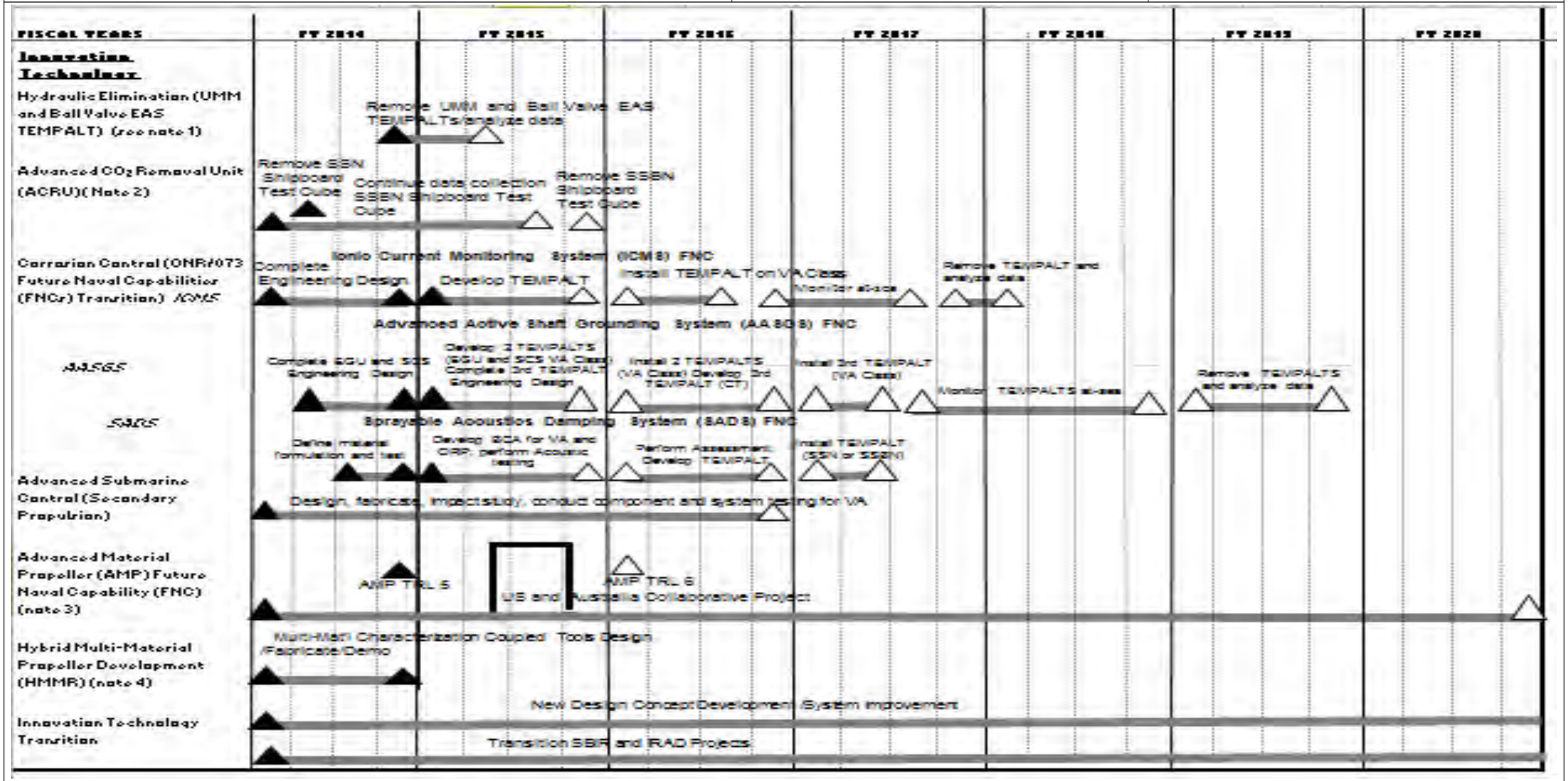
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |




**Note 1**: Funds provided via BTR in FY14. ULRM transfers to Project 2096 in FY16.

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2033*** | | | | |
| Stealth: Electromagnetic Signatures Project Arrangement (PA) w/UK | 1 | 2014 | 4 | 2016 |
| Stealth: Intermediate Scale Measurement System (ISMS)/Large Scale Vehicle (LSV) Tech Refresh | 1 | 2014 | 4 | 2015 |
| Stealth: ISMS/LSV - ISMS Upgrades | 1 | 2016 | 4 | 2016 |
| Stealth: ISMS /LSV Sustainment, Maintenance,Crew Qualification and Operations | 1 | 2014 | 4 | 2020 |
| Stealth: ISMS/LSV Test Schedule - ONR Time Critical S&T for ORP | 1 | 2014 | 3 | 2014 |
| Stealth: ISMS/LSV Test Schedule OHIO Replacement Program Assessment, Signature and Propulsor Trials | 4 | 2014 | 4 | 2020 |
| Stealth: ISMS/LSV Test Schedule VA Blk IV Testing, Improved Advanced Hybrid (IAH) Propulsor | 3 | 2014 | 2 | 2015 |
| Stealth: SSN/SSGN Survivability (S3P) - Triumph v Dallas | 1 | 2014 | 1 | 2014 |
| Stealth: SSN/SSGN Survivability (S3P) - Addresses gaps in Stealth survivability for SSNs and SSGNs | 1 | 2014 | 4 | 2020 |
| Stealth: Advanced Hull Coatings - PA signed | 3 | 2014 | 3 | 2014 |
| Stealth: Advanced Hull Coatings - Joint US/UK Coatings Development and Modeling | 1 | 2015 | 4 | 2017 |
| Stealth: Advanced Hull Coatings - Define Requirements/Initiate Treatment Configuration | 1 | 2015 | 1 | 2016 |
| Stealth: Advanced Hull Coatings - Finalize Requiremtns and Treatment Configuration/ Procure Materials | 2 | 2016 | 2 | 2017 |
| Stealth: Advanced Hull Coatings - Fabricate Treatment/ Dev OPALT Pkg | 3 | 2017 | 2 | 2018 |
| Stealth: Advanced Hull Coatings - Treatment Installatiion/Conduct At-Sea test on VA Class Sub | 3 | 2018 | 4 | 2019 |
| Stealth: Advanced Hull Coatings - Data Analysis | 1 | 2020 | 4 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Payloads and Sensors: TAHS - Complete TEMPALT, install and monitor at-sea for 688 Class | 1 | 2014 | 4 | 2015 |
| Payloads and Sensors: TAHS - Develop and validate Towed Array Predicting Tool FNC | 1 | 2014 | 4 | 2017 |
| Payloads and Sensors: Payload Integration - AWESUM - Sub UAS FLEX | 3 | 2014 | 3 | 2014 |
| Payloads and Sensors: Payload Integration - AWESUM - Sub UAS Fleet Exercise | 4 | 2015 | 4 | 2015 |
| Payloads and Sensors: Payload Integration - AWESUM - Concept Development (JCTD) | 1 | 2014 | 4 | 2015 |
| Payloads and Sensors: Payload Integration - AWESUM - Collaboration on UAS with UK/Australia | 1 | 2016 | 4 | 2020 |
| Payloads and Sensors: Payload Integration - ULRM (BTR) - Update TEMPALT Data pkg, prep Test Plan and ICD, test vehicle, prep for At-Sea Demo | 2 | 2014 | 2 | 2015 |
| Payloads and Sensors: Payload Integration - Lithium Ion Battery Certification - Develop preliminary hazard analysis, design battery carriage and casualty container | 1 | 2015 | 4 | 2015 |
| Payloads and Sensors: Payload Integration - Lithium Ion Battery Certification - Commence and complete testing. Prepare TEMPALT package. | 1 | 2016 | 4 | 2016 |
| Payloads and Sensors: Payload Integration - Innovative Payload Concepts | 4 | 2014 | 4 | 2020 |
| Payloads and Sensors: Integrated Autonomous Undersea Warfare Surveillance (IAUWS) - Project Agreement between US and Australia | 1 | 2014 | 4 | 2015 |
| Innovation Technology Transition/Concept Development: Hydraulic Elimination UMM and Ball Valve EAS TEMPALTs Removal/analyze data (Informs VA Class and ORP) | 4 | 2014 | 2 | 2015 |
| Innovation Technology Transition/Concept Development: Advanced CO2 - Remove SSN Shipboard Test Cube | 2 | 2014 | 2 | 2014 |
| Innovation Technology Transition/Concept Development: Advanced CO2 - Continue Data Collections on the SSBN Shipboard Test Cube | 1 | 2014 | 3 | 2015 |
| Innovation Technology Transition/Concept Development: Remove SSBN Shipboard Test Cube | 4 | 2015 | 4 | 2015 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Innovation Technology Transition/Concept Development: Corrosion Control Ionic Current Monitoring System (ICMS) FNC - Complete Engineering Design | 1 | 2014 | 4 | 2014 |
| Innovation Technology Transition/Concept Development: ICMS - Develop TEMPALT | 1 | 2015 | 4 | 2015 |
| Innovation Technology Transition/Concept Development: ICMS - Install TEMPALT on VA Class | 1 | 2016 | 3 | 2017 |
| Innovation Technology Transition/Concept Development: ICMS - Monitor At-Sea | 4 | 2016 | 3 | 2017 |
| Innovation Technology Transition/Concept Development: ICMS - Remove TEMPALT and analyze data | 4 | 2017 | 1 | 2018 |
| Innovation Technology Transition/Concept Development: Advanced Active Shaft Grounding System (AASGS) FNC - Complete Engineering Design | 2 | 2014 | 4 | 2014 |
| Innovation Technology Transition/Concept Development: AASGS - Develop 2 TEMPALTs (EGU and SCS) VA Class. Complete 3rd TEMPALT Engineering Design | 1 | 2015 | 4 | 2015 |
| Innovation Technology Transition/Concept Development: AASGS - Install 2 TEMPALTs on VA Class and Develop 3rd TEMPALT | 1 | 2016 | 4 | 2016 |
| Innovation Technology Transition/Concept Development: AASGS - Install 3rd TEMPALT on VA Class | 1 | 2017 | 2 | 2017 |
| Innovation Technology Transition/Concept Development: AASGS - Monitor TEMPALTS at-sea | 3 | 2017 | 4 | 2018 |
| Innovation Technology Transition/Concept Development: AASGS - Remove TEMPALTS and analyze data | 1 | 2019 | 4 | 2019 |
| Innovation Technology Transition/Concept Development: Sprayable Acoustics Damping System (SADS) FNC - Define material formulation and test | 3 | 2014 | 4 | 2014 |
| Innovation Technology Transition/Concept Development: SADS - Develop BCA for VA and ORP, perform acoustic testing | 1 | 2015 | 4 | 2015 |
| Innovation Technology Transition/Concept Development: SADS - Perform assessment, develop TEMPALT | 1 | 2016 | 4 | 2016 |
| Innovation Technology Transition/Concept Development: SADS - Install TEMPALT on SSN or SSBN | 1 | 2017 | 2 | 2017 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2033 / *Adv Submarine Systems Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Innovation Technology Transition/Concept Development: Advanced Submarine Control (Secondary Propulsion) - Design, Fab, Conduct Component/System Testing | 1 | 2014 | 4 | 2016 |
| Innovation Technology Transition/Concept Development: AMP TRL -5 | 4 | 2014 | 4 | 2014 |
| Innovation Technology Transition/Concept Development: AMP TRL -6 | 1 | 2016 | 1 | 2016 |
| Innovation Technology Transition/Concept Development: AMP - US and Australia Collaborative Project | 1 | 2014 | 4 | 2020 |
| Innovation Technology Transition/Concept Development: Hybrid Multi-Material Propeller Dev (HMMR) - Characterization Coupled Design Tools/Fabricate/demo | 1 | 2014 | 4 | 2014 |
| Innovation Technology Transition/Concept Development: Innovation Technology Transition - New Design Concept/Dev and System Improvements | 1 | 2014 | 4 | 2020 |
| Innovation Technology Transition/Concept Development: Innovation Technology Transition - Transitions SBIR and IRAD Projects | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603561N / *Advanced Submarine System Development* | Project (Number/Name)<br>2096 / *Payload Delivery Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2096: *Payload Delivery Development* | - | - | - | 3.800 | - | 3.800 | - | - | - | - | - | 3.800 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Project established in FY16. Efforts previously funded under Project 2033.

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

Demonstrate the launch and recovery of large Unmanned Undersea Vehicle (UUV) from an SSGN for a large diameter open ocean interface.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Universal Launch and Recovery Module (ULRM) | - | - | 3.800 | - | 3.800 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** New Project Unit commencing in FY16. Previous efforts were funded under Project 2033 (Payloads and Sensors).<br>***FY 2014 Accomplishments:***<br>Efforts performed under Project 2033.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>Conduct ULRM at-sea demonstration. Commence Tactical Unit design for ULRM.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | - | 3.800 | - | 3.800 |

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

N/A

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2096 / *Payload Delivery Development* |

**D. Acquisition Strategy**

Develop requirements for Tactical Units in order to refine cost estimates.

**E. Performance Metrics**

Conduct successful at-sea test.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603561N / *Advanced Submarine System Development* | Project (Number/Name)<br>2096 / *Payload Delivery Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | WR | NUWC : Newport, RI | 0.000 | - | | - | | 0.100 | Dec 2015 | - | | 0.100 | - | 0.100 | - |
| Product Development | SS/CPFF | Electric Boat : Groton, EB | 0.000 | - | | - | | 0.700 | Dec 2015 | - | | 0.700 | - | 0.700 | - |
| | | **Subtotal** | 0.000 | - | | - | | 0.800 | | - | | 0.800 | - | 0.800 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | C/CPFF | Electric Boat : Groton, CT | 0.000 | - | | - | | 2.800 | Dec 2015 | - | | 2.800 | - | 2.800 | - |
| Test and Evaluation | WR | NUWC : Newport, RI | 0.000 | - | | - | | 0.200 | Dec 2015 | - | | 0.200 | - | 0.200 | - |
| | | **Subtotal** | 0.000 | - | | - | | 3.000 | | - | | 3.000 | - | 3.000 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | - | | 3.800 | | - | | 3.800 | - | 3.800 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2096 / *Payload Delivery Development* |

| | FY 2014 | | | | FY 2015 | | | | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 2096*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Payload Integration - Universal Launch and Recovery Module (ULRM) Conduct at-sea test; commence tactical design | | | | | | | | | [redacted] | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>2096 / *Payload Delivery Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2096*** | | | | |
| Payload Integration - Universal Launch and Recovery Module (ULRM) Conduct at-sea test; commence tactical design | 1 | 2016 | 4 | 2016 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | Date: February 2015 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603561N / *Advanced Submarine System Development* | | | | Project (Number/Name)<br>3220 / *SBSD Advanced Submarine System Development* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 3220: *SBSD Advanced Submarine System Development* | 1,987.193 | 760.134 | - | - | - | - | - | - | - | - | - | 2,747.327 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Note: Beginning in 2015, there is an administrative change that will shift efforts funded from PE 0603561N (SBSD Advanced Submarine System Development) / Project 3220 to PE 0603595N (Ohio Replacement) / Project 3220. This shift is consistent with Congressional intent identified in HR 933 (FY13).

The Sea Based Strategic Deterrent (SBSD) Advanced Submarine System Development project supports the OHIO Replacement (OR) program. The funding applies to the design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for Common Missile Compartment (CMC) design, whole ship design, and component technologies development for the next generation U.S. ballistic missile submarine. This RDT&E program supports cooperation with the United Kingdom (UK) to maintain strategic deterrence, based on a single effort to develop a CMC as agreed by the UK Secretary of State for Defence and the U.S. Secretary of Defense in 2009.

The OHIO Replacement program strategy is to maximize the re-use of existing OHIO systems and new designs from the SEAWOLF and VIRGINIA Classes (as applicable), focus on Life Cycle Total Ownership Cost (TOC) affordability, and meet the military requirements established for this SSBN to achieve mission success in a challenging environment. The requested funding levels provide for the Technology Development, Design, and Engineering Integration efforts necessary to support the OHIO Replacement SSBN lead ship construction start in FY 2021.

The following key activities support a ship acquisition program to replace the OHIO Class SSBNs:

1. Design and development of a missile compartment, launch system, and strategic support systems to meet U.S. strategic requirements while cooperating with the UK on modernizing its strategic deterrent in accordance with Presidential direction (December 2006).
2. Concept and System Definition for remaining portions of the ship will be accomplished through a Design/Build/Sustain approach modeled after the approach used by the VIRGINIA Class program.
3. Engineering and integration of existing technologies and development of new technologies required to provide the capabilities needed to ensure platform operational effectiveness and minimize life cycle cost.

OR Concept and System Definition Prototyping, and Technology Development Efforts:

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

The OR program supports design, systems engineering, prototyping and vendor qualification activities needed to develop CMC design, the OHIO Replacement whole ship design, and component development. The OR design timelines are based on the design approach proven on the VIRGINIA Class Program, adjusted for the additional complexity of a missile compartment and Strategic Weapons Systems (SWS). Planned technical studies and prototyping are necessary to reduce risks associated with updating SSBN system designs for current technical standards and demonstrating design feasibility of developmental technology to meet the ship design and construction schedule.

The Navy continues investing in program funded affordability initiatives similar to those employed successfully for VIRGINIA Class, but tailored to the unique SSBN mission and operational tempo of OHIO Replacement to drive down overall program costs. Efforts will focus on reducing ship construction costs through implementing more effective design features to produce a more affordable/producible class. As part of this effort, alternative contracting strategies will be examined to include multi-class multiyear procurement (MYP) and economic order quantity (EOQ).

Activities are being executed to ensure the first article quad pack prototype of the CMC is on schedule to support the UK SUCCESSOR Programme. The CMC program will mature required technologies and re-host the TRIDENT II D5 SWS (Launcher, Fire Control and Navigation) while ensuring no degradation to D5 security, safety and performance. In addition, whole ship design efforts are focused on technologies requiring significant engineering, integration and development time and those technologies that are required to support ship design and construction schedules such as the propulsor, maneuvering/ship control and signatures. These technologies are critical for stealth capability for a ship class that will be in service until the 2080s. Ship concept design efforts include important pre-construction activities such as finalizing ship requirements, risk characterization and mitigation, improvement and validation of performance prediction tools and improvement of design tools. Technology development will address engineering and integration of existing technologies as well as maturation of developmental technologies.
Note: Beginning in 2015, there is an administrative change that will shift efforts funded from PE 0603561N (SBSD Advanced Submarine System Development) / Project 3220 to PE 0603595N (Ohio Replacement) / Project 3220. This shift is consistent with Congressional intent identified in HR 933 (FY13).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** CMC Design and Prototyping | 262.623 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued efforts for the design and development of the CMC to include: Completion of CMC System Descriptions, completion of 100 percent of CMC engineered components procurement specifications, approximately 70 percent of Diagrams, 20 percent of the Arrangements and 5 percent of Design Disclosures for the CMC according to schedule. Provided ongoing verification and validation efforts for missile tube to quad pack production techniques. Maintained design and prototyping efforts and placed contract actions for LLTM | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| to support CMC fixture manufacturing to enable proving CMC modular construction efficiencies. Continued system engineering efforts to complete definition of the required CMC testing during the build cycle and finalized planning activities for CMC test facility development. Completed additional competitive development and testing of missile tube to keel robotic welding techniques that support process certification necessary for the Integrated Tube and Hull (ITH) manufacturing technique. Completed validation of multiple vendors for integrated tube and hull manufacturing. Design and System Developments have matured to enable the placement of contract actions for competitive procurement of material to support development of prototype first article missile tubes. Received approvals for CMC Safety Requirements Hazard Analysis (SRHAs).<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Ship Study and Design | 101.205 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Major FY2014 accomplishments include setting Ship length in January 2014 and signing 159 sections of the Ship Specification in March 2014. Continued with preliminary design of forward and aft ends of OHIO Replacement including Rest of Ship system integration, on schedule completion of 38 percent of engineered component procurement specification development, 80 percent of System Diagrams, commencement of Ship Arrangements, and Design Disclosures, and control surface design. Completed non-shipboard prototype design and continued Integrated Product Development Environment (IPDE) design tool process validation. Ensured coordination of the Common Missile Compartment (CMC) interfaces with the Rest of Ship design efforts.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** NAVSEA R&D and Prototyping | 107.603 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Finalized Generation 1 propulsor designs for OHIO Replacement. Finalized requirements for Large Scale Vehicle (LSV) modifications and commenced fabrication of Generation 1 Propulsor LSV test asset hardware. Initialized full scale bearing test rig evaluation using VIRGINIA Class (VCS) sized components. Continued control surface design. Conducted full scale low voltage anode simulations to support developing the cathodic protection system preliminary design. Began Phase I of the Concept of Operations Experiment (COOPEX) to support Hovering and Missile Compensation Control System (HMCCS) and Ship Control System (SCS) Designs. Equipped surrogate full scale test platform to support stern design. Continued development of approximately 50 engineered components and supported ship requirements refinement. Continued development and delivery of preliminary GFI for Non-Propulsion Electronics Systems (NPES) needed to support Rest of Ship design development.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Strategic Weapons Systems Integration | 171.433 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued system engineering efforts required for the re-hosting and integration of the TRIDENT II (D5) SWS on the OHIO Replacement submarine; including review and modification of SWS Coordination, Interface and Arrangement Drawings for SWS equipment within the CMC and MCCM, SWS system and subsystem preliminary design, and Hardware and Software requirements development. Continued SWS Test Systems material procurement and builds, test berth / facility modifications and development of special test vehicles. Continued development of SWS Ashore test capability and SWS training capability / requirements. Commence build of Fire Control Engineering Test Systems. Continued design efforts for the development of a missile launch | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| tube test capability and test stand including refurbishment of a test vehicle to support launch system prototype efforts and evaluation / qualification program. Initiated design and development efforts for shipboard SWS Navigation. Initiated systems engineering design efforts related to the OHIO Replacement guidance handling carts. Material procurement for underwater launch risk mitigation testing.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Systems Engineering/Program Management | 67.270 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued to provide technical and programmatic oversight including Program Office management and technical support from government laboratories for review, analysis and approval of lead design yard and various government performer's design deliverables. Continued maintenance planning and design for sustainment activities. Updated the Ohio Replacement Capabilities Development Document (CDD) and its derivative documents in preparation for submission to and approval by the Joint Requirements Oversight Counsel (JROC). Continued the functional allocation of platform level requirements as informed by the CDD to ship systems and components to support the maturation of the ship's design documents. Identification and assessment of platform, shore facilities, and infrastructure characteristics to identify improvement opportunities to positively impact program costs.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Design for Affordability | 50.000 | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued execution of the DFA program including design yard cost reduction initiatives in order to drive down overall program costs across design, construction and Operations and Support (O&S). The Lead Design Yard has met the R&D Design Contract affordability incentives ahead of schedule for Non-Recurring Engineering, Recurring Construction, and Operations and Support (O&S) cost reductions ahead of schedule. Through May 2014, the OHIO Replacement shipbuilder NRE costs have been reduced by over $800M (Then Year (TY) Dollars) on a schedule to meet NRE cost targets. Additionally, efforts have resulted in a 12-ship class cost reduction of over $500M (Constant Year (CY) 2010 Dollars) in construction and over $130M (CY 2010 Dollars) in operating and support (O&S). Achieving these cost reductions in the design phase of the program does not result in a near term budget reduction as the current budget is constrained to aggressive should cost targets. Rather, the program continues to invest in successful cost reduction initiatives to reduce long term budget requirements. Specific initiatives include robotic welding, Integrated Product Development Environment (IPDE) process development, and material reuse. Continued program affordability incentive efforts are targeted to achieving potential savings associated with multi-year and/or Economic Order Quantity (EOQ) procurements across submarine classes, investigating the government vs. contractor furnished equipment mix for potential efficiencies, and potential savings associated with continuous missile tube and/or launch tube production runs. Affordability efforts continue to be inherent in the entire OHIO Replacement design.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 760.134 | - | - | - | - |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/3219: *SBSD Nuclear Technology Development* | 296.050 | 369.964 | 422.661 | - | 422.661 | 411.598 | 401.698 | 291.302 | 278.600 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/3220: *(U) OHIO Replacement* | - | 812.807 | 977.034 | - | 977.034 | 718.185 | 771.442 | 488.712 | 209.178 | Continuing | Continuing |
| • SCN/1045: *OHIO Replacement Submarine* | - | - | - | - | - | 777.793 | 791.793 | 2,771.344 | 1,316.280 | Continuing | Continuing |
| • RDTEN/3237: *ORP Launch Test Facility* | - | 36.470 | - | - | - | - | - | - | - | - | 36.470 |

**Remarks**

**D. Acquisition Strategy**

The common missile compartment will be designed and developed to support the U.S. and UK in development of the OHIO Replacement and SUCCESSOR SSBN programs enabling a common U.S.-UK CMC and maximizing the benefit of the ongoing U.S.-UK partnership in strategic deterrence. The OHIO Replacement R&D efforts will incentivize cost reduction initiatives in the design, construction and operations & support portions of the program. R&D efforts will be performed by Navy laboratories, shipyards, private industry, and University Affiliated Research Centers.

**E. Performance Metrics**

Updated Integrated Master Schedule and CMC build strategy down-select. Development of signature management efforts to address knowledge gap, concepts for propulsor and shafting, and design guidance and interface control requirements.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603561N / *Advanced Submarine System Development* | Project (Number/Name)<br>3220 / *SBSD Advanced Submarine System Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | SS/CPFF | Ship Design Contractor-EB : Groton, CT | 1,118.555 | 458.977 | Dec 2013 | - | | - | | - | | - | - | 1,577.532 | - |
| Product Development | WR | NSWC : Carderock, MD | 230.394 | 64.751 | Dec 2013 | - | | - | | - | | - | - | 295.145 | - |
| Product Development | SS/CPFF | ARL Penn State University : State College, PA | 3.575 | 0.370 | Dec 2013 | - | | - | | - | | - | - | 3.945 | - |
| Product Development | SS/CPFF | NGMS : Sunnyvale, CA | 109.253 | 40.056 | Dec 2013 | - | | - | | - | | - | - | 149.309 | - |
| Product Development | WR | NUWC : Newport, RI | 47.363 | 25.943 | Dec 2013 | - | | - | | - | | - | - | 73.306 | - |
| Product Development | SS/CPFF | JHU/APL : Laurel, MD | 19.451 | 5.787 | Dec 2013 | - | | - | | - | | - | - | 25.238 | - |
| Product Development | SS/CPFF | Draper Labs : Cambridge, MA | 8.197 | 3.365 | Dec 2013 | - | | - | | - | | - | - | 11.562 | - |
| Product Development | SS/CPFF | LMFS : Mitchel Field, NY | 22.464 | 12.607 | Dec 2013 | - | | - | | - | | - | - | 35.071 | - |
| Product Development | Various | NSWC : Corona, CA | 0.000 | 0.224 | Dec 2013 | - | | - | | - | | - | - | 0.224 | - |
| Product Development | Various | NAVSEA : Various | 46.508 | 17.969 | Dec 2013 | - | | - | | - | | - | - | 64.477 | - |
| Product Development | Various | EMCUBE : Alexandria, VA | 0.000 | 0.667 | Dec 2013 | - | | - | | - | | - | - | 0.667 | - |
| Product Development | Various | JRC : Washington, DC | 0.000 | 0.928 | Dec 2013 | - | | - | | - | | - | - | 0.928 | - |
| Product Development | WR | NOTU : Port Canaveral, FL | 4.400 | - | Dec 2013 | - | | - | | - | | - | - | 4.400 | - |
| Product Development | SS/CPFF | LMMSC : Sunnyvale, CA | 73.454 | 30.866 | Dec 2013 | - | | - | | - | | - | - | 104.320 | - |
| Product Development | C/CPFF | GDAIS : Pittsfield, MA | 82.006 | 33.556 | Dec 2013 | - | | - | | - | | - | - | 115.562 | - |
| Product Development | SS/CPFF | IEC : Anaheim, CA | 7.555 | 1.056 | Dec 2013 | - | | - | | - | | - | - | 8.611 | - |
| Product Development | WR | NSWC : Dahlgren, VA | 9.927 | 6.575 | Dec 2013 | - | | - | | - | | - | - | 16.502 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | SS/CPFF | BAE : Rockville, MD | 31.844 | 7.837 | Dec 2013 | - | | - | | - | | - | - | 39.681 | - |
| Product Development | SS/CPFF | BNA : Huntington Beach, CA | 7.698 | 1.453 | Dec 2013 | - | | - | | - | | - | - | 9.151 | - |
| Product Development | WR | NSWC Crane : Crane, IN | 23.069 | 13.317 | Dec 2013 | - | | - | | - | | - | - | 36.386 | - |
| Product Development | WR | NWC CL : China Lake, CA | 25.109 | 6.593 | Dec 2013 | - | | - | | - | | - | - | 31.702 | - |
| Product Development | SS/CPFF | SPA : Alexandria, VA | 9.774 | 3.402 | Dec 2013 | - | | - | | - | | - | - | 13.176 | - |
| Product Development | Various | SSP : Various | 24.857 | 2.774 | Dec 2013 | - | | - | | - | | - | - | 27.631 | - |
| | | **Subtotal** | 1,905.453 | 739.073 | | - | | - | | - | | - | - | 2,644.526 | - |

**Remarks**

Note: Various is used for multiple activities with different award dates

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Test and Evaluation Support | C/CPFF | T&E Support : Various | 1.155 | - | | - | | - | | - | | - | - | 1.155 | - |
| Government Test and Evaluation Support | WR | T&E Support : Various | 6.751 | - | | - | | - | | - | | - | - | 6.751 | - |
| | | **Subtotal** | 7.906 | - | | - | | - | | - | | - | - | 7.906 | - |

**Remarks**

Note: Various is used for multiple activities with different award dates. Contractor Test & Evaluation Support cost category item funds will be sent to Shipbuilder and Support Contractors to be determined. Government Test and Evaluation Support cost category item funds will be sent to several Navy activities to be determined.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Management Support | C/CPFF | Various : Multiple Awards | 35.391 | 9.391 | Nov 2013 | - | | - | | - | | - | - | 44.782 | - |
| Government Management Support | WR | Various : NSWC Carderock, MD | 37.091 | 11.170 | Nov 2013 | - | | - | | - | | - | - | 48.261 | - |
| Travel | WR | NAVSEA HQ : Washington, D.C. | 1.352 | 0.500 | Dec 2013 | - | | - | | - | | - | - | 1.852 | - |
| | | **Subtotal** | 73.834 | 21.061 | | - | | - | | - | | - | - | 94.895 | - |

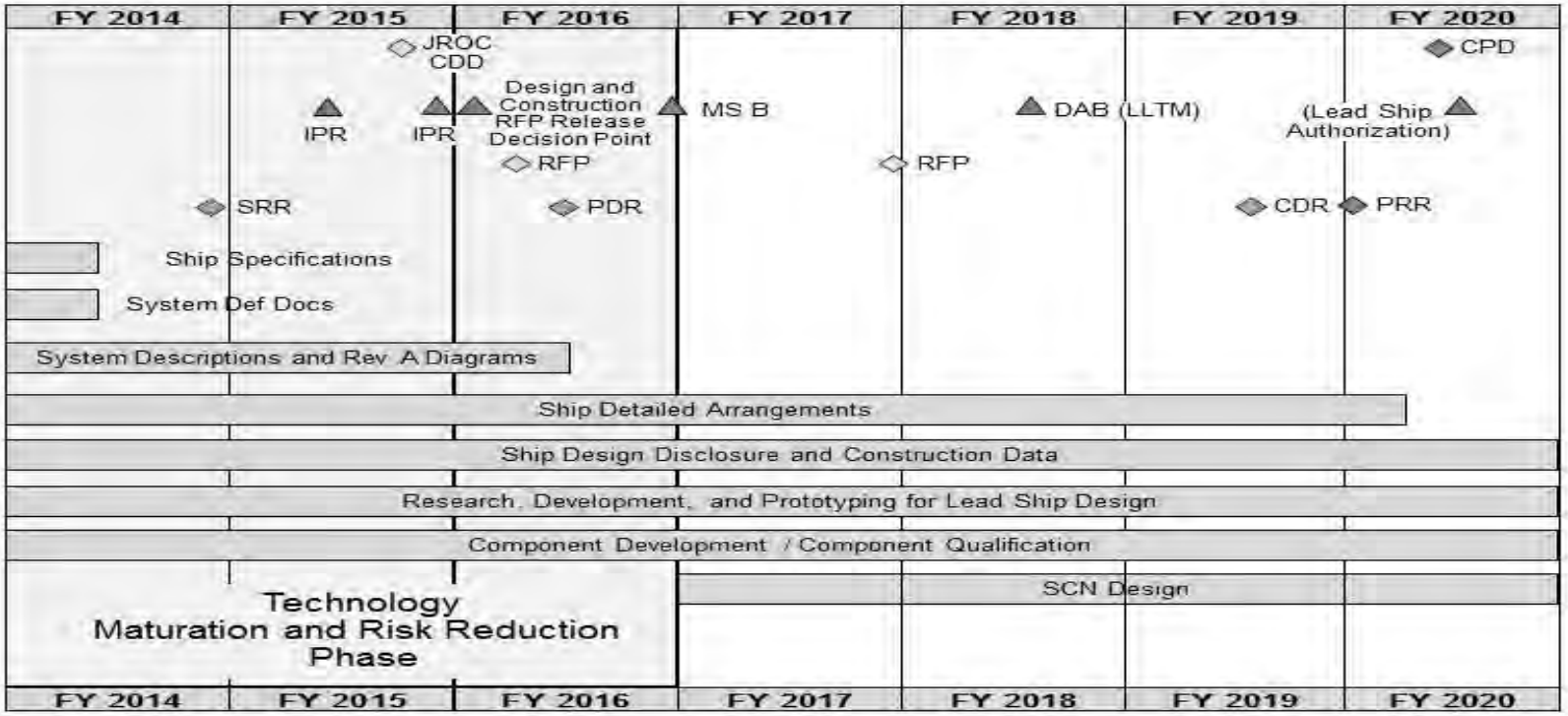
**Remarks**

Note: Various is used for multiple activities with different award dates

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,987.193 | 760.134 | | - | | - | | - | | - | - | 2,747.327 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |




CDD - Capabilities Development Document
CDR - Critical Design Review
CPD - Capability Production Document
DAB - Defense Acquisition Board
IPR - In Progress Review
JROC - Joint Requirements Oversight Council
LLTM - Long Lead Time Material
MS - Milestone
PDR - Preliminary Design Review
PRR – Production Readiness Review
RDT&E - Research, Development, Test, & Evaluation
RFP - Request for Proposal
SCN – Shipbuilding and Conversion, Navy
SRR - System Requirements Review

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603561N / *Advanced Submarine System Development* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Notes: * Effort began prior to 1st Quarter FY 2014. ** Effort continues past 4th Quarter FY 2020.*** | | | | |
| Ship Specifications* | 1 | 2014 | 2 | 2014 |
| System Definition Documents* | 1 | 2014 | 2 | 2014 |
| System Descriptions and REV A Diagrams* | 1 | 2014 | 2 | 2016 |
| Ship Detailed Arrangements* | 1 | 2014 | 1 | 2020 |
| Ship Design Disclosure and Construction Data* | 1 | 2014 | 4 | 2020 |
| Research Development and Prototyping for Lead Ship*,** | 1 | 2014 | 4 | 2020 |
| Component Development/Component Qualification*,** | 1 | 2014 | 4 | 2020 |
| SCN Design** | 1 | 2017 | 4 | 2020 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603562N *I Submarine Tactical Warfare Sys* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 53.946 | 8.675 | 8.044 | 10.371 | - | 10.371 | 9.958 | 10.270 | 9.550 | 11.578 | Continuing | Continuing |
| 0770: *Adv Sub Supp Equip Prog* | 13.054 | 3.807 | 3.343 | 4.103 | - | 4.103 | 4.052 | 4.161 | 4.415 | 4.733 | Continuing | Continuing |
| 1739: *Submarine Arctic W/F Development* | 40.892 | 4.868 | 4.701 | 6.268 | - | 6.268 | 5.906 | 6.109 | 5.135 | 6.845 | Continuing | Continuing |

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

The Submarine Tactical Warfare Systems program element is comprised of the Advanced Submarine Support Equipment Program (ASSEP) and the Submarine Special Operations Support Program. The objective is to improve submarine operational effectiveness through the development and implementation of advanced Research and Development (R&D). In order to provide improved operational effectiveness, R&D efforts are focused on Advanced Imaging Developments and Advanced Electronic Warfare Support (ES) Developments. A continuing need exists to improve these capabilities in view of the advancements in potential imaging counter detection, the need to support specialized missions, and the increasingly dense and sophisticated electronic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Ongoing developments in 360 degree imaging systems and electro-optic infra-red vulnerability signature reduction technologies are supporting these needs.

The Submarine Arctic Warfare Development program responds to the increased threat of naval activity in the Arctic regions while continuously supporting the Navy's strategic objective of Assured Access and Combat Credibility. The U.S. Navy Submarine Force (SUBFOR) demonstrates existing Arctic Warfare capabilities, operational and tactical proficiency while developing advanced submarine research and development technology in unique cold water environments, under-ice conditions, and ice-covered shallow water regions during Ice Exercises (ICEX). ICEXs are conducted biannually and require up front comprehensive planning and work-up training, as well as post exercise analysis and reporting. ICEX provides the framework for various submarine research and development programs to conduct test and evaluation in Arctic regions or at periodic Ice Camps. Particular emphasis is placed on the areas of sonar operability, tactical surveillance, weapon utility, and other submarine support missions. Efforts include assessment of combat system effectiveness, development of Arctic specific improvements for existing sonar and weapons, development of class specific Arctic operational guidelines, and the testing of ice-capable submarine support structures. This program also provides SUBFOR a cadre of trained Arctic Operation Specialists (AOS) and an inventory of unique Arctic sensors to optimize submarine safety during under-ice operations.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | R-1 Program Element (Number/Name)<br>PE 0603562N *I Submarine Tactical Warfare Sys* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | 8.764 | 8.044 | 8.896 | - | 8.896 |
| Current President's Budget | 8.675 | 8.044 | 10.371 | - | 10.371 |
| Total Adjustments | -0.089 | - | 1.475 | - | 1.475 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.089 | - | | | |
| • Program Adjustments | - | - | 1.531 | - | 1.531 |
| • Rate/Misc Adjustments | - | - | -0.056 | - | -0.056 |

**Change Summary Explanation**

Cost/Funding:

Project 1739: FY 2016 funding was added ($+1.500M) under 'Program Adjustments' to reflect the rephasing of Submarine Arctic Warfare Development program Ice Exercises (ICEXs) and Ice Camps from being conducted every three (3) years to every two (2) years in accordance with Department requirements.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603562N / *Submarine Tactical Warfare Sys* | Project (Number/Name)<br>0770 / *Adv Sub Supp Equip Prog* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0770: *Adv Sub Supp Equip Prog* | 13.054 | 3.807 | 3.343 | 4.103 | - | 4.103 | 4.052 | 4.161 | 4.415 | 4.733 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

A continuing need exists to improve Imaging and Electronic Warfare support (EW) capabilities in view of the advancements in potential imaging counter detection and the increasingly dense electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine EW and Imaging to be operationally effective in the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare, Intelligence Collection, Maritime Protection, and Joint Strike. The program is divided into two project categories: Advanced Imaging Project Development and Advanced Electronic Warfare Support Project Development. Both of these categories will allow for the mitigation of submarine masts, periscopes, and sensors to visual, radar, and infrared detection. Evaluation of state of the art technology to implement periscope/mast improvements via EW electromagnetic and electro-optic sensors results in improved capability. Engineering Demonstration Models (EDMs) are developed, evaluated, and validated in the lab and through at-sea testing.

The Advanced Imaging Project Development projects include the development of the Affordable Modular Panoramic Photonics Mast (AMPPM) which introduces several groundbreaking technologies such as individually replaceable capability modules (allowing a vast array of capability combinations without requiring redesign) as well as presenting live 360 degree High Definition video (greatly increasing situational awareness and reducing scope exposure time.) Also in support of the Advance Imaging Project Development are; Electro-Optic/Infrared (EO/IR) Vulnerability Signature Reduction, Automatic Aircraft Cueing, RF Vulnerability Reduction (RAS), Mast Test Vehicle (MTV) testing, Imaging Engineering Measurement Program, and a Project Arrangement (PA) with Australia covering Electromagnetic Spectrum Sensor System Simulation & Development for model-based mission planning and a Coalition Warfare Program (CWP) covering periscope vulnerability. The Advanced EW Development projects include the development of: Radar Vulnerability Tool, Enhanced DeInterleavers, Electronic Support (ES) Correlator, Low Probability of Intercept (LPI) Direction Finding (DF), High Speed Network, Embedded Built-in Test (BIT), EW on-Board Trainer (OBT), Multi-function Modular Mast (MMM) Payloads and Next Generation EW Systems Algorithms and Applications. OPNAV direction provided for Next Generation EW in reference dated 17 June 12, SER N97/12U144401.

All programs funded in this project are non-Acquisition Category (ACAT) programs. The test articles identified consist of critical components that will be fully developed during Engineering Manufacturing and Development phase into EDMs.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Advanced Imaging Project Development | 2.038 | 2.047 | 2.280 | - | 2.280 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>LPPM Lab Test/Sell Off | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| 360 Degree Imaging (ONR) Development, AMPPM - Lab Testing SWIR and Hyperspectral<br>Universal Mast Controller S/W & H/W Development/Test, EDM# 3 Delivery<br>Electro-Optic/Infrared Vulnerability Signature Reduction Development / At-Sea Test<br>Radio Frequency over Fiber (RFoF) Lab Testing<br>Covert Electronic Support Measures (ESM) FDR<br>Automatic Aircraft Cueing Development<br>***FY 2015 Plans:***<br>360 Imaging (ONR) - AMPPM - FNC Lab Demo<br>360 Imaging (ONR) - AMPPM - FNC Pierside Testing<br>Low Profile Photonics Mast At-sea Test<br>RFoF Lab Demo At Sea Test<br>Covert ESM Lab Testing<br>Covert ESM At Sea Test<br>Automatic Aircraft Cueing Continued Development<br>GPS Denied Navigation Development<br>Submarine METOC Development<br>PA Electromagnetic Spectrum Sensor System Simulation - Development<br>CWP Periscope Vulnerability - Development<br>***FY 2016 Base Plans:***<br>RF Vulnerability Reduction (RAS) - Lab Test<br>Automatic Aircraft Cueing - Lab Test<br>GPS Denied Navigation Continued Development<br>Submarine METOC Continued Development<br>CWP Periscope Vulnerability - Lab Test<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Advanced Electronic Warfare Support (EW) Project Development | 1.769 | 1.296 | 1.823 | - | 1.823 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Electronic Support (ES) Vulnerability Tool / Tactical Decision Aid Lab Demo<br>Enhanced DeInterleavers SBIR Lab Demo/Development | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| LPI DF / Localization Development<br>Embedded Built-in Test (BIT) Development/Lab Demo<br>ES Server (Valkyrie) Development | | | | | |
| ***FY 2015 Plans:***<br>ES Vulnerability Tool / Tactical Decision Aid Lab Demo/Transition to EW<br>ES Server (Valkyrie) Lab Demo / Transition to EW<br>Enhanced DeInterleavers Lab Demo #1<br>LPI DF / Localization Continued Development<br>Embedded Built-in Test (BIT) Transition to EW<br>Submarine EW Digital DF Development<br>Hunan Machine Interface (HMI) Development | | | | | |
| ***FY 2016 Base Plans:***<br>Enhanced DeInterleavers Lab Demo #2<br>LPI DF / Localization Lab Test<br>MMM Payload Coherent Electronic Attack for Submarines (CEAS) Development<br>High Speed Network Development / Lab Testing<br>Submarine EW Digital DF Continued Development<br>Hunan Machine Interface (HMI) Continued Development | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.807 | 3.343 | 4.103 | - | 4.103 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

This project optimizes technology insertion using a build-test-build approach to support EW and Imaging operational needs. Operational needs have been based on the tactical requirements identified in CNO letters, Serial N77/3U629212, dated 04 Sep 03, CNO ltr Ser N772/5U936037 dtd 13 JUN 2005, CNO ltr Ser N776/4U786103 dtd 1 APR 2004, COMSUBLANT/ COMSUBPAC, Virginia Class SSN Operational Requirements Documentation objectives, ORD for Photonics (ORD #365-87-94) [dtd JUL 1994], Operational Requirements Document (ORD) for ES (ORD # 570-77-00) [dtd 20 DEC 2000], ORD for ISIS (ORD #663-77-05) [dtd MAR 2005], Capability

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

Development Document (CDD) for Submarine EW Systems (Ver-DRAFT), Common Submarine Imaging System (CSIS) (CDD# 849-87-11) dtd 22 Dec 2011 for Submarine Imaging Systems and JOINT COMMAND SUBMARINE FORCE/COMMANDER SUBMARINE FORCE ltr Ser# N00/00621 dtd 24 Oct 2011. Project efforts develop submarine unique improvements to mast, periscope, and EW electromagnetic spectrum and electro-optic sensors based on emerging technologies that are available from DoD Exploratory Development Programs, industry Independent Research and Development, and other sources. Engineering Demonstration Models (EDMs) will be developed to provide a realistic method of evaluating the improvements, including deployment on submarines for testing.

**E. Performance Metrics**

The 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 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NUWC : RI | 9.696 | 2.213 | Nov 2013 | 2.266 | Oct 2014 | 3.318 | Oct 2015 | - | | 3.318 | Continuing | Continuing | Continuing |
| Systems Engineering | SS/FFP | JHU/ARL : MD | 0.918 | 0.178 | Jul 2014 | - | Dec 2014 | 0.183 | Jul 2016 | - | | 0.183 | Continuing | Continuing | Continuing |
| Primary Hardware Development | WR | NSWC Philadelphia : PA | 0.367 | 0.263 | Mar 2014 | - | Nov 2014 | - | Nov 2015 | - | | - | - | 0.630 | - |
| Primary Hardware Development | C/CPFF | 3 Phoenix : VA | 1.641 | 0.188 | Apr 2014 | 0.289 | Dec 2014 | - | | - | | - | - | 2.118 | - |
| Primary Software Deveopment | WR | SSC PAC : CA | 0.000 | 0.310 | May 2014 | 0.410 | Oct 2014 | 0.421 | Oct 2015 | - | | 0.421 | - | 1.141 | - |
| Primary Software Development | C/CPFF | Reserach Associates of Syracuse : NY | 0.000 | 0.173 | Sep 2014 | 0.032 | Dec 2014 | - | | - | | - | - | 0.205 | - |
| Primary Hardware Development | C/CPFF | Northrop Grumman : VA | 0.000 | 0.186 | Apr 2014 | 0.318 | Dec 2014 | - | | - | | - | - | 0.504 | - |
| Primary Hardware Development | C/CPFF | SEACORP : RI | 0.000 | 0.267 | Sep 2014 | - | | - | | - | | - | - | 0.267 | - |
| Primary Software and Hardware Development | C/CPFF | Accipiter : PA | 0.000 | - | | - | | 0.153 | Mar 2016 | - | | 0.153 | - | 0.153 | - |
| | | **Subtotal** | 12.622 | 3.778 | | 3.315 | | 4.075 | | - | | 4.075 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Technical Services | C/CPAF | Booz Allen & Hamilton : McLean, VA | 0.216 | - | Feb 2014 | - | Feb 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.216 | - | | - | | - | | - | | - | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

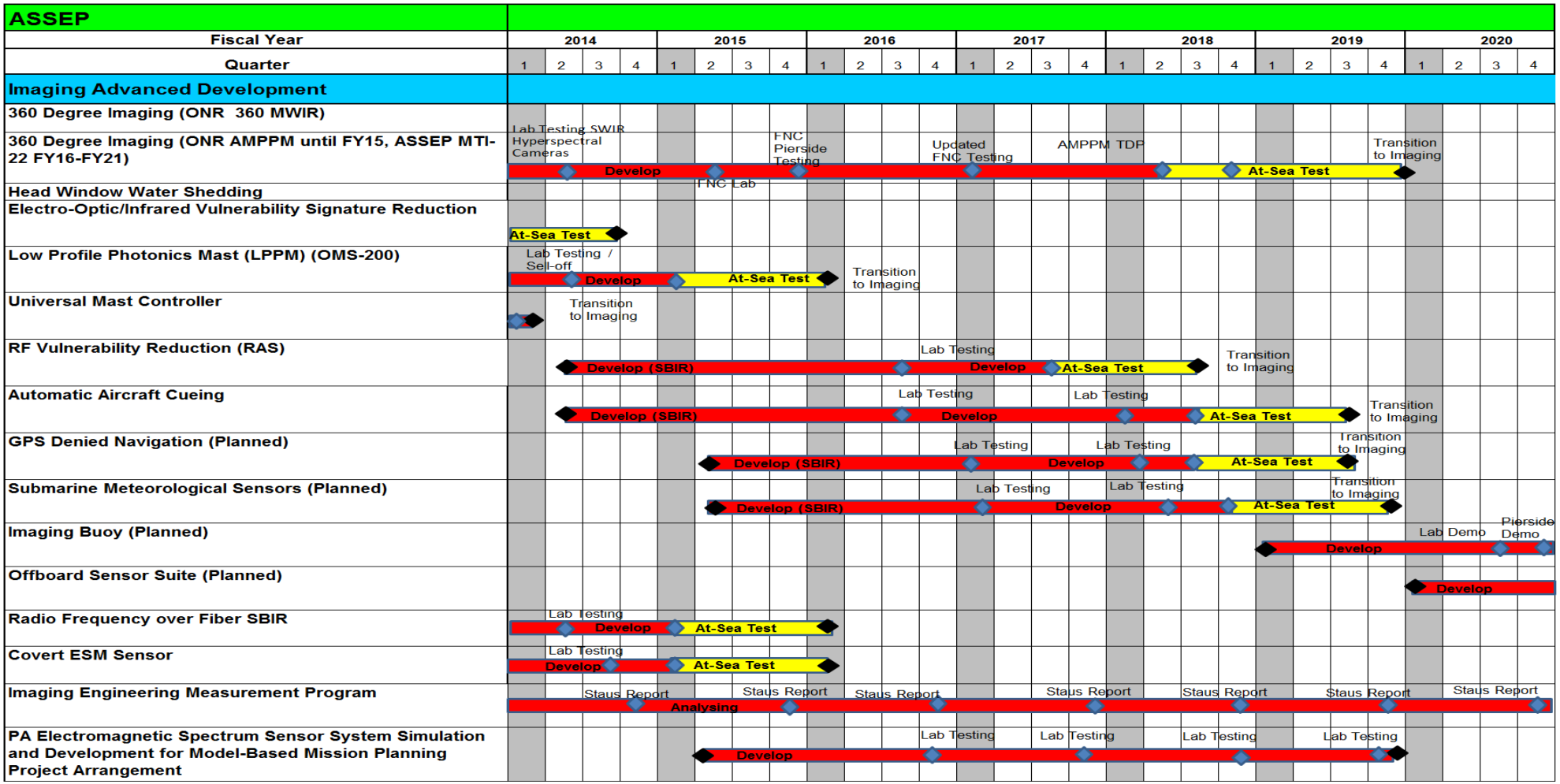
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | NAVSEA : WNY | 0.216 | 0.029 | Oct 2013 | 0.028 | Oct 2014 | 0.028 | Oct 2015 | - | | 0.028 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.216 | 0.029 | | 0.028 | | 0.028 | | - | | 0.028 | - | - | - |

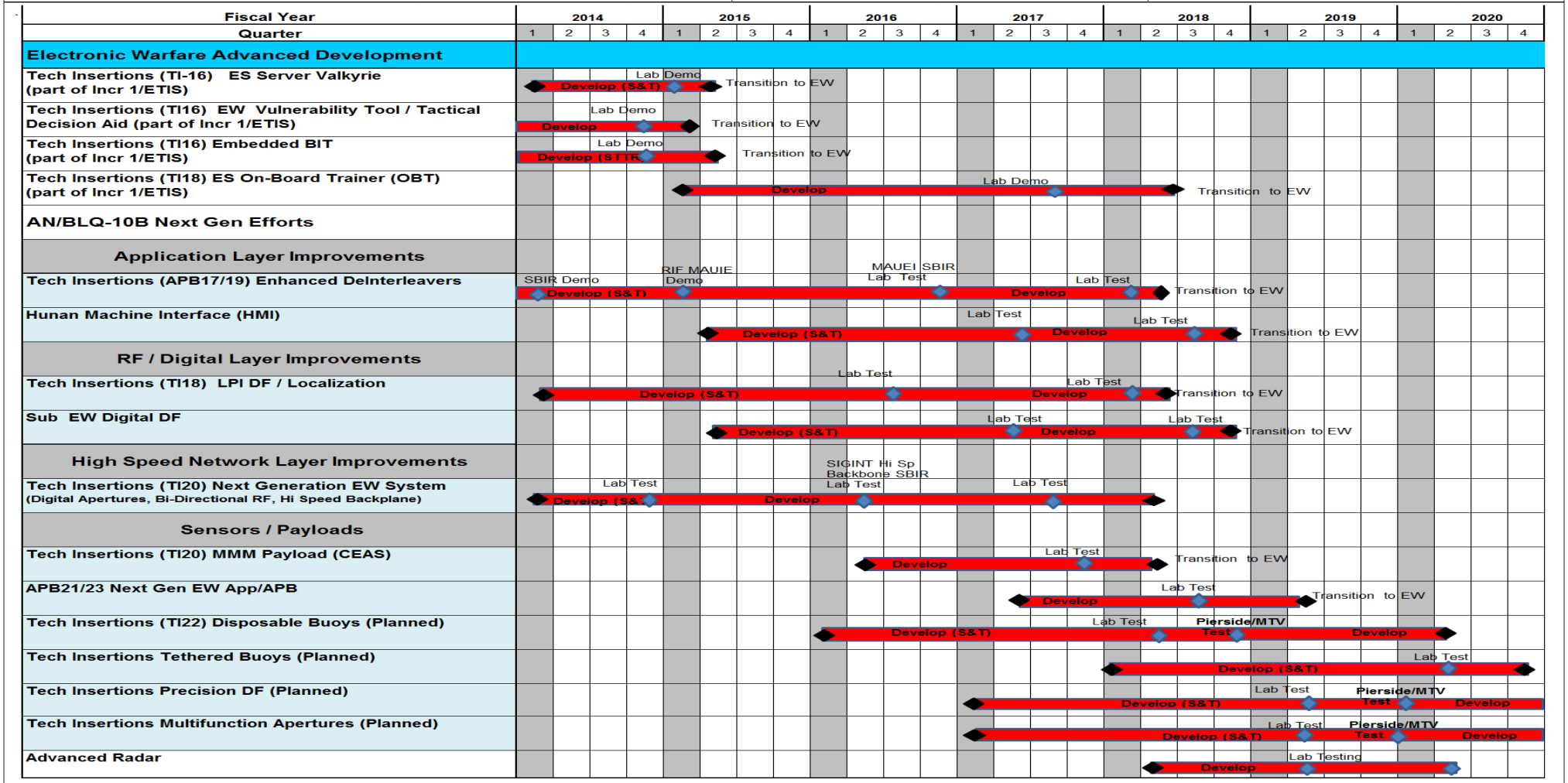
| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 13.054 | 3.807 | | 3.343 | | 4.103 | | - | | 4.103 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0770*** | | | | |
| Imaging Advanced Development: 360 Degree Imaging (ONR) | 1 | 2014 | 2 | 2018 |
| Imaging Advanced Development: 360 Degree Imaging (ONR) - AMPPM - Lab Testing SWIR | 2 | 2014 | 2 | 2014 |
| Imaging Advanced Development: 360 Degree Imaging (ONR) - AMPPM - Hyperspectral Lab Test | 2 | 2014 | 2 | 2014 |
| Imaging Advanced Development: 360 Degree Imaging (ONR) - AMPPM - FNC Lab Demo | 2 | 2015 | 2 | 2015 |
| Imaging Advanced Development: 360 Degree Imaging (ONR) - AMPPM - FNCPierside Testing | 4 | 2015 | 4 | 2015 |
| Imaging Advanced Development: 360 Degree Imaging (ONR) - AMPPM - Updated FNC Testing | 1 | 2017 | 1 | 2017 |
| Imaging Advanced Development: 360 Degree Imaging (ONR) - AMPPM - AMPPM TDP | 2 | 2018 | 2 | 2018 |
| Imaging Advanced Development: 360 Degree Imaging (ONR) - AMPPM - At-Sea Test | 2 | 2018 | 4 | 2019 |
| Imaging Advanced Development: 360 Degree Imaging (ONR) - AMPPM - Transition to Imaging | 4 | 2019 | 4 | 2019 |
| Imaging Advanced Development: EO/IR Vulnerability Signature Reduction - At-Sea Test | 1 | 2014 | 3 | 2014 |
| Imaging Advanced Development: Low Profile Photonics Mast - Development | 1 | 2014 | 1 | 2015 |
| Imaging Advanced Development: Low Profile Photonics Mast - Lab Testing/Sell-off | 4 | 2014 | 4 | 2014 |
| Imaging Advanced Development: Low Profile Photonics Mast - At-Sea Test | 1 | 2015 | 1 | 2016 |
| Imaging Advanced Development: Low Profile Photonics Mast - Transition to Imaging | 1 | 2016 | 1 | 2016 |
| Imaging Advanced Development: UMC #3 Delivery | 1 | 2014 | 1 | 2014 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Imaging Advanced Development: UMC Transition to Imaging | 1 | 2014 | 1 | 2014 |
| Imaging Advanced Development: RF Vulnerability Reduction (RAS) Development | 2 | 2014 | 3 | 2017 |
| Imaging Advanced Development: RF Vulnerability Reduction (RAS) Lab Testing | 3 | 2016 | 3 | 2016 |
| Imaging Advanced Development: RF Vulnerability Reduction (RAS) At-Sea Test | 3 | 2017 | 3 | 2018 |
| Imaging Advanced Development: RF Vulnerability Reduction (RAS) Transition to Imaging | 3 | 2018 | 3 | 2018 |
| Imaging Advanced Development: Automatic Aircraft Cueing - Develop | 2 | 2014 | 3 | 2018 |
| Imaging Advanced Development: Automatic Aircraft Cueing - Lab Testing | 3 | 2016 | 3 | 2016 |
| Imaging Advanced Development: Automatic Aircraft Cueing - Lab Testing #2 | 1 | 2018 | 1 | 2018 |
| Imaging Advanced Development: Automatic Aircraft Cueing - At-Sea Test | 3 | 2018 | 3 | 2019 |
| Imaging Advanced Development: Automatic Aircraft Cueing - Transition to Imaging | 3 | 2019 | 3 | 2019 |
| Imaging Advanced Development: GPS Denied Navigation - Develop | 2 | 2015 | 3 | 2018 |
| Imaging Advanced Development: GPS Denied Navigation - Lab Testing | 1 | 2017 | 1 | 2017 |
| Imaging Advanced Development: GPS Denied Navigation - Lab Testing #2 | 1 | 2018 | 1 | 2018 |
| Imaging Advanced Development: GPS Denied Navigation - At-Sea Test | 3 | 2018 | 3 | 2018 |
| Imaging Advanced Development: GPS Denied Navigation - Transition to Imaging | 3 | 2018 | 3 | 2018 |
| Imaging Advanced Development: Submarine Meteorological Sensors - Develop | 2 | 2015 | 4 | 2019 |
| Imaging Advanced Development: Submarine Meteorological Sensors - Lab Testing | 1 | 2017 | 1 | 2017 |
| Imaging Advanced Development: Submarine Meteorological Sensors - Lab Testing #2 | 2 | 2017 | 2 | 2017 |
| Imaging Advanced Development: Submarine Meteorological Sensors - At-Sea Test | 4 | 2019 | 4 | 2020 |
| Imaging Advanced Development: Submarine Meteorological Sensors - Transition to Imaging | 4 | 2020 | 4 | 2020 |
| Imaging Advanced Development: Imaging Buoy (Planned) - Develop | 1 | 2019 | 4 | 2019 |
| Imaging Advanced Development: Imaging Buoy (Planned) - Lab Demo | 3 | 2020 | 3 | 2020 |
| Imaging Advanced Development: Imaging Buoy (Planned) - Pierside Demo | 4 | 2020 | 4 | 2020 |
| Imaging Advanced Development: Offboard Sensor Suite (Planned) - Develop | 1 | 2020 | 4 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Imaging Advanced Development: RF over Fiber Lab Test | 4 | 2014 | 4 | 2014 |
| Imaging Advanced Development: RF over Fiber At-Sea Test | 1 | 2015 | 1 | 2016 |
| Imaging Advanced Development: Covert ESM FDR | 4 | 2014 | 4 | 2014 |
| Imaging Advanced Development: Covert ESM Lab Test | 1 | 2015 | 1 | 2015 |
| Imaging Advanced Development: Covert ESM (At-Sea-Test) | 1 | 2015 | 1 | 2016 |
| Imaging Advanced Development: Imaging Engineering Measurement Program Analysis | 1 | 2014 | 4 | 2020 |
| Imaging Advanced Development: Imaging Engineering Measurement Program - Status Report #1 | 4 | 2014 | 4 | 2014 |
| Imaging Advanced Development: Imaging Engineering Measurement Program - Status Report #2 | 4 | 2015 | 4 | 2015 |
| Imaging Advanced Development: Imaging Engineering Measurement Program - Status Report #3 | 4 | 2016 | 4 | 2016 |
| Imaging Advanced Development: Imaging Engineering Measurement Program - Status Report #4 | 4 | 2017 | 4 | 2017 |
| Imaging Advanced Development: Imaging Engineering Measurement Program - Status Report #5 | 4 | 2018 | 4 | 2018 |
| Imaging Advanced Development: Imaging Engineering Measurement Program - Status Report #6 | 4 | 2019 | 4 | 2019 |
| Imaging Advanced Development: Imaging Engineering Measurement Program - Status Report #7 | 4 | 2020 | 4 | 2020 |
| Imaging Advanced Development: PA Electromagnetic Spectrum Sensor System Simulation & Development for Model-Based Mission Planning Project Arrangment and CWP Periscope Vulnerability- Develop | 2 | 2015 | 2 | 2015 |
| Imaging Advanced Development: CWP Periscope Vulnerability - Test | 4 | 2016 | 4 | 2016 |
| Imaging Advanced Development: PA Electromagnetic Spectrum Sensor System Simulation and Development for Model-Based Mission Planning Project Arrangment - Lab Test #1 | 4 | 2017 | 4 | 2017 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Imaging Advanced Development: PA Electromagnetic Spectrum Sensor System Simulation and Development for Model-Based Mission Planning Project Arrangment - Lab Test #2 | 4 | 2018 | 4 | 2018 |
| Imaging Advanced Development: PA Electromagnetic Spectrum Sensor System Simulation and Development for Model-Based Mission Planning Project Arrangment - Lab Test #3 | 4 | 2019 | 4 | 2019 |
| Electronic Warfare Advance Development: TI-16 ES Server Valkyrie - Develop | 1 | 2014 | 2 | 2015 |
| Electronic Warfare Advance Development: TI-16 ES Server Valkyrie - Lab Demo | 1 | 2015 | 1 | 2015 |
| Electronic Warfare Advance Development: TI-16 ES Server Valkyrie - Transition to EW | 2 | 2015 | 2 | 2015 |
| Electronic Warfare Advance Development: TI-16 Radar Vulnerability Tool/Tactical Decision Aid - Lab Demo #1 | 4 | 2014 | 4 | 2014 |
| Electronic Warfare Advance Development: TI-16 Radar Vulnerability Tool/Tactical Decision Aid - Transition to EW | 1 | 2015 | 1 | 2015 |
| Electronic Warfare Advance Development: TI-16 Embedded BIT - Develop | 1 | 2014 | 2 | 2015 |
| Electronic Warfare Advance Development: TI-16 Embedded BIT - Lab Demo | 4 | 2014 | 4 | 2014 |
| Electronic Warfare Advance Development: TI-16 Embedded BIT - Transition to EW | 2 | 2015 | 2 | 2015 |
| Electronic Warfare Advance Development: TI-18 ES On-Board Trainer - Develop | 1 | 2015 | 2 | 2018 |
| Electronic Warfare Advance Development: TI-18 ES On-Board Trainer - Lab Demo | 3 | 2017 | 3 | 2017 |
| Electronic Warfare Advance Development: TI-18 ES On-Board Trainer - Transition to EW | 2 | 2018 | 2 | 2018 |
| Electronic Warfare Advance Development: Technical Insertions (APB/17/19) Enhanced DeInterleavers Develop | 1 | 2014 | 2 | 2018 |
| Electronic Warfare Advance Development: Technical Insertions (APB/17/19) Enhanced DeInterleavers SBIR Demo | 1 | 2014 | 1 | 2014 |
| Electronic Warfare Advance Development: Technical Insertions (APB/17/19) Enhanced DeInterleavers RIF MAUEI Demo | 1 | 2015 | 1 | 2015 |
| Electronic Warfare Advance Development: Technical Insertions (APB/17/19) Enhanced DeInterleavers Lab Test | 4 | 2016 | 4 | 2016 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Electronic Warfare Advance Development: Technical Insertions (APB/17/19) Enhanced DeInterleavers Lab Test #2 | 1 | 2018 | 1 | 2018 |
| Electronic Warfare Advance Development: Technical Insertions (APB/17/19) Enhanced DeInterleavers Transition to EW | 2 | 2018 | 2 | 2018 |
| Electronic Warfare Advance Development: Technical Insertions (TI-18) LPI DF / Localization - Develop | 1 | 2014 | 2 | 2018 |
| Electronic Warfare Advance Development: Technical Insertions (TI-18) LPI DF / Localization - Lab Test | 3 | 2016 | 3 | 2016 |
| Electronic Warfare Advance Development: Technical Insertions (TI-18) LPI DF / Localization - Lab Test #2 | 1 | 2018 | 1 | 2018 |
| Electronic Warfare Advance Development: Technical Insertions (TI-18) LPI DF / Localization - Transition to EW | 2 | 2018 | 2 | 2018 |
| Electronic Warfare Advance Development: TI-20 Next Generation EW System-Development | 1 | 2014 | 4 | 2016 |
| Electronic Warfare Advance Development: TI-20 Next Generation EW System- Lab Test | 4 | 2014 | 4 | 2014 |
| Electronic Warfare Advance Development: TI-20 Next Generation EW System - High Speed Network Development | 2 | 2014 | 2 | 2018 |
| Electronic Warfare Advance Development: TI-20 Next Generation EW System - High Speed Network Lab Test | 2 | 2016 | 2 | 2016 |
| Electronic Warfare Advance Development: TI-20 Next Generation EW System - Transition to EW | 2 | 2018 | 2 | 2018 |
| Electronic Warfare Advance Development: TI-20 MMM Payload - Development (CEAS) | 1 | 2015 | 2 | 2018 |
| Electronic Warfare Advance Development: TI-20 MMM Payload - Lab Test | 4 | 2017 | 4 | 2017 |
| Electronic Warfare Advance Development: TI-20 MMM Payload - Transition to EW | 2 | 2018 | 2 | 2018 |
| Electronic Warfare Advance Development: APB21/23 Next Gen EW App/APB - Develop | 4 | 2016 | 2 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Electronic Warfare Advance Development: APB21/23 Next Gen EW App/APB - Lab Test | 3 | 2018 | 3 | 2018 |
| Electronic Warfare Advance Development: APB21/23 Next Gen EW App/APB - Transition to EW | 2 | 2019 | 2 | 2019 |
| Electronic Warfare Advance Development: Technical Insertions TI-22 Disposable Buoys - Develop | 1 | 2016 | 2 | 2020 |
| Electronic Warfare Advance Development: Technical Insertions TI-22 Disposable Buoys - Lab Test | 2 | 2018 | 2 | 2018 |
| Electronic Warfare Advance Development: Technical Insertions TI-22 Disposable Buoys - Pierside/MTV Test | 4 | 2019 | 4 | 2019 |
| Electronic Warfare Advance Development: Technical Insertions TI-22 Disposable Buoys - Transition to EW | 2 | 2020 | 2 | 2020 |
| Electronic Warfare Advance Development: Technical Insertions Tethered Buoys (Planned) - Develop | 1 | 2018 | 4 | 2020 |
| Electronic Warfare Advance Development: Technical Insertions Tethered Buoys (Planned) - Lab Test | 2 | 2020 | 2 | 2020 |
| Electronic Warfare Advance Development: Technical Insertions Tethered Buoys (Planned) - Transition to EW | 4 | 2020 | 4 | 2020 |
| Electronic Warfare Advance Development: Technical Insertions Precision DF (Planned) - Develop | 1 | 2017 | 4 | 2020 |
| Electronic Warfare Advance Development: Technical Insertions Precision DF (Planned) - Lab Test | 2 | 2019 | 2 | 2019 |
| Electronic Warfare Advance Development: Technical Insertions Precision DF (Planned) - Lab Test | 4 | 2020 | 4 | 2020 |
| Electronic Warfare Advance Development: Technical Insertions Multifunction Aperatures (Planned) - Develop | 1 | 2017 | 4 | 2020 |
| Electronic Warfare Advance Development: Technical Insertions Multifunction Aperatures (Planned) - Lab Test | 2 | 2019 | 2 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>0770 / *Adv Sub Supp Equip Prog* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Electronic Warfare Advance Development: Technical Insertions Multifunction Aperatures (Planned) - Lab Test #2 | 4 | 2020 | 4 | 2020 |
| Electronic Warfare Advance Development: Advanced Radar Development | 2 | 2018 | 2 | 2020 |
| Electronic Warfare Advance Development: Advanced Radar Lab Test | 2 | 2019 | 2 | 2019 |
| Electronic Warfare Advance Development: Advanced Radar Transition to EW | 2 | 2020 | 2 | 2020 |
| Electronic Warfare Advance Development: TI-20 Next Gen EW Human Machine Interface Development | 1 | 2015 | 4 | 2018 |
| Electronic Warfare Advance Development: TI-20 Next Gen EW Human Machine Interface Lab Test #1 | 1 | 2015 | 1 | 2015 |
| Electronic Warfare Advance Development: TI-20 Next Gen EW Human Machine Interface Lab Test #1 | 3 | 2017 | 3 | 2017 |
| Electronic Warfare Advance Development: TI-20 Next Gen EW Human Machine Interface Transition to EW | 4 | 2018 | 4 | 2018 |
| Electronic Warfare Advance Development: TI-20 Next Gen EW Digital EW Direction Finding Development | 2 | 2015 | 4 | 2018 |
| Electronic Warfare Advance Development: TI-20 Next Gen EW Digital EW Direction Finding Lab Test #1 | 2 | 2014 | 2 | 2014 |
| Electronic Warfare Advance Development: TI-20 Next Gen EW Digital EW Direction Finding Lab Test #2 | 3 | 2018 | 3 | 2018 |
| Electronic Warfare Advance Development: TI-20 Next Gen EW Digital EW Direction Finding Transition to EW | 4 | 2018 | 4 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603562N / *Submarine Tactical Warfare Sys* | Project (Number/Name)<br>1739 / *Submarine Arctic W/F Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1739: *Submarine Arctic W/F Development* | 40.892 | 4.868 | 4.701 | 6.268 | - | 6.268 | 5.906 | 6.109 | 5.135 | 6.845 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Submarine Arctic Warfare Development project responds to the increased threat of submarine and surface ship activity in Arctic regions of the world through the development of advanced submarine concepts. It places particular emphasis on submarine operability and mission support in unique, cold, ice-covered environments. Efforts include assessment of combat system effectiveness, weapons testing, use of High Frequency (HF) sonars in Arctic regions, testing of ice-capable submarine structures, and development of class-specific Arctic operational guidelines. This project also provides the framework for various research and development programs to conduct test and evaluation in shallow water and Arctic regions.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps | 4.868 | 4.701 | 6.268 | - | 6.268 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Conducted Arctic work-up training and ICEX mission 1-2014. Evaluated new display software for the Commercial Off-The-Shelf (COTS) SEABIRD Conductivity, Temperature, and Depth (CTD) probes. Supported Arctic deployments, including inter-Fleet transfers, as required by the SUBFOR Commanders. Investigated, researched, developed and deployed new systems for Arctic submarine support. Supported testing and tactical development required to improve submarine Arctic operability and warfighting. | | | | | |
| ***FY 2015 Plans:***<br>Initiate planning and support for ICEX mission 1-2016 and Ice Camp 1-2016. Support Arctic deployments, including inter-Fleet transfers, as required by the SUBFOR Commanders. Investigate, research, develop and deploy new systems for Arctic submarine support. Support testing and tactical development required to improve submarine Arctic operability and warfighting. Develop Temporary Alteration (TEMPALT) design for High Frequency (HF) sonar on SSN 21 Class Submarines. | | | | | |
| ***FY 2016 Base Plans:***<br>Conduct Arctic work-up training, ICEX mission 1-2016, and Ice Camp 1-2016. Support Arctic deployments, including inter-Fleet transfers, as required by the SUBFOR Commanders. Investigate, research, develop and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>1739 / *Submarine Arctic W/F Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| deploy new systems for Arctic submarine support. Support testing and tactical development required to improve submarine Arctic operability and warfighting. Initiate planning for ICEX mission 1-2018 and Ice Camp 1-2018.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.868 | 4.701 | 6.268 | - | 6.268 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Use sole source and competitively awarded contracts through the Fleet Logistics Center (FLC) regional contracting office for equipment and technical services. The NAVSEA University Affiliated Research Center (UARC) omnibus contract is used for procurement of logistics support for Ice Camps and Conductivity, Temperature, and Depth (CTD) probe display software development.

**E. Performance Metrics**

Conduct and support Arctic deployments, including inter-Fleet transfers, as required by the SUBFOR Commanders.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>1739 / *Submarine Arctic W/F Development* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | COMSUBPAC : CA | 30.055 | 3.669 | Nov 2013 | 3.641 | Nov 2014 | 4.283 | Nov 2015 | - | | 4.283 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | NUWC/Newport : RI | 0.235 | - | | - | | - | | - | | - | - | 0.235 | 0.235 |
| Developmental Test & Evaluation | C/CPFF | UT/ARL : TX | 0.760 | 0.134 | Jun 2014 | 0.175 | Feb 2015 | 0.225 | Dec 2015 | - | | 0.225 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | C/CPFF | UW/APL : WA | 8.528 | 1.000 | Feb 2014 | 0.825 | Jan 2015 | 1.700 | Dec 2015 | - | | 1.700 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 39.578 | 4.803 | | 4.641 | | 6.208 | | - | | 6.208 | - | - | - |

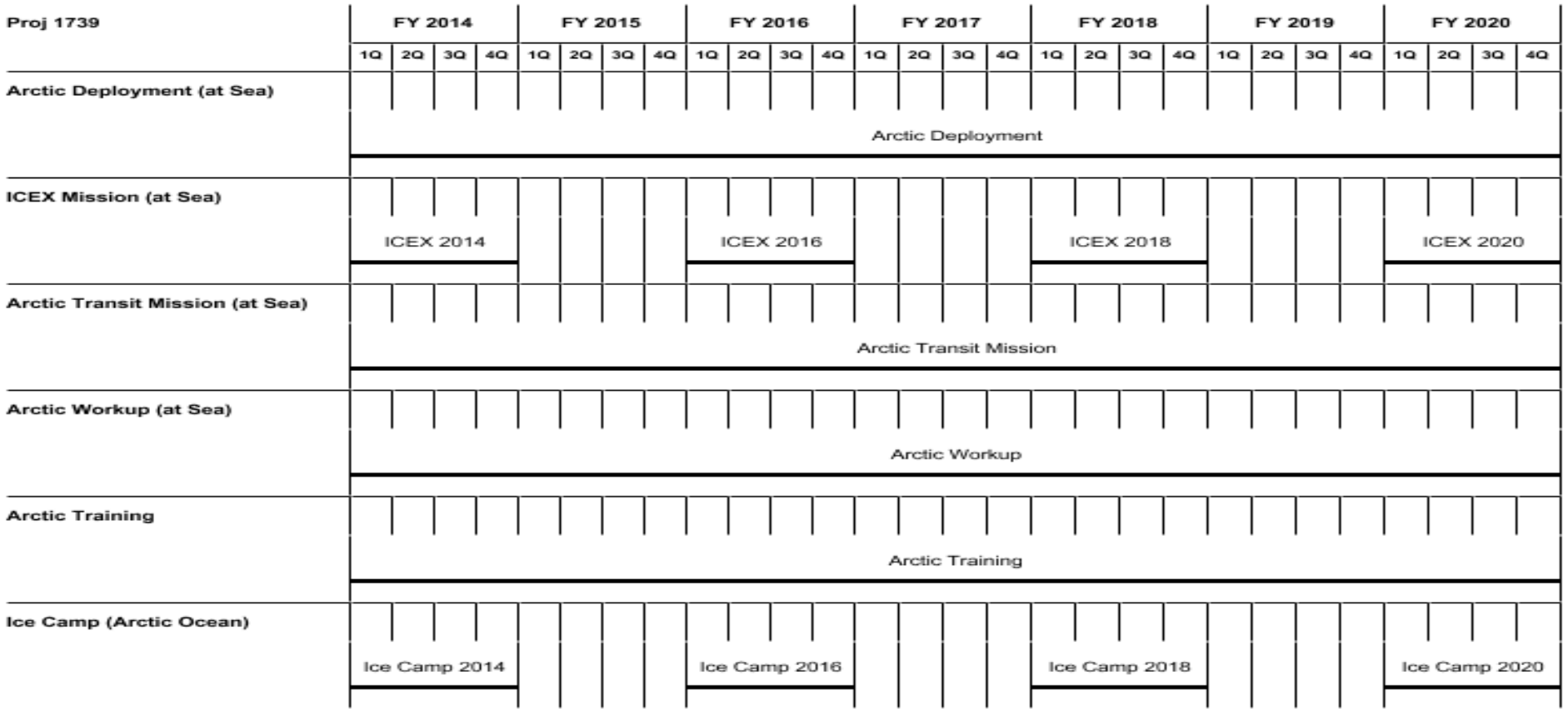
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPAF | EG&G : VA | 0.311 | - | | - | | - | | - | | - | - | 0.311 | 0.311 |
| Program Management Support | C/CPAF | BAE SYSTEMS : MD | 0.963 | 0.065 | Mar 2014 | 0.060 | Nov 2014 | 0.060 | Dec 2015 | - | | 0.060 | Continuing | Continuing | Continuing |
| Travel | Allot | NAVSEA PEO IWS 5 : Washington, DC | 0.040 | - | | - | | - | | - | | - | - | 0.040 | Continuing |
| | | **Subtotal** | 1.314 | 0.065 | | 0.060 | | 0.060 | | - | | 0.060 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 40.892 | 4.868 | | 4.701 | | 6.268 | | - | | 6.268 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>1739 / *Submarine Arctic W/F Development* |




*2016PB - 0603562N - 1739*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603562N / *Submarine Tactical Warfare Sys* | **Project (Number/Name)**<br>1739 / *Submarine Arctic W/F Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1739*** | | | | |
| Arctic Deployment (at Sea): Submarine Deployment as required by the Submarine Type Commander | 1 | 2014 | 4 | 2020 |
| ICEX Mission (at Sea): ICEX Mission (at Sea) 2014 | 1 | 2014 | 4 | 2014 |
| ICEX Mission (at Sea): ICEX Mission (at Sea) 2016 | 1 | 2016 | 4 | 2016 |
| ICEX Mission (at Sea): ICEX Mission (at Sea) 2018 | 1 | 2018 | 4 | 2018 |
| ICEX Mission (at Sea): ICEX Mission (at Sea) 2020 | 1 | 2020 | 4 | 2020 |
| Arctic Transit Mission (at Sea): Arctic Transit Mission (at Sea) | 1 | 2014 | 4 | 2020 |
| Arctic Workup (at Sea): Arctic Workup (at Sea) | 1 | 2014 | 4 | 2020 |
| Arctic Training: Arctic Training | 1 | 2014 | 4 | 2020 |
| Ice Camp (Arctic Ocean): Ice Camp (Arctic Ocean) 2014 | 1 | 2014 | 4 | 2014 |
| Ice Camp (Arctic Ocean): Ice Camp (Arctic Ocean) 2016 | 1 | 2016 | 4 | 2016 |
| Ice Camp (Arctic Ocean): Ice Camp (Arctic Ocean) 2018 | 1 | 2018 | 4 | 2018 |
| Ice Camp (Arctic Ocean): Ice Camp (Arctic Ocean) 2020 | 1 | 2020 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603563N / *Ship Concept Advanced Design* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 144.720 | 17.604 | 17.864 | 11.888 | - | 11.888 | 10.445 | 10.334 | 5.147 | 5.274 | Continuing | Continuing |
| 2196: *Design, Tools, Plans and Concepts* | 1.021 | 0.461 | 0.433 | 0.443 | - | 0.443 | 0.449 | 0.454 | 0.464 | 0.474 | Continuing | Continuing |
| 3161: *NAVSEA Tech Authority* | 143.699 | 17.143 | 11.838 | 11.445 | - | 11.445 | 9.996 | 9.880 | 4.683 | 4.800 | Continuing | Continuing |
| 3376: *Strategic Sealift* | 0.000 | - | 5.593 | - | - | - | - | - | - | - | - | 5.593 |

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

Explore alternative surface ship force structures, advanced surface ship and unmanned surface vehicles concepts, and the potential technologies for these force structures and advanced concepts in support of pre-acquisition mission needs analysis, mission area analysis, and planning. The objective is a more affordable, mission capable surface ship force including increased ship production capability; ships with reduce manning, reduced operating and support costs, and greater utilization of the latest technology. The program directly supports the Navy Shipbuilding Plan with state-of-the-art design tools and methods for surface ship force structure alternative studies, ship & unmanned vehicle concept studies, and the actual conduct of surface ship force structure alternative studies and advanced design concept studies for the ships that may become part of the shipbuilding plan.

Project 2196 - This project funds concept development engineering, mission effectiveness analysis, and other analyses for formulation of future surface ship force structure along with development of the tools to accomplish these efforts. Efforts include advanced ship concept studies, ship and ship systems technology assessments, and the development and upgrade of ship concept design and engineering tools, methods, and criteria.

Project 3161 - This project funds a prioritized portfolio of time-sensitive initiatives through integrated efforts in Cross Platform Systems Development (CPSD), furthering Sea Enterprise through the development of support elements meeting relevant needs of the warfare community. The areas of exploration for CPSD include surface ship concept advanced development, next generation unmanned surface vehicle, high speed ships, tool integration and technical data exchange, cybersecurity, embedded interoperability engineering, and mission capability systems engineering. The research products developed by this project directly support and influence both immediate fleet requirements and future acquisition programs by providing a range of technically acceptable alternatives and evaluation of emerging technologies.

In particular, tasks within this project continue to directly support interoperability testing and certification for Littoral Combat Ship (LCS) and other platforms in deploying battle groups, development and certification of Operator Guidance tools for surface combatants (CG 47, DDG 51, DDG 1000), Total Ownership Cost (TOC) pilot programs, future
flexible and modular warship analyses, and development of specifications and processes to reduce production costs of platforms.

Tasks within this project continue to directly support the Test and Evaluation Master Plan (TEMP) execution for multiple ship classes including, LCS, JHSV, and DDG 1000 reducing Live Fire Test and Evaluation (LFT&E) costs, furthered validation of hydrodynamic simulation tool supporting DDG 1000 Hull Form Plan (HFP), have increased technology readiness level for aluminum combatants, developed tools to execute the CG 47 Cracking Task Force recommendations, increased situational

awareness for deploying strike groups. This project supports NAVSEA's core mission and allows for improved performance and reduced cost of current and future naval platforms.

Project 3376 - Strategic Sealift Research and Development - Develops new concepts and technologies which can be applied to or will enable future strategic sealift, and Seabasing systems. The technologies include ship configuration concepts, equipment to increase cargo handling and cargo loading/unloading rates (including commercial and merchant ship systems), improved man/machine interfaces, improved structural configurations and materials, and Logistics-Over-the-Shore (LOTS) equipment and system improvements. FY 2014 and earlier efforts were funded under NDSF BA 04 Project 3116 Strategic Sealift Research and Development. Effort moves back to NDSF BA 04 Project 3116 Strategic Sealift Research and Development in FY 16.

Note: NDSF BA 04 Project 3116 Strategic Sealift Research and Development amounts: FY 2014: $6.288M

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 17.501 | 17.864 | 19.365 | - | 19.365 |
| Current President's Budget | 17.604 | 17.864 | 11.888 | - | 11.888 |
| Total Adjustments | 0.103 | - | -7.477 | - | -7.477 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 0.229 | - | | | |
| • SBIR/STTR Transfer | -0.126 | - | | | |
| • Program Adjustments | - | - | -7.392 | - | -7.392 |
| • Rate/Misc Adjustments | - | - | -0.085 | - | -0.085 |

**Change Summary Explanation**

Programmatic:

Project 3161: The CPSD Program was adjusted based on reduced level of effort. Added additional funding to support increased cybersecurity technologies for application to emerging shipboard and combat system control system architectures and mitigate vulnerabilities across Platform IT (PIT) capabilities.

Financial: Moved project 3376 back to NDSF BA 04 Project 3116 Strategic Sealift Research and Development in FY 16.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603563N / *Ship Concept Advanced Design* | Project (Number/Name)<br>2196 / *Design, Tools, Plans and Concepts* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2196: *Design, Tools, Plans and Concepts* | 1.021 | 0.461 | 0.433 | 0.443 | - | 0.443 | 0.449 | 0.454 | 0.464 | 0.474 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project provides the foundation for an affordable and mission capable surface ship force. It also supports the next step in the development of a transformed naval force by accomplishing the pre-milestone A (especially pre-concept decision) efforts for all potential surface ships. These efforts are the required first step in the integration of total ship systems, including combat systems, weapons systems and Hull, Mechanical and Electrical (HM&E) systems. Inadequate early planning and ship concept formulation can result in down-stream design, construction and operational problems. A more subtle and severely negative impact of neglecting this early effort is that the "best" concepts and technologies may never even be considered and our greatest potential ship design advances never realized. Designs and technologies must meet the threat. This project supports this requirement.

This project funds concept development engineering, mission effectiveness analysis, and other analyses for formulation of future surface ship force structure along with development of the tools to accomplish these efforts. Advanced ship concept studies, ship and ship systems technology assessments, and the development and upgrade of ship concept design and engineering tools, methods, and criteria are also funded in this project.

This project accomplishes the following: (1) Develops alternative surface ship force structure concepts including the ships and unmanned vehicles; (2) Evaluates the mission capability effectiveness and costs for these alternative surface fleet architectures; (3) Performs fleet war fighting/mission effectiveness assessment studies; (4) Identifies future surface ship requirements and characteristics necessary to meet future threats and support mission needs; (5) Investigates new affordable ship concepts and evaluates technologies necessary to support these concepts; (6) Provides design methods and automated design tools to develop and evaluate ship concepts; and (7) Supports development of Initial Capabilities Documents (ICD) and analogous early requirements documents for future ships. These efforts are done to support mission analysis; mission needs development and technology assessment in support of future fleet concepts and potential ship acquisition programs. These efforts are fundamental to the Navy's formulation of the future fleet.

Supports concept exploration and mission needs assessment for potential future ship acquisition programs, however, these are not direct efforts for specific, authorized shipbuilding programs. This project supports and maintains this country's naval ship design and engineering capabilities in the area of very early stage (Concept Design) design tools, criteria, and methods.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Ship Concepts and Mission Need Analysis | 0.391 | 0.433 | 0.443 | - | 0.443 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>2196 / *Design, Tools, Plans and Concepts* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Description:*** Develop ship concepts and perform analysis for potential ships and Force Architecture 5-10 years out in shipbuilding plan.<br><br>***FY 2014 Accomplishments:***<br>Continued concept designs for small and medium surface combatants that develop agile, fuel efficient and flexible platforms capable of operating in required environments. These efforts are enabling the design of future affordable surface combatants with increased reliable, efficient, long range, high speed and optimized payload capabilities, including payloads such as unmanned vehicles.<br><br>***FY 2015 Plans:***<br>Developing concepts of integrating unmanned vehicles aboard surface ships. Refining cost analyses of surface ship design and construction. Further improvements of surface ship design tools. Continuing concept development efforts to explore flexible, modular surface combatants.<br><br>***FY 2016 Base Plans:***<br>Continue improving tools that relate ship costs to ship capabilities. Explore concepts of surface ships that can deploy swarms of unmanned autonomous systems, and react to such swarms deployed by the enemy. Analyze the impact of distributed high energy storage systems on ship design.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Total Ship Technology Assessment (TSTA) | 0.070 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Analyze the benefits and impacts of new ship, Hull, Mechanical & Electrical (HM&E) concepts, technologies and warfare systems.<br><br>***FY 2014 Accomplishments:***<br>Commenced development of small scale tools to automate challenging and/or labor intensive naval architecture activities (such as weight reports, liquid loading vs. trim scenarios) and to add capability to existing software tools. The products aid in the in-house technical capability of the Navy in conducting pre-AoA studies for surface ships.<br><br>***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>2196 / *Design, Tools, Plans and Concepts* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.461 | 0.433 | 0.443 | - | 0.443 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0204202N: *DDG-1000* | 189.580 | 202.517 | 103.199 | - | 103.199 | 20.126 | 13.132 | - | - | Continuing | Continuing |
| • RDTEN/0603512N: *Carrier Systems Development* | 77.993 | 5.959 | 8.348 | - | 8.348 | 7.539 | 7.531 | 5.668 | 5.787 | Continuing | Continuing |
| • RDTEN/0603564N: *Ship Preliminary Design/Feasibility* | 37.380 | 1.773 | 4.332 | - | 4.332 | 2.500 | 2.500 | - | - | Continuing | Continuing |
| • RDTEN/0604567N: *Ship Contract Design/Live Fire T&E* | 174.375 | 40.016 | 49.712 | - | 49.712 | 40.880 | 45.950 | 47.121 | 36.013 | Continuing | Continuing |
| • RDTEN/0603582N: *Combat System Integration* | 4.270 | 20.881 | 35.901 | - | 35.901 | 35.213 | 31.985 | 29.556 | 30.259 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

This is a non-acquisition program that develops, evaluates, and validates early stages of total ship concepts and technologies in support of SCN planning and potential future ship acquisition programs. This program also supports development, demonstration, evaluation, and validation of engineering tools, methods, and criteria for those concept designs and assessments.

**E. Performance Metrics**

Quarterly Program Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>2196 / *Design, Tools, Plans and Concepts* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | C/CPFF | Various Contractors : Various | 0.400 | 0.090 | Jun 2014 | 0.097 | Feb 2015 | 0.096 | Apr 2016 | - | | 0.096 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC : Various | 0.334 | 0.297 | Nov 2013 | 0.275 | Nov 2014 | 0.277 | Nov 2015 | - | | 0.277 | Continuing | Continuing | Continuing |
| Engineering Development | C/CPFF | Various Contractors : Various | 0.171 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Engineering Development | WR | NSWC : Various | 0.062 | 0.074 | Nov 2013 | 0.061 | Nov 2014 | 0.070 | Nov 2015 | - | | 0.070 | Continuing | Continuing | Continuing |
| Demonstration & Evaluation | C/CPFF | Various Contractors : Various | 0.029 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Test & Evaluation | C/CPFF | Various Contractors : Various | 0.020 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.016 | 0.461 | | 0.433 | | 0.443 | | - | | 0.443 | - | - | - |

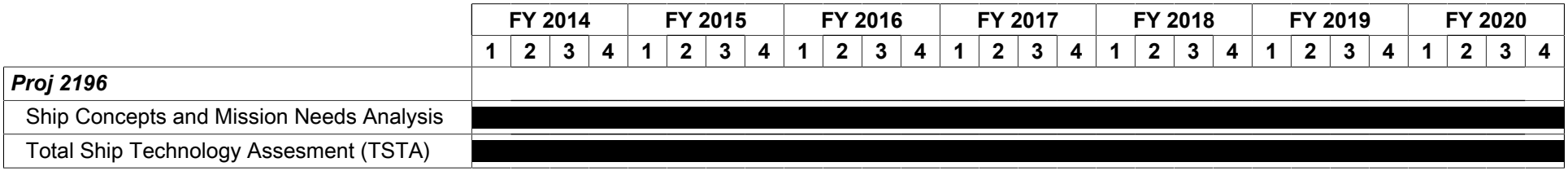
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | NAVSEA HQ : Washington, DC | 0.005 | - | | - | | - | | - | | - | - | 0.005 | - |
| | | **Subtotal** | 0.005 | - | | - | | - | | - | | - | - | 0.005 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1.021 | 0.461 | | 0.433 | | 0.443 | | - | | 0.443 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>2196 / *Design, Tools, Plans and Concepts* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>2196 / *Design, Tools, Plans and Concepts* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2196*** | | | | |
| Ship Concepts and Mission Needs Analysis | 1 | 2014 | 4 | 2020 |
| Total Ship Technology Assesment (TSTA) | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603563N / *Ship Concept Advanced Design* | Project (Number/Name)<br>3161 / *NAVSEA Tech Authority* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3161: *NAVSEA Tech Authority* | 143.699 | 17.143 | 11.838 | 11.445 | - | 11.445 | 9.996 | 9.880 | 4.683 | 4.800 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project has been established to support NAVSEA Technical Authority through coordinated, collaborative, cross-platform systems development resulting in advanced capabilities across business lines through development adaptation and extension of processes, procedures, and tools necessary to develop and explore alternative surface ship force structures; advanced surface ship and unmanned surface vehicle concepts; interoperability; and development of systems level engineering criteria and options to support these force structures and advanced concepts as part of pre-acquisition mission needs analysis, mission area analysis, SCN, and R&D planning. The objective is the coordination of ongoing early-stage concept design and development efforts for cross-platform applicability to result in more affordable, mission-capable, and interoperable surface ship forces including ships that are less expensive to build with reduced manning, reduced operating and support costs, and greater utilization of the latest technology.

NAVSEA Tech Authority efforts under Project 3161, known as the Cross Platform Systems Development (CPSD) Program enhance ongoing efforts within Project 2196 and transition directly to early-stage ship design for Ship Preliminary Design and Feasibility Studies and other Program Executive Office (PEO) ship design programs. While these efforts support concept exploration and mission needs assessment for potential future ship acquisition programs, they are not direct efforts for specific, authorized shipbuilding programs. This project is the only R&D effort (Government or commercial) that provides a coordinated, collaborative approach to the development of: cross-platform naval ship and weapon system design, as well as engineering capabilities in the areas of design tools, criteria, and methods. This project also provides innovative solutions for current Fleet issues involving Technical Authority, such as current interoperability issues with new systems or platforms.

Naval Ship System Engineering Technical Authority recapitalization and product development consolidates platform advanced concept development and design tool development in CPSD 1.0 (Platform Concept Advanced Development) and CPSD 2.0 (Platform Design and Certification Tools/Engineering and Tech Data Exchange Development); and aligned standards and requirements development for modularity and system / component commonality within CPSD 3.0 (Ship Systems Engineering/ Modular Ship Systems Development). Program product areas support: platform-centric force architecture and concept development and tools (CPSD 1.0, CPSD 2.0), engineering products and system development (CPSD 3.0, CPSD 5.0), and system interoperability and mission capability for delivering ships (CPSDs 6.0, 8.0, 9.0). CPSD develops and transitions products to Technical Warrant Holder (TWH) community and develop prioritized plans and activities for future products from emerging cross platform technical requirements and associated capabilities.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Platform Concept Advanced Development (CPSD 1.0) | 1.158 | 1.091 | 0.670 | - | 0.670 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3161 / *NAVSEA Tech Authority* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Description:*** This effort directly supports the Navy's ability to understand risk and associated cost of surface warfare assets; Pre-Milestone A ships, and unmanned surface vehicle (USV) design and analysis.<br><br>***FY 2014 Accomplishments:***<br>Continued to develop the NAVSEA ship concept development processes for supporting the Long Range Shipbuilding Strategy (LRSS), Capability Based Analyses (CBAs), Analyses of Alternatives (AOAs), inform ship design policy and new technology impact assessment. Developed design space exploration methods that leverage previous Navy design tool investments by employing behavior models of higher fidelity. This will allow much more comprehensive trade studies in support of Capabilities Based Assessments and Analyses of Alternatives. Continued next generation surface ship, and unmanned vehicle concept exploration.<br><br>***FY 2015 Plans:***<br>Exploring concepts for flexible and modular surface ships that meet Long Range Shipbuilding Strategy capability goals at reduced cost. Develop concepts for surface ship designs that optimize the use of unmanned vehicles. Exploring ways to extend mission modularity concepts from LCS to other surface ship platforms.<br><br>***FY 2016 Base Plans:***<br>Refine concepts and support specification development for flexible and modular future surface combatants. Support the execution of cross-platform aspects of the previously-developed Flexible Warship Roadmap.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Platform Design and Certification Tools/Engineering and Tech Data Exchange (CPSD 2.0) | 1.775 | 1.673 | 1.028 | - | 1.028 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This effort supports the development of validation tools to certify the safety and mission capability of platform concepts and subsequently ships and submarines; establishes the integrated NAVSEA suite. This effort advances platform design methods, design validation tools, cost tools, manpower tools, and tools to aid in rapid total platform definition.<br><br>***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3161 / *NAVSEA Tech Authority* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continued to develop tools that allow for reliable, efficient, long-range, high-speed platforms with optimized payload capabilities. Continued to develop early stage ship design tools supporting total ownership cost reductions through enhancements of performance based cost models and manpower assessments tools.<br>***FY 2015 Plans:***<br>Developing a tool to assess the performance of a hull array sonar after loss of one or more hydrophones. Studying historical thirty year shipbuilding plans for insights into key drivers impacting fleet inventory levels, mix, and balance. Refining ship design tools to better incorporate combat system capabilities.<br>***FY 2016 Base Plans:***<br>Refine and transition hull array sonar tool. Improve ship design tools to better incorporate distributed high energy storage systems, as well as directed energy weapons. Continue enhancement of fleet architecture and force shaping tools to incorporate the future introduction of unmanned systems in large numbers.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Ship Systems Engineering /Modular Ship Systems Development (CPSD 3.0) | 2.107 | 1.732 | 1.064 | - | 1.064 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This effort supports Ship system development with a focus on technology transition, modularity, ship system technology integration, and design standards for new ship classes for pre-Analysis of Alternatives (AoA) studies and ongoing program of record (PoR) ship modernization.<br>***FY 2014 Accomplishments:***<br>Continued to improve processes for technology upgrades during midlife overhauls that allow for affordable fleet/force modernization. Allowed for long term strategic use of platform and system modularity to enable an affordable future fleet. Continued analysis of fracture mechanics assessment for failure of aluminum structure after a cracking incident to determine inspection periodicity and temporary repair techniques for in-service CG, DDG LCS, and JHSV platforms.<br>***FY 2015 Plans:***<br>Exploring cross platform approaches to solving corrosion problems, techniques and applications not being developed by other programs. Developing the use of composite materials for use in more shipboard applications. Exploring methods to reduce the rejection rate of LM2500 turbine blades during overhaul with the intent of | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3161 / *NAVSEA Tech Authority* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| reducing overhaul costs. Exploring methods of extending propulsion shaft life through improved shaft coatings and couplings.<br>***FY 2016 Base Plans:***<br>Analyze the logistical and engineering aspects of the application of 3D modeling and printing technology. Assess the current state of technology of robotic methods of cleaning, welding, painting, and inspecting shipboard tank and void spaces.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** High Speed Ships and Craft Engineering (CPSD 5.0) | 9.546 | 4.780 | 3.064 | - | 3.064 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This effort supports the development of concepts for future high speed ships that promise improved mission effectiveness in mobility, survivability, and warfare mission areas.<br>***FY 2014 Accomplishments:***<br>Continued the development of improved platform stealth and survivability. Continued to develop a R&D engineering model to support the development, design, acquisition, R&D testing and acceptance of a future modular mission ice capable surface combatant. Continued the development of analytical tools, and continued a prescribed set of model tests and extensive analyses to support development of surface ship Safe Operating Envelope (SOE) and Heavy Weather Guidance (HWG) products. The analytical methods developed include a simulation tool required to characterize ship motions in environments not within the Navy's ability to test. Continued to support the integration of capability on the ship and associated training guidance for the ship's crew.<br>***FY 2015 Plans:***<br>Continuing development of analytical tools for the generation of surface ship Operator Guidance products. Completing and delivering surface ship HWG. Continue Verification, Validation, and Accreditation (VV&A) of the simulation tool for characterizing ship motions in environments not within ability to test. Continuing simulation runs of ship motions in prescribed environmental conditions required to develop the surface ship Operator Guidance. Continue to support the integration of capability on the ship and associated training guidance for the ship's crew. Participate in efforts to improve understanding of hydrodynamic performance of multi-hull ships.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3161 / *NAVSEA Tech Authority* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue the development of analytical tools for the generation surface ship Operator Guidance products. Complete Verification, Validation, and Accreditation (VV&A) of the simulation tool for characterizing ship motions in environments not within ability to test. Complete simulation runs of ship motions in prescribed environmental conditions required to develop the surface ship Operator Guidance. Continue to support the integration of capability on the ship and associated training guidance for the ship's crew.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Alternative Power Systems Engineering (CPSD 6.0)<br>***Articles:***<br>***Description:*** This effort investigates concepts for ships with alternative power/propulsion systems evaluating effectiveness in mobility, survivability, and warfare mission areas.<br>***FY 2014 Accomplishments:***<br>Completed development of a non-propagating, fire-limiting lithium ion battery.<br>***FY 2015 Plans:***<br>Evaluating pod propulsor for future ship concept design.<br>***FY 2016 Base Plans:***<br>Evaluate energy harvesting technology for mobility and primary mission systems. Investigate concepts supporting Forward Deployed Energy (FDE) techniques for refueling unmanned vehicles.<br>***FY 2016 OCO Plans:***<br>N/A | 1.148<br>- | 1.081<br>- | 0.665<br>- | -<br>- | 0.665<br>- |
| ***Title:*** Embedded Interoperability (I/O) Engineering (CPSD 8.0)<br>***Articles:***<br>***Description:*** Description: This effort establishes and executes a dedicated process for evaluating the interoperability performance of warfare systems early in the acquisition cycle, prior to certification. Embedded I/O ensures that fewer mission critical system failures degrade the ultimately fielded war fighting capability. Focus on emerging Open Architecture warfare systems, including LCS Class.<br>***FY 2014 Accomplishments:*** | 0.519<br>- | 0.642<br>- | 0.355<br>- | -<br>- | 0.355<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3161 / *NAVSEA Tech Authority* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continued the focus on development of high performance, low cost communication solutions for improved information dominance and interoperability.<br>***FY 2015 Plans:***<br>Exploring methods of further reducing costs of achieving certified interoperable systems. Exploring ways to standardize and reduce the number of surface electro-optic and infrared systems and their interfaces. Further improving the generation of strike group interoperability and the generation of Capabilities and Limitations documents.<br>***FY 2016 Base Plans:***<br>Develop concepts making use of virtual reality and automated data assistants to lessen the information overload problem for ship combat system operators.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Mission Capability Systems Engineering (CPSD 9.0)<br>***Articles:***<br>***Description:*** This effort supports the development of force-level systems engineering criteria and guidance at the Systems of Systems (SoS) and Family of Systems (FoS) level. This effort allows for the enhanced warfighter and system performance with reduced personnel costs.<br>***FY 2014 Accomplishments:***<br>Created a federated network architecture (combat systems, HM&E, and C4I) in future Surface Combatants with the focus on integration into both LCS classes.<br>***FY 2015 Plans:***<br>Complete federated network architecture study that enhances and aligns combat system and operations procedures. Assess certified cybersecurity technologies for application to emerging shipboard and combat system control system architectures.<br>***FY 2016 Base Plans:***<br>Study the concepts of modularity and open architecture in combat systems and propose parallel concepts for hull, mechanical, and electrical systems. Study advanced cybersecurity technologies for application to shipboard, and other naval combatant systems.<br>***FY 2016 OCO Plans:*** | 0.890<br>- | 0.839<br>- | 4.599<br>- | -<br>- | 4.599<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3161 / *NAVSEA Tech Authority* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 17.143 | 11.838 | 11.445 | - | 11.445 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0204202N: *DDG-1000* | 189.580 | 202.517 | 103.195 | - | 103.195 | 20.126 | 13.132 | - | - | - | 1,755.677 |
| • RDTEN/0603512N: *Carrier Systems Development* | 77.993 | 5.959 | 8.348 | - | 8.348 | 7.539 | 7.531 | 5.668 | 5.787 | Continuing | Continuing |
| • RDTEN/0603564N: *Ship Preliminary Design/ Feasibility Studies* | 37.380 | 1.773 | 4.332 | - | 4.332 | 2.500 | 2.500 | - | - | Continuing | Continuing |
| • RDTEN/0604567N: *Ship Contract Design/Live Fire T&E* | 174.375 | 40.016 | 49.712 | - | 49.712 | 40.880 | 45.950 | 47.121 | 36.013 | Continuing | Continuing |
| • RDTEN/0603582N: *Combat System Integration* | 4.270 | 20.881 | 35.901 | - | 35.901 | 35.213 | 31.985 | 29.556 | 30.259 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

This is a non-acquisition program that develops, evaluates, and validates early stages of total ship concepts and technologies in support of SCN planning and potential future ship acquisition programs. This program also supports development, demonstration, evaluation, and validation of engineering tools, methods, and criteria for those concept designs and assessments. This program provides validated engineering tools, methods, and criteria for ship, and weapon system concept designs and assessments while fostering collaboration and coordination of efforts resulting in more effective use of funding.

**E. Performance Metrics**

Quarterly Program Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3161 / *NAVSEA Tech Authority* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | C/CPFF | Various Contractors : Various | 15.666 | 1.400 | May 2014 | 1.400 | Feb 2015 | 1.120 | Feb 2016 | - | | 1.120 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC, NUWC, CDSA : Various | 52.625 | 5.845 | Mar 2014 | 4.359 | Dec 2014 | 5.412 | Dec 2015 | - | | 5.412 | Continuing | Continuing | Continuing |
| Engineering Development | C/CPFF | DRS : Stevensville, MD | 2.769 | 0.444 | Feb 2014 | 0.036 | Dec 2014 | 0.010 | Dec 2015 | - | | 0.010 | Continuing | Continuing | Continuing |
| Engineering Development | WR | NSWC, NUWC : Various | 45.074 | 4.941 | Mar 2014 | 3.450 | Dec 2014 | 3.472 | Dec 2015 | - | | 3.472 | Continuing | Continuing | Continuing |
| Demonstration & Evaluation | WR | NSWC : Various | 17.603 | 1.173 | Mar 2014 | 1.268 | Nov 2014 | 0.500 | Nov 2015 | - | | 0.500 | Continuing | Continuing | Continuing |
| Demonstration & Evaluation | WR | SPAWAR : Various | 1.922 | - | Mar 2014 | - | Mar 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Test and Evaluation | WR | NSWC : Various | 7.295 | 3.310 | Nov 2013 | 1.305 | Nov 2014 | 0.921 | Nov 2015 | - | | 0.921 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 142.954 | 17.113 | | 11.818 | | 11.435 | | - | | 11.435 | - | - | - |

**Management Services ($ in Millions)**

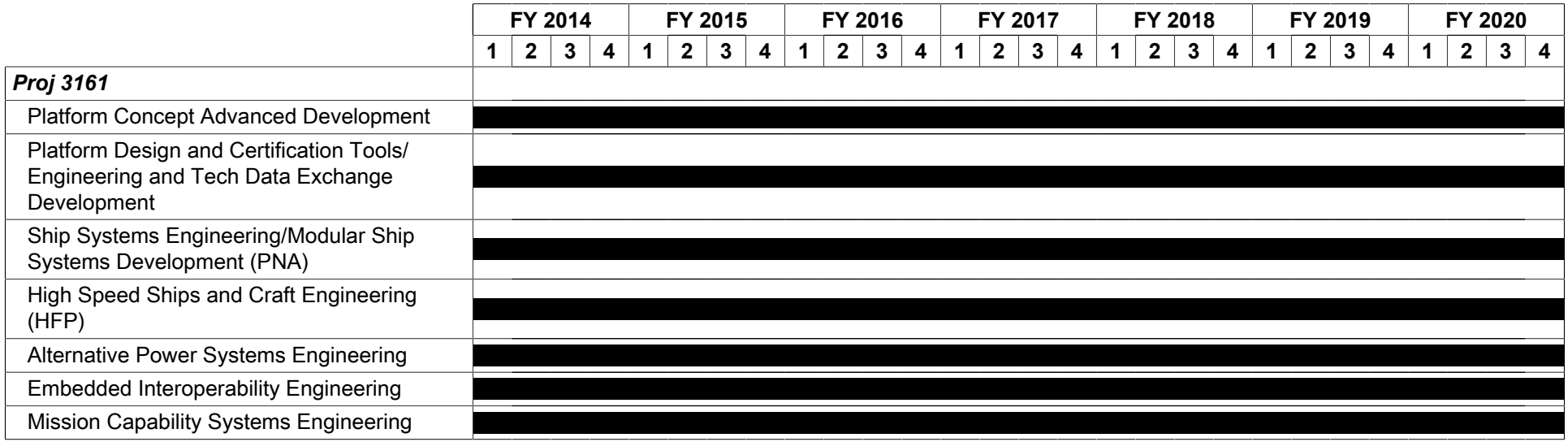
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM/Travel | Allot | NAVSEA HQ : Washington, DC | 0.600 | 0.030 | Oct 2013 | 0.020 | Oct 2014 | 0.010 | Oct 2015 | - | | 0.010 | Continuing | Continuing | Continuing |
| DAWDF | Various | Not Specified : Not Specified | 0.145 | - | | - | | - | | - | | - | - | 0.145 | - |
| | | **Subtotal** | 0.745 | 0.030 | | 0.020 | | 0.010 | | - | | 0.010 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 143.699 | 17.143 | | 11.838 | | 11.445 | | - | | 11.445 | - | - | - |

**Remarks**

Award Dates reflect estimated completion of incremental funding execution.

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3161 / *NAVSEA Tech Authority* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3161 / *NAVSEA Tech Authority* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3161*** | | | | |
| Platform Concept Advanced Development | 1 | 2014 | 4 | 2020 |
| Platform Design and Certification Tools/Engineering and Tech Data Exchange Development | 1 | 2014 | 4 | 2020 |
| Ship Systems Engineering/Modular Ship Systems Development (PNA) | 1 | 2014 | 4 | 2020 |
| High Speed Ships and Craft Engineering (HFP) | 1 | 2014 | 4 | 2020 |
| Alternative Power Systems Engineering | 1 | 2014 | 4 | 2020 |
| Embedded Interoperability Engineering | 1 | 2014 | 4 | 2020 |
| Mission Capability Systems Engineering | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603563N / *Ship Concept Advanced Design* | Project (Number/Name)<br>3376 / *Strategic Sealift* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3376: *Strategic Sealift* | - | - | 5.593 | - | - | - | - | - | - | - | - | 5.593 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Project 3376 - Strategic Sealift Research and Development - Develops new concepts and technologies which can be applied to or will enable future strategic sealift, and Seabasing systems. The technologies include ship configuration concepts, equipment to increase cargo handling and cargo loading/unloading rates (including commercial and merchant ship systems), improved man/machine interfaces, improved structural configurations and materials, and Logistics-Over-the-Shore (LOTS) equipment and system improvements.

Effort moves back to NDSF BA 04 Project 3116 Strategic Sealift Research and Development in FY 16.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Shipboard Crane Systems/Shipboard Cargo Systems | - | 1.250 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>FY15 - Continued investigation and demonstration of shipboard crane/cargo systems improvements. | | | | | |
| ***FY 2016 Base Plans:***<br>N/A | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Sealift Concept Development | - | 1.283 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3376 / *Strategic Sealift* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| FY15 - Continued providing Advanced Planning, Sealift Research, and Technology development and program guidance.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Lighter/HSV Seabase to Shore Cargo Transfer | - | 3.060 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>FY15 - Continued development and demonstration of at-sea vehicle transfer capability.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 5.593 | - | - | - |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • NDSF/3116: *Strategic Sealift Research and Development* | 6.288 | - | 5.502 | - | 5.502 | 5.523 | 5.773 | 5.898 | 6.017 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Not applicable for SEALIFT R&D efforts.

**E. Performance Metrics**

Annual Program Review.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3376 / *Strategic Sealift* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sealift Concept Development | WR | Various Contractors : Various | 0.000 | - | | 1.283 | Jan 2015 | - | | - | | - | - | 1.283 | - |
| Shipboard Crane Systems | WR | Various Contractors : Various | 0.000 | - | | 1.250 | Jan 2015 | - | | - | | - | - | 1.250 | - |
| Lighter/HSV Seabase to Shore Cargo Transfer | WR | Various Contractors : Various | 0.000 | - | | 3.060 | Jan 2015 | - | | - | | - | - | 3.060 | - |
| | | **Subtotal** | 0.000 | - | | 5.593 | | - | | - | | - | - | 5.593 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 5.593 | | - | | - | | - | - | 5.593 | - |

**Remarks**

FY2014 and earlier efforts were funded under NDSF BA 04 Project 3116 Strategic Sealift Research and Development. Due to Congressional direction to fund Sealift requirements in NDSF, beginning FY2016, Strategic Sealift Research and Development will move back to NDSF BA 04 Project 3116 from PE 0603563N PU3376.

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3376 / *Strategic Sealift* |

| | FY 2014 | | | | FY 2015 | | | | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 3376*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shipboard Crane Systems/Shipboard Cargo Systems | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sealift Concept Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lighter/HSV Seabase to Shore Cargo Transfer | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603563N / *Ship Concept Advanced Design* | **Project (Number/Name)**<br>3376 / *Strategic Sealift* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3376*** | | | | |
| Shipboard Crane Systems/Shipboard Cargo Systems | 1 | 2015 | 4 | 2015 |
| Sealift Concept Development | 1 | 2015 | 4 | 2015 |
| Lighter/HSV Seabase to Shore Cargo Transfer | 1 | 2015 | 4 | 2015 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | | Date: February 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603564N *I Ship Prel Design & Feasibility Studies* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 62.905 | 37.380 | 1.773 | 4.332 | - | 4.332 | 2.500 | 2.500 | - | - | - | 111.390 |
| 0409: *DDG-51 Flt III Concept Development* | 30.015 | 10.959 | 1.773 | 3.332 | - | 3.332 | - | - | - | - | - | 46.079 |
| 2474: *LX(R) Design & Total Ship Integration* | 7.923 | 15.356 | - | - | - | - | - | - | - | - | - | 23.279 |
| 3377: *T-ATS (X) Ship Concept Development* | 0.000 | - | - | 1.000 | - | 1.000 | 2.500 | 2.500 | - | - | - | 6.000 |
| 9999: *Congressional Adds* | 24.967 | 11.065 | - | - | - | - | - | - | - | - | - | 36.032 |
| **MDAP/MAIS Code:** 180 | | | | | | | | | | | | |

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

0409 - DDG 51 FLT III Concept Development - Develop Preliminary Analysis, Testing, and Design for introduction of DDG 51 FLT III in FY16.

2474 - LX(R) is expected to functionally replace LSD-41 Class ships and LSD-49 Class ships for embark, transport, control, insert, sustainment, and extract of Marine Air-Ground Task Force elements and supporting forces by helicopters, landing craft, and amphibious vehicles. Efforts are required to identify viable alternatives, including examining a reduced cost variant of LPD-17 Class. Efforts include all Gate and Milestone (MS) documentation, Capabilities Development Documentation (CDD), and Indicative Design (ID). Program is on track to support FY26 retirement of LSDs. LX(R) is financed in RDTEN PE 0604454N Project 2474 in FY15 and out.

3377 - The Navy requires ocean-going towing, salvage, and rescue capabilities to support Fleet operations. The Navy's current capabilities are provided by four T-ATF 166 class Fleet Tugs and four T-ARS 50 class Salvage ships which reach the end of their expected service lives starting in 2020 and 2025, respectively.
The T-ATF Fleet Tugs perform towing at sea, salvage, and diving operations; act as a support ship for portable deep-diving equipment and submarine rescue operations; provide fire-fighting assistance; and perform oil spill pollution abatement. The T-ARS Salvage Ships perform combat salvage, lifting, emergency repair, and rescue towing of combatant or support ships damaged, stranded, scuttled, distressed, or abandoned at sea to repair yards or safe havens.
The T-ATS(X) program will recapitalize the current Fleet Tugs and Salvage Ships with a common hull Towing, Salvage and Rescue Ship (T-ATS(X)) that is capable of performing the missions of the retiring T-ATF and T-ARS classes. RDT&E funding will provide for trade studies and program support leading to award of a Detail Design and Construction contract in FY17.

NDSF BA 04 Project 3117 prior year amounts: FY 2014: $20.024M

C253 - Develop concept studies, ship design, and trade off studies 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(X) will operate as a shuttle ship from resupply ports to customer ships. Additionally, in

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603564N *I Ship Prel Design & Feasibility Studies* |

conjunction with a T-AKE Dry Cargo/Ammunition Ship, 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 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 38.117 | 23.716 | 29.895 | - | 29.895 |
| Current President's Budget | 37.380 | 1.773 | 4.332 | - | 4.332 |
| Total Adjustments | -0.737 | -21.943 | -25.563 | - | -25.563 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -21.943 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.737 | - | | | |
| • Program Adjustments | - | - | -25.427 | - | -25.427 |
| • Rate/Misc Adjustments | - | - | -0.136 | - | -0.136 |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2014 | FY 2015 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *T-AO(X) - Cong* | 11.065 | - |
| Congressional Add Subtotals for Project: 9999 | 11.065 | - |
| Congressional Add Totals for all Projects | 11.065 | - |

**Change Summary Explanation**

Funding:

1. FY 16 funding previously programmed under PRJ 0408 is now budgeted under PE 0603581N (Littoral Combat Ship) Project 3096 (Littoral Combat Ship).

2. The Department moved FY 16 and later funding for PRJ 3377 not associated with T-ATS(X) development back to NDSF BA 04 to comply with Congressional intent

Administrative: Renamed project 3377 (T-ATS(X) Ship Concept Development) from Naval Operational Logistics Integration

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | Project (Number/Name)<br>0409 / *DDG-51 Flt III Concept Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0409: *DDG-51 Flt III Concept Development* | 30.015 | 10.959 | 1.773 | 3.332 | - | 3.332 | - | - | - | - | - | 46.079 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

DDG 51 FLT III Concept Development study - Funding is provided to evaluate design options associated with FLT III. Ship concepts were developed to determine cost and feasibility. The concepts were variants of the DDG 51 Flight IIA design, and included incorporation of SPY-6 (AMDR).

DDG 51 FLT III Preliminary Design - Funding is for preliminary design efforts associated with introduction of Flight III in FY16. The current plan will support the Finite Element Analysis (FEA) of the Deckhouse Structure, EMX Analysis, which will include Electromagnetic Signatures, Electromagnetic Interference (EMI), Electromagnetic Pulse (EMP), and Radiation Hazard. It will also include Electrical Power capability increase and Distribution analysis, Cooling Systems analysis, Topside Signature testing, and Weight and Stability analysis and life cycle margin improvement.

DDG 51 FLT III Contract Design - Funding is provided beginning in FY 2013 to develop the results from Preliminary Design to produce a technical package. This phase will develop contract drawings and specifications for the Detail Design and Construction contract.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Proj:0409 DDG-51 Flt III Concept Development | 10.959 | 1.773 | 3.332 | - | 3.332 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed Preliminary Design. Continue Contract Design efforts to support release of Request for Proposal package for shipbuilders to bid. Develop functional design Government Furnished Information for combat systems. Develop Engineering Change Proposal (ECP) packages to the level necessary to award Detail Design contracts. Support cost estimating. Continue development of Land Based Engineering Site modifications, equipment installation and preliminary testing. | | | | | |
| ***FY 2015 Plans:***<br>Continue to develop functional design Government Furnished Information for combat systems. Update ECP packages as necessary to compete and award shipbuilding contracts. Support cost estimating. Continue development of Land Based Engineering Site modifications, equipment installation and preliminary testing. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>0409 / *DDG-51 Flt III Concept Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Incorporate Government Furnished Information updates from SPY-6. Perform technical analysis of design changes. Complete final review, modeling and analysis efforts.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 10.959 | 1.773 | 3.332 | - | 3.332 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2122: *DDG 51 Class* | 1,985.115 | 2,795.946 | 3,149.703 | - | 3,149.703 | 3,353.936 | 3,440.080 | 3,543.571 | 3,633.657 | Continuing | Continuing |
| • SCN/5300: *Completion of PY Shipbuilding Programs (DDG 51)* | 100.000 | 129.144 | 75.014 | - | 75.014 | - | 46.084 | - | - | - | 350.242 |

**Remarks**

**D. Acquisition Strategy**

DDG 51 FLT III concept development provides technical assistance to develop a design package that supports the competitive award of a Flight III ECP. The DDG 51 Acquisition Strategy reflects the competitive award of the FY13-17 Multi-Year Procurement in a Flight IIA configuration, and supports Flight III upgrades beginning with one of the FY16 ships.

**E. Performance Metrics**

None

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | Project (Number/Name)<br>0409 / *DDG-51 Flt III Concept Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DDG 51 FLT III Concept Study | WR | NSWC : Dahlgren, VA | 2.920 | - | | - | | - | | - | | - | - | 2.920 | - |
| DDG 51 FLT III Concept Study | WR | NSWC : Carderock, MD | 3.076 | - | | - | | - | | - | | - | - | 3.076 | - |
| DDG 51 FLT III Concept Study | WR | SPAWAR : Charleston, SC | 0.285 | - | | - | | - | | - | | - | - | 0.285 | - |
| DDG 51 FLT III Concept Study | FFRDC | JHU : Baltimore, MD | 1.447 | - | | - | | - | | - | | - | - | 1.447 | - |
| DDG 51 FLT III Concept Study | MIPR | CPSD : Columbia, SC | 0.000 | - | | - | | - | | - | | - | - | - | - |
| DDG 51 FLT III Concept Study | C/CPAF | BIW : Bath, ME | 0.376 | - | | - | | - | | - | | - | - | 0.376 | - |
| DDG 51 FLT III Concept Study | WR | NRL : Washington, DC | 0.164 | - | | - | | - | | - | | - | - | 0.164 | - |
| DDG 51 FLT III Concept Study | C/CPAF | Ingalls : Pascagoula, MS | 0.214 | - | | - | | - | | - | | - | - | 0.214 | - |
| DDG 51 FLT III Concept Study | C/CPAF | Seaport : Washington, DC | 4.819 | - | | - | | - | | - | | - | - | 4.819 | - |
| DDG 51 FLT III Concept Study | MIPR | DTIC : Ft. Belvoir, VA | 0.002 | - | | - | | - | | - | | - | - | 0.002 | - |
| DDG 51 FLT III Concept Study | Various | Various : Washington, DC | 1.653 | - | | - | | - | | - | | - | - | 1.653 | - |
| DDG 51 FLT III Concept Study | WR | SPAWAR : San Diego, CA | 0.244 | - | | - | | - | | - | | - | - | 0.244 | - |
| DDG 51 FLT III Concept Study | WR | NAWC : Pax River, MD | 0.025 | - | | - | | - | | - | | - | - | 0.025 | - |
| DDG 51 FLT III Preliminary Design | WR | NSWC : Carderock, MD | 4.925 | 0.448 | Jan 2014 | - | | - | | - | | - | - | 5.373 | - |
| DDG 51 FLT III Preliminary Design | C/CPAF | Seaport : Washington, DC | 6.157 | 0.518 | Feb 2014 | - | | - | | - | | - | - | 6.675 | - |
| DDG 51 FLT III Preliminary Design | WR | NSWC : Dahlgren, VA | 2.057 | 0.224 | May 2014 | - | | - | | - | | - | - | 2.281 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>0409 / *DDG-51 Flt III Concept Development* |

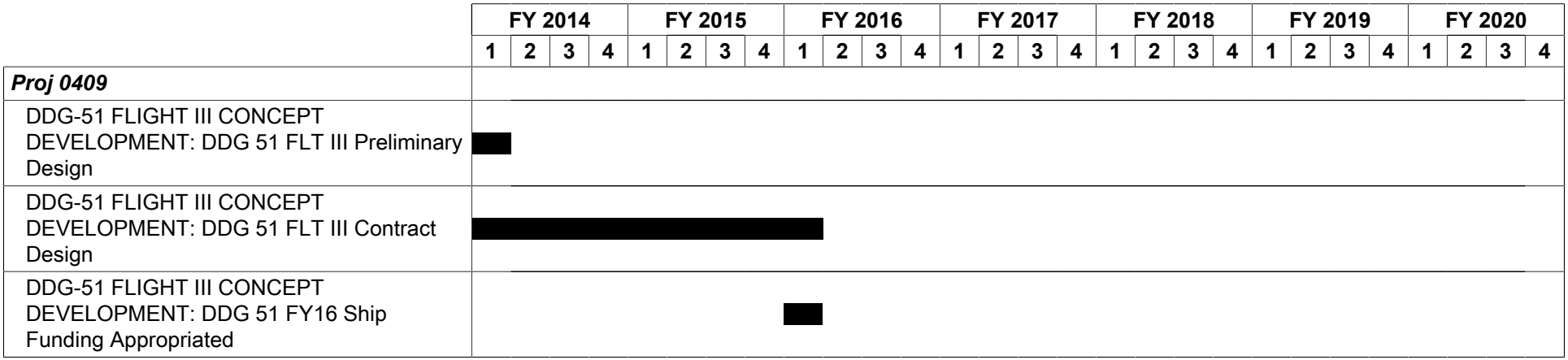
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DDG 51 FLT III Preliminary Design | C/CPAF | BIW : Bath, ME | 0.535 | 0.095 | May 2014 | - | | - | | - | | - | - | 0.630 | - |
| DDG 51 FLT III Preliminary Design | C/CPAF | Ingalls : Pascagoula, MS | 0.535 | 0.095 | May 2014 | - | | - | | - | | - | - | 0.630 | - |
| DDG 51 FLT III Contract Design | WR | NSWC : Dahlgren, VA | 0.000 | 0.395 | Aug 2014 | - | | - | | - | | - | - | 0.395 | - |
| DDG 51 FLT III Contract Design | WR | NSWC : Carderock, MD | 0.181 | 3.799 | Apr 2014 | - | | - | | - | | - | - | 3.980 | - |
| DDG 51 FLT III Contract Design | C/CPAF | Ingalls : Pascagoula, MS | 0.000 | 0.205 | May 2014 | - | | - | | - | | - | - | 0.205 | - |
| DDG 51 FLT III Contract Design | C/CPAF | Seaport : Washington, DC | 0.400 | 4.975 | Jun 2014 | 1.773 | Feb 2015 | 3.332 | Dec 2015 | - | | 3.332 | - | 10.480 | - |
| DDG 51 FLT III Contract Design | C/CPAF | BIW : Bath, ME | 0.000 | 0.205 | May 2014 | - | | - | | - | | - | - | 0.205 | - |
| | | **Subtotal** | 30.015 | 10.959 | | 1.773 | | 3.332 | | - | | 3.332 | - | 46.079 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 30.015 | 10.959 | | 1.773 | | 3.332 | | - | | 3.332 | - | 46.079 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>0409 / *DDG-51 Flt III Concept Development* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>0409 / *DDG-51 Flt III Concept Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0409*** | | | | |
| DDG-51 FLIGHT III CONCEPT DEVELOPMENT: DDG 51 FLT III Preliminary Design | 1 | 2014 | 1 | 2014 |
| DDG-51 FLIGHT III CONCEPT DEVELOPMENT: DDG 51 FLT III Contract Design | 1 | 2014 | 1 | 2016 |
| DDG-51 FLIGHT III CONCEPT DEVELOPMENT: DDG 51 FY16 Ship Funding Appropriated | 1 | 2016 | 1 | 2016 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | Project (Number/Name)<br>2474 / *LX(R) Design & Total Ship Integration* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2474: *LX(R) Design & Total Ship Integration* | 7.923 | 15.356 | - | - | - | - | - | - | - | - | - | 23.279 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

2474 - LX(R) is expected to functionally replace LSD-41 Class ships and LSD-49 Class ships for embark, transport, control, insert, sustainment, and extract of Marine Air-Ground Task Force elements and supporting forces by helicopters, landing craft, and amphibious vehicles. Efforts are required to identify viable alternatives, including examining a reduced cost variant of LPD-17 Class. Efforts include all Gate and Milestone (MS) documentation, Capabilities Development Documentation (CDD), and Indicative Design (ID). Program is on track to support FY26 retirement of LSDs. LX(R) is financed in RDTEN PE 0604454N Project 2474 in FY15 and out.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** LX(R) DESIGN/TOTAL SHIP INTEGRATION | 15.356 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed Analysis of Alternatives (AoA). Conducted Alternative Systems Review. Continued Navy staffing of Capabilities Development Document (CDD). Continued developing documentation to support Gate 2 and Milestone A, including Service Cost Position (SCP), Cost Analysis Requirements Description (CARD), Program Protection Plan (PPP), Systems Engineering Plan (SEP), Reliability, Availability, Maintainability-Cost (RAM-C) Report, Test & Evaluation Master Plan (TEMP), Life Cycle Sustainment Plan (LCSP), Acquisition Strategy (AS), etc. Began Indicative Design (ID), and continued shipbuilding industry studies. Preparing for Gate 2. | | | | | |
| ***FY 2015 Plans:***<br>N/A | | | | | |
| ***FY 2016 Base Plans:***<br>N/A | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 15.356 | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>2474 / *LX(R) Design & Total Ship Integration* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0604454N: *Amphibious Ship Replacement LX(R)* | - | 36.859 | 46.486 | - | 46.486 | 28.690 | 12.410 | 9.470 | 9.703 | Continuing | Continuing |
| • SCN/3010: *Amphibious Ship Replacement LX(R)* | - | - | - | - | - | - | - | 170.751 | 1,624.107 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Predecisional, expect competition will be part of the acquisition strategy after MS A.

**E. Performance Metrics**

Predecisional, performance metrics will be developed in parallel with the CDD.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | Project (Number/Name)<br>2474 / *LX(R) Design & Total Ship Integration* | |

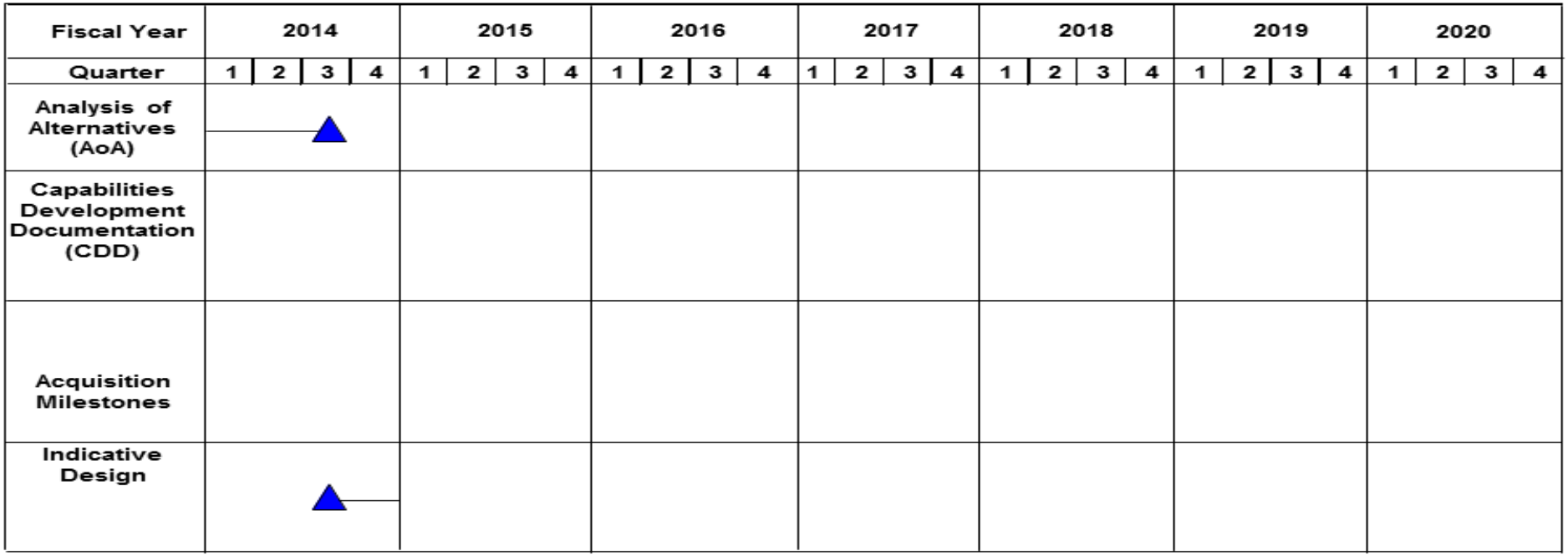
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Systems Integration | C/CPIF | CSC, Alion, ICI : Washington, DC | 4.150 | 7.001 | Mar 2014 | - | | - | | - | | - | - | 11.151 | - |
| Design/Systems Integration | WR | NSWC Carderock : Bethesda, MD | 1.348 | 2.266 | Mar 2014 | - | | - | | - | | - | - | 3.614 | - |
| Design/Systems Integration | WR | NSWC Dahlgren : Dahlgren, VA | 0.380 | 0.200 | Apr 2014 | - | | - | | - | | - | - | 0.580 | - |
| Design/Systems Integration | WR | PEO C4I, PEO IWS : Washington, DC | 1.445 | 0.450 | Jun 2014 | - | | - | | - | | - | - | 1.895 | - |
| Design/Systems Integration | WR | NSWC, Port Hueneme : Port Hueneme, CA | 0.000 | 0.070 | Apr 2014 | - | | - | | - | | - | - | 0.070 | - |
| Design/SI (Shipbuilder Participation) | C/CPFF | HII, General Dynamics : Various | 0.600 | 5.369 | Apr 2014 | - | | - | | - | | - | - | 5.969 | - |
| | | **Subtotal** | 7.923 | 15.356 | | - | | - | | - | | - | - | 23.279 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 7.923 | 15.356 | | - | | - | | - | | - | - | 23.279 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>2474 / *LX(R) Design & Total Ship Integration* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>2474 / *LX(R) Design & Total Ship Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2474*** | | | | |
| Analysis of Alternatives (AoA) | 1 | 2014 | 3 | 2014 |
| Indicative Design | 3 | 2014 | 4 | 2014 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | Project (Number/Name)<br>3377 / *T-ATS (X) Ship Concept Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3377: *T-ATS (X) Ship Concept Development* | - | - | - | 1.000 | - | 1.000 | 2.500 | 2.500 | - | - | - | 6.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

FY 2015 and prior year T-ATS(X) Ship Concept Development funding was budgeted in National Defense Sealift Fund (NDSF) Appropriation, BA 04 PE 0408042N under Project 3117 Naval Operational Logistics Integration.

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

T-ATS(X) Design - Recapitalizes the existing T-ATF 166 Fleet Tug and T-ARS 50 Salvage Ship Classes with a common hull Towing, Salvage and Rescue Ship (T-ATS(X)) to support Fleet operations. The T-ATF Fleet Tugs perform towing at sea, salvage, and diving operations; act as a support ship for portable deep-diving equipment and submarine rescue operations; provide fire-fighting assistance; and perform oil spill pollution abatement. The T-ARS Salvage Ships perform combat salvage, lifting, emergency repair, and rescue towing of combatant or support ships damaged, stranded, scuttled, distressed, or abandoned at sea to repair yards or safe havens.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Ship Concept Development | - | - | 1.000 | - | 1.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Ship Concept Development for future tug, salvage, and rescue mission capabilities.<br><br>***FY 2014 Accomplishments:***<br>N/A<br><br>***FY 2015 Plans:***<br>N/A<br><br>***FY 2016 Base Plans:***<br>Complete source selection process, award multiple competitive phase I design contracts, oversee design phase, and begin preparation of Milestone B documentation.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | - | 1.000 | - | 1.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>3377 / *T-ATS (X) Ship Concept Development* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/5035: *T-ATS(X) Fleet Ocean Tug* | - | - | - | - | - | 74.848 | 76.653 | 153.073 | 80.254 | - | 384.828 |

**Remarks**

**D. Acquisition Strategy**

The first T-ATS(X) will be awarded in FY17.

**E. Performance Metrics**

None.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>3377 / *T-ATS (X) Ship Concept Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Integration | Various | Alion/CSC/SPAWAR/ NAVAIR/NSWC : DC, DC, Charleston, SC | 0.000 | - | | - | | 0.750 | Jan 2016 | - | | 0.750 | 2.950 | 3.700 | - |
| Ship Design Modifications | Various | Various : Various | 0.000 | - | | - | | - | | - | | - | 1.500 | 1.500 | - |
| | | **Subtotal** | 0.000 | - | | - | | 0.750 | | - | | 0.750 | 4.450 | 5.200 | - |

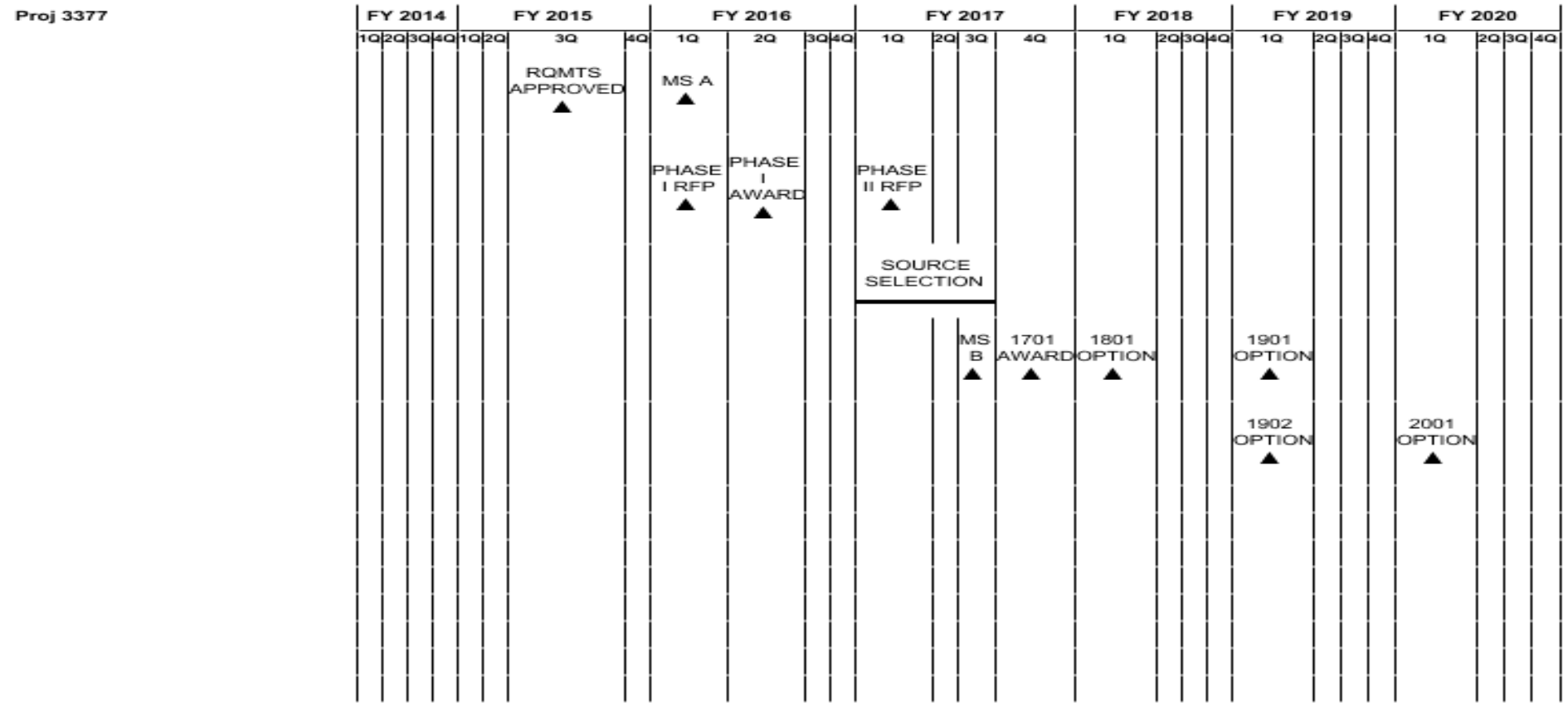
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Milestone Documention Support | C/FFP | CSC : DC | 0.000 | - | | - | | - | | - | | - | 0.550 | 0.550 | - |
| RFP and Specification Development | Various | Alion/CSC/ SPAWAR : DC, DC, Charleston, SC | 0.000 | - | | - | | 0.250 | Jan 2016 | - | | 0.250 | - | 0.250 | - |
| | | **Subtotal** | 0.000 | - | | - | | 0.250 | | - | | 0.250 | 0.550 | 0.800 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | - | | 1.000 | | - | | 1.000 | 5.000 | 6.000 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>3377 / *T-ATS (X) Ship Concept Development* |




*2016PB - 0603564N - 3377*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>3377 / *T-ATS (X) Ship Concept Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3377*** | | | | |
| T-ATS(X) REQUIREMENTS APPROVED | 3 | 2015 | 3 | 2015 |
| T-ATS(X) MILESTONE A | 1 | 2016 | 1 | 2016 |
| T-ATS(X) RELEASE OF PHASE I RFP | 1 | 2016 | 1 | 2016 |
| T-ATS(X) PHASE I CONTRACT AWARD | 2 | 2016 | 2 | 2016 |
| T-ATS(X) RELEASE OF PHASE II RFP | 1 | 2017 | 1 | 2017 |
| T-ATS(X) SOURCE SELECTION | 1 | 2017 | 3 | 2017 |
| T-ATS(X) MILESTONE B | 3 | 2017 | 3 | 2017 |
| T-ATS(X) 1701 DD&C CONTRACT AWARD | 4 | 2017 | 4 | 2017 |
| T-ATS(X) 1801 OPTION AWARD | 1 | 2018 | 1 | 2018 |
| T-ATS(X) 1901 OPTION AWARD | 1 | 2019 | 1 | 2019 |
| T-ATS(X) 1902 OPTION AWARD | 1 | 2019 | 1 | 2019 |
| T-ATS(X) 2001 OPTION AWARD | 1 | 2020 | 1 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 24.967 | 11.065 | - | - | - | - | - | - | - | - | - | 36.032 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Beginning in FY13, Research and Development efforts for T-AO(X) (3417) is funded under RDTE,N PE 0603564N, PROJ C253 by a FY13 congressional add vice NDSF. FY14 RDTE,N efforts are funded under PROJ 3375C.

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

T-AO(X) Design - Develop concept studies, ship design, and trade off studies 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(X) will operate as a shuttle ship from resupply ports to customer ships. Additionally, in conjunction with a T-AKE Dry Cargo/Ammunition Ship, 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) | FY 2014 | FY 2015 |
|---|---|---|
| ***Congressional Add:*** T-AO(X) - Cong | 11.065 | - |
| ***FY 2014 Accomplishments:*** Efforts funded under RDTE,N PE 0603564N, PROJ C253. Continued to provide engineering support for the T-AO(X) design process, validation of requirements and oversight of Industry Studies contracts. Supported initial development and staffing of Pre-B documents. Coordinated efforts with NAVSEA, MSC, PEO Ships, CNO, ASN RD&A, OSD and Fleet. | | |
| ***FY 2015 Plans:*** Support the conduct of OSD Pre-B Decision Point. Issue DD&C RFP after Pre-B Decision Point. Support development and staffing of Milestone B (MS B) documents. Develop Developmental Testing Phase A (DT-A) Report in support of MS B. Support conduct of Systems Functional Review(SFR). Coordinate efforts with NAVSEA, MSC, PEO Ships, CNO, ASN RD&A, OSD and Fleet. FY 2015 efforts financed with FY 2014 carryover. | | |
| **Congressional Adds Subtotals** | 11.065 | - |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 5025: *T-AO(X) Recapitalization* | - | - | 674.190 | - | 674.190 | - | 576.760 | 579.246 | 590.647 | 8,617.000 | 11,037.843 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

The first Fleet Oiler will be 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 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Integration and Design | Various | SPAWAR, NSWC, NAVAIR, CSC & Alion : Charleston, Carderock & Pt Hueneme, Pax River & DC | 5.150 | 5.345 | Oct 2014 | - | | - | | - | | - | - | 10.495 | - |
| Engineering System Spec Development | C/CPFF | Alion : DC | 0.800 | - | | - | | - | | - | | - | - | 0.800 | - |
| Design Concepts/TOC/ Trade Off Studies | C/FFP | Various : Various | 9.000 | - | | - | | - | | - | | - | - | 9.000 | - |
| Expanded Industry Studies | C/FFP | Various : Various | 4.000 | - | | - | | - | | - | | - | - | 4.000 | - |
| | | **Subtotal** | 18.950 | 5.345 | | - | | - | | - | | - | - | 24.295 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics, Risk Management, RFP Development | C/CPFF | Alion : DC | 1.000 | 1.000 | Sep 2014 | - | | - | | - | | - | - | 2.000 | - |
| MilestoneA/B & Pre-B Documentation Support | C/CPFF | Alion & CSC : DC | 1.500 | 2.000 | Sep 2014 | - | | - | | - | | - | - | 3.500 | - |
| | | **Subtotal** | 2.500 | 3.000 | | - | | - | | - | | - | - | 5.500 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | Various | Various : Various | 0.550 | 0.250 | Jul 2014 | - | | - | | - | | - | - | 0.800 | - |
| Operational Test & Evaluation | Various | Various : Various | 0.750 | 0.350 | Mar 2014 | - | | - | | - | | - | - | 1.100 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Live Fire Test & Evaluation | Various | Various : Various | 0.650 | 0.220 | Sep 2014 | - | | - | | - | | - | - | 0.870 | - |
| | | **Subtotal** | 1.950 | 0.820 | | - | | - | | - | | - | - | 2.770 | - |

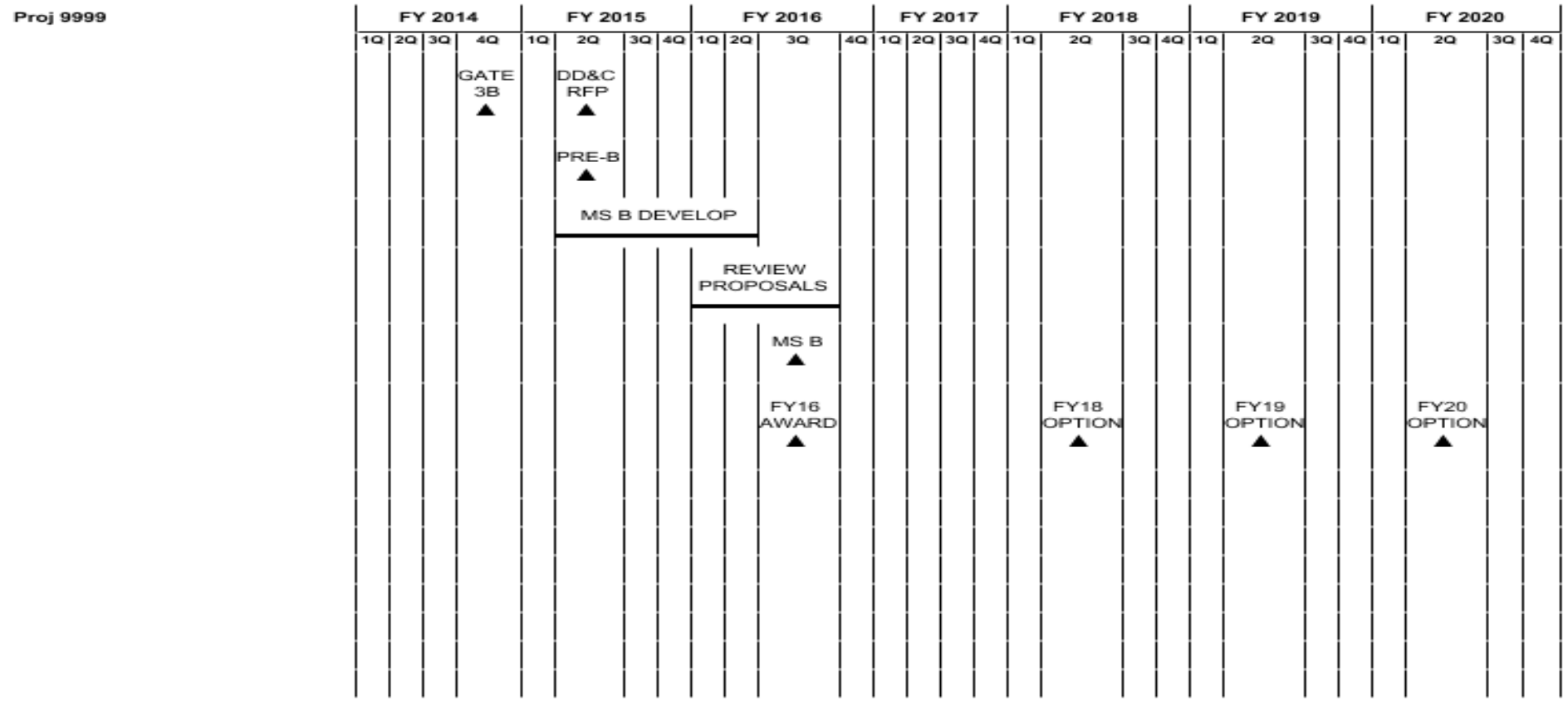
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Selection Documentation | WR | NSWC : Carderock | 0.200 | 0.900 | Oct 2014 | - | | - | | - | | - | - | 1.100 | - |
| Program Management Support | C/CPFF | Alion & CSC : DC | 1.367 | 1.000 | Dec 2014 | - | | - | | - | | - | - | 2.367 | - |
| | | **Subtotal** | 1.567 | 1.900 | | - | | - | | - | | - | - | 3.467 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 24.967 | 11.065 | | - | | - | | - | | - | - | 36.032 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603564N / *Ship Prel Design & Feasibility Studies* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| T-AO(X) GATE 3B | 4 | 2014 | 4 | 2014 |
| T-AO(X) PRE-B REVIEW | 2 | 2015 | 2 | 2015 |
| RELEASE T-AO(X) DD&C RFP | 2 | 2015 | 2 | 2015 |
| T-AO(X) MS B DOCUMENTATION DEVELOPMENT | 2 | 2015 | 2 | 2016 |
| EVALUATE T-AO(X) DD&C PROPOSALS | 1 | 2016 | 3 | 2016 |
| T-AO(X) MILESTONE B | 3 | 2016 | 3 | 2016 |
| T-AO(X) 1601 DD&C AWARD | 3 | 2016 | 3 | 2016 |
| T-AO(X) 1801 DD&C OPTION | 2 | 2018 | 2 | 2018 |
| T-AO(X) 1901 DD&C OPTION | 2 | 2019 | 2 | 2019 |
| T-AO(X) 2001 DD&C OPTION | 2 | 2020 | 2 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603570N *I Advanced Nuclear Power Systems* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | 428.933 | 499.961 | 482.040 | - | 482.040 | 472.203 | 464.257 | 356.285 | 345.358 | Continuing | Continuing |
| 1258: *Nuclear Technology Development* | 0.000 | 60.727 | 65.204 | 62.767 | - | 62.767 | 64.107 | 65.509 | 67.260 | 68.667 | Continuing | Continuing |
| 2692: *CVN 21 Propulsion Plant Development* | 0.000 | 57.499 | 60.459 | - | - | - | - | - | - | - | - | 117.958 |
| 3219: *SBSD Nuclear Technology Development* | 0.000 | 296.050 | 369.964 | 419.273 | - | 419.273 | 408.096 | 398.748 | 289.025 | 276.691 | Continuing | Continuing |
| 3221: *Training Platform Replacement* | 0.000 | 14.657 | 4.334 | - | - | - | - | - | - | - | - | 18.991 |

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

The details of this program element are classified CONFIDENTIAL and are submitted annually to Congress in the classified budget justification books.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 428.933 | 499.961 | 485.933 | - | 485.933 |
| Current President's Budget | 428.933 | 499.961 | 482.040 | - | 482.040 |
| Total Adjustments | - | - | -3.893 | - | -3.893 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Rate/Misc Adjustments | - | - | -3.893 | - | -3.893 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603570N / *Advanced Nuclear Power Systems* | Project (Number/Name)<br>1258 / *Nuclear Technology Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1258: *Nuclear Technology Development* | - | 60.727 | 65.204 | 62.767 | - | 62.767 | 64.107 | 65.509 | 67.260 | 68.667 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

The details of this program element are classified CONFIDENTIAL and are submitted annually to Congress in the classified budget justification books.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | | Date: February 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603570N / *Advanced Nuclear Power Systems* | | | | Project (Number/Name)<br>2692 / *CVN 21 Propulsion Plant Development* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 2692: *CVN 21 Propulsion Plant Development* | - | 57.499 | 60.459 | - | - | - | - | - | - | - | - | 117.958 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

The details of this program element are classified CONFIDENTIAL and are submitted annually to Congress in the classified budget justification books.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603570N / *Advanced Nuclear Power Systems* | | | | Project (Number/Name)<br>3219 / *SBSD Nuclear Technology Development* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 3219: *SBSD Nuclear Technology Development* | - | 296.050 | 369.964 | 419.273 | - | 419.273 | 408.096 | 398.748 | 289.025 | 276.691 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

The details of this program element are classified CONFIDENTIAL and are submitted annually to Congress in the classified budget justification books.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603570N / *Advanced Nuclear Power Systems* | | | | Project (Number/Name)<br>3221 / *Training Platform Replacement* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 3221: *Training Platform Replacement* | - | 14.657 | 4.334 | - | - | - | - | - | - | - | - | 18.991 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

The details of this program element are classified CONFIDENTIAL and are submitted annually to Congress in the classified budget justification books.

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603573N *I Advanced Surface Machinery Sys* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 109.261 | 17.551 | 21.026 | 25.904 | - | 25.904 | 23.221 | 18.135 | 18.421 | 18.814 | Continuing | Continuing |
| 2471: *Integrated Power Systems (IPS)* | 109.261 | 17.551 | 21.026 | 25.904 | - | 25.904 | 23.221 | 18.135 | 18.421 | 18.814 | Continuing | Continuing |

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

This PE includes the development of advanced surface ship hull, mechanical, and electrical (HM&E) components and systems for all future ships and back-fit ships where appropriate. This PE is managed by PMS-320, the Electric Ships Office, located organizationally within PEO SHIPS, with responsibility for developing Naval Power Systems that focus on energy efficiency, providing power to mission systems, and platform integration of those components and systems. The mission of PMS 320 is to develop and provide smaller, simpler, more affordable and more capable electric power systems for all Navy platforms and focus Navy and industry investments.

This PE is the bridge between Science and Technology (S&T) and ship platform and mission systems acquisition programs by identifying prospective applications for S&T research, advanced development, and performing additional product development and qualification when necessary to meet platform or mission system requirements.

In October 2009, SECNAV outlined a set of specific objectives supporting U.S. Navy energy reform including several aimed at significantly reducing Fleet fuel consumption and improving our energy security posture. PMS-320 supports the DON Energy Goals by employing an integrated approach to develop and transition more affordable technologies that satisfy increasing shipboard power demands and high operational tempo while improving energy efficiency, reducing fuel consumption, and reducing Total Ownership Cost.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 18.144 | 21.026 | 26.384 | - | 26.384 |
| Current President's Budget | 17.551 | 21.026 | 25.904 | - | 25.904 |
| Total Adjustments | -0.593 | - | -0.480 | - | -0.480 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.032 | - | | | |
| • SBIR/STTR Transfer | -0.561 | - | | | |
| • Rate/Misc Adjustments | - | - | -0.480 | - | -0.480 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603573N *I Advanced Surface Machinery Sys* |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $0.280 million to account for the availability of prior year execution balances and $0.200 million to account for other rate/misc adjustments.

FY 2014 reduction reflect SBIR/STTR Transfer.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603573N / *Advanced Surface Machinery Sys* | Project (Number/Name)<br>2471 / *Integrated Power Systems (IPS)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2471: *Integrated Power Systems (IPS)* | 109.261 | 17.551 | 21.026 | 25.904 | - | 25.904 | 23.221 | 18.135 | 18.421 | 18.814 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project supports the development and transition strategy of Navy Power and Propulsion Systems including power generation, power conversion, power distribution, energy storage, power utilization and automation and control functions for fully integrated electric propulsion (such as T-AKE -1 class or DDG 1000 class), hybrid electric propulsion (such as LHD 8 and LHA(R) class), as well as legacy mechanical propulsion ships (such as DDG 51 class). This project supports optimized integration of mission systems, appropriate component and system controls, integration of components and systems into future and current ships, and providing power system solution alternatives to new and existing platforms.

Project developments are aligned with the Navy's 30 year shipbuilding plan via the Naval Power Systems Technology Development Roadmap, which outlines the way ahead for future developments and provides a basis for coordinated planning and investment by the Navy and private industry.

This project develops and transitions products that increase energy efficiency (and thereby create fewer greenhouse gas emissions and reduce dependence upon foreign petroleum sources), provide additional power to mission systems, and integrates those components and systems into ship platforms.

DON Energy Initiatives - Energy Storage Module (ESM) Stable Backup Power (SBP), Advanced Power Generation Module (APGM), and Gas Turbine (GT) Efficiency Upgrades: This project supports the DON Energy Initiative designed to reduce ship energy consumption and increase mission effectiveness through longer time on station. The ESM will provide stable backup power to enable DDG51 Class single genertor operations (and significant fuel savings) when tactical situations to tactical situations permit. The APGM is an upgrade to the DDG1000 auxiliary gas turbine and will provide increased power to meet DDG51 Flight III requirements for advanced sensors and future weapons with reduction in life cycle costs through increased fuel efficiency over legacy gas turbine generator sets. GT Efficiency Upgrades will provide fuel efficiency improvements to existing gas turbine engines for both backfit and new construction ships.

Mission Power: Designs, develops, tests and integrates shipboard power systems to incorporate advanced sensors, Directed Energy and other advanced weapons. Design and testing includes Modeling and Simulation, as well as land based testing, to reduce risk and demonstrate readiness for shipboard use. AMDR PCM provides power conversion from ship's 4160 VAC distribution systems to 1000 VDC to support AMDR Radar.

The growth in Advanced Surface Machinery Sys from FY15 to FY16 is driven by the number of Air Missile Defense Radar (AMDR) Power Conversion Modules (PCM) planned to be built in FY16. Specifically, Mission Power FY16 Plans include building three (3) units vs. the FY15 Plan to build one (1) unit. Building 3 units vs. 1 in addition to ordering Long Lead Time Material (LLTM) for two (2) units, conducting factory acceptance testing, and the continuance of test planning efforts directly resulted in an increase cost in FY16 planned budget vs. FY15.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603573N / *Advanced Surface Machinery Sys* | **Project (Number/Name)**<br>2471 / *Integrated Power Systems (IPS)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Energy Efficiency | 10.200 | 8.931 | 9.600 | - | 9.600 |
| ***Articles:*** | - | - | - | - | - |

***FY 2014 Accomplishments:***
Commenced design of ESM SBP system. Ordered portions of Long Lead Time Material (LLTM) for ESM SBP First Article Unit (FAU). Continued ESM SBP test planning and test site modification planning. Commenced qualification testing of ESM SBP battery sub-system. Completed Land Based ESM Proof Of Concept (POC) testing. ESM POC is a candidate to support Solid State Laser (SSL) At-Sea testing aboard the Self Defense Test Ship (SDTS) notionally scheduled for FY16.

Continued design and began procurement of the Advanced Power Generation Module (APGM) High Efficiency Plus (HE+) gas turbine engine. Commenced design of APGM Generator Set. Commenced APGM land based test planning.

Continued development of Gas Turbine (GT) Efficiency Upgrades. Transitioned management of LM2500 Efficiency Upgrades to Naval Systems Engineering Directorate (NAVSEA 05). Evaluated other opportunities for Gas Turbine Efficiency Upgrades.

***FY 2015 Plans:***
Complete design of ESM Stable Backup Power (SBP) system. Order remaining LLTM for ESM SBP First Article Unit (FAU). Commence build of ESM FAU. Continue ESM SBP land based test planning and commence land based test site modifications. Continue qualification testing of ESM SBP battery sub-system.

Complete design of Advanced Power Generation Module (APGM) High Efficiency Plus (HE+) gas turbine engine and Generator Set. Procure material required for build of APGM Generator Set. Continue test planning for APGM electric system testing.

Continue planning for future gas turbine efficiency upgrades.

***FY 2016 Base Plans:***
Complete build and Factory Acceptance Testing (FAT) of ESM Stable Backup Power (SBP) First Article Unit (FAU). Complete ESM SBP test planning and test site modifications. Complete qualification of ESM SBP battery sub-system. Prepare Test Plans and Procedures for ESM SBP Land based testing at the Naval Surface Warfare Center Carderock Division - Ship Systems Engineering Station located in Philadelphia, PA.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603573N / *Advanced Surface Machinery Sys* | **Project (Number/Name)**<br>2471 / *Integrated Power Systems (IPS)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Complete material procurement for the Advanced Power Generation Module (APGM) Generator Set and commence assembly. Continue Test Planning. Prepare Test Plans and Procedures.<br><br>Continue planning for future gas turbine efficiency upgrades.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Mission Power | 5.100 | 9.900 | 14.500 | - | 14.500 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed Source Selection, awarded contract, and commenced design of DDG 51 Flight III Air Missile Defense Radar (AMDR) Power Conversion Module (PCM).<br><br>Transitioned ONR developed compact power components, (Bi-directional Power Converter, Multi-Function Power Converter, and Power Management Controller) per the signed Technology Transition Agreements (TTAs).<br><br>Commenced validation testing of compact power Multi-Function Power Converter.<br>***FY 2015 Plans:***<br>Complete design of DDG51 Flight III AMDR PCM shipboard units and order LLTM for two (2) LRIP units. Commence build of one (1) LRIP unit which will support DDG51 Flight III AMDR Developmental Testing (DT) at the Surface Combat System Center (SCSC) Wallops Island, VA and DDG51 Flight III Integration Testing at the Naval Surface Warfare Center Carderock Division (NSWCCD) - Ship Systems Engineering Station (SSES).<br><br>Commence planning DDG51 Flight III AMDR PCM LRIP Factory Acceptance Test (FAT) and Environmental Qualification Tests (EQT). Commence planning for the Power Hardware in the Loop (PHIL) testing at Florida State University. Commence planning for electrical system validation testing at the NSWCCD-SSES land based test site. Initiate planning for AMDR / PCM integration testing in support of AMDR Developmental Testing (DT).<br><br>Continue Energy Magazine (EM) specification development and begin acquisition documentation.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603573N / *Advanced Surface Machinery Sys* | **Project (Number/Name)**<br>2471 / *Integrated Power Systems (IPS)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue planning DDG51 Flight III AMDR PCM LRIP Factory Acceptance Test (FAT) and Environmental Qualification Tests(EQT). Continue planning for the Power Hardware in the Loop (PHIL) testing at Florida State University. Continue planning for electrical system validation testing at the NSWCCD-SSES land based test site, and continue to support planning for AMDR / PCM integration testing in support of AMDR Developmental Testing (DT).<br><br>Complete manufacture and build of one (1) LRIP unit. Commence Factory Acceptance Test. Order LLTM for two (2) LRIP units. Commence manufacture and build of three (3) LRIP units.<br><br>LRIP units will support DDG51 Flight III AMDR Developmental Testing (DT) at the Surface Combat System Center (SCSC) Wallops Island, VA and DDG51 Flight III Integration Testing at the Naval Surface Warfare Center Carderock Division (NSWCCD) - Ship Systems Engineering Station (SSES).<br><br>Refine Energy Magazine (EM) specification and interface development, and develop acquisition documentation.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Naval Power Technology Development / Platform Integration & Transition | 2.251 | 2.195 | 1.804 | - | 1.804 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued to execute the The Advanced Electric Power and Propulsion Project, Project Arrangement (short title AEP3 PA or PA) ref DoD-MOD-N-12-0001 which is an agreement between the US and UK Governments to cooperate on a scope of work associated with characterising, developing, modelling and de-risking electrical power and propulsion system architectures and equipment for future surface and submarine platforms to meet the needs of both Navies.<br><br>Continued to develop power and propulsion system configurations in support of future surface ship acquisition programs. Developed alternative power and propulsion solutions for future surface combatants and amphibious ships. Continued to improve baseline power system performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continued to conduct land based testing in order to increase energy efficiency and fuel savings, improve survivability, and enable advanced sensors and weapons (i.e., AMDR, Directed Energy Weapons). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603573N / *Advanced Surface Machinery Sys* | **Project (Number/Name)**<br>2471 / *Integrated Power Systems (IPS)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continued to analyze alternatives for supplying power to advanced radars, combat systems, and electric weapons power demands and potential interfaces to develop optimum alternative solutions. Continued assessments of Naval Power System alternate architectures to best meet emerging ship requirements.<br><br>Commenced biennial update of the Naval Power Systems Technology Development Roadmap. Support maturation and transition of ONR Future Naval Capabilitites (FNC) products to meet TDR identified gaps.<br><br>Continued studies to determine appropriate Energy Magazine (EM) design requirements to support advanced weapons and sensors in conjunction with Laser and Railgun ONR efforts. Studies included evaluation of ongoing Energy Storage Module (ESM) and its ability to meet need of EM to support high power and energy weapons and sensors. Determined appropriate top level requirements and begin EM specification development.<br><br>Planned and stood up Combat Power and Energy System Overarching Integrated Product Team (OIPT)<br><br>Completed design and commenced manufacture and test Vacuum Circuit Breakers (VCB) for compliance with required specifications. | | | | | |
| ***FY 2015 Plans:***<br>Continue to execute the The Advanced Electric Power and Propulsion Project, Project Arrangement (short title AEP3 PA or PA) ref DoD-MOD-N-12-0001 which is an agreement between the US and UK Governments to cooperate on a scope of work associated with characterising, developing, modelling, and de-risking electrical power and propulsion system architectures and equipment for future surface and submarine platforms to meet the needs of both Navies.<br><br>Continue to develop power and propulsion system configurations in support of future surface ship acquisition programs. Develop alternative power and propulsion solutions for future surface combatants and amphibious ships. Continue to improve baseline power system performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continue to analyze alternatives for supplying power to advanced radars, combat systems, and electric weapons power demands and potential interfaces to develop optimum alternative solutions. Continue assessments of Naval Power System alternate architectures to best meet emerging ship requirements. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603573N / *Advanced Surface Machinery Sys* | **Project (Number/Name)**<br>2471 / *Integrated Power Systems (IPS)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Complete biennial update of the Naval Power Systems Technology Development Roadmap. Support maturation and transition of ONR Future Naval Capabilitites (FNC) products to meet TDR identified gaps.<br><br>Continue Combat Power and Energy System Overarching Integrated Product Team (OIPT).<br><br>Generate strategy, technology development plan and resource requirements for future surface combatant integrated power system. | | | | | |
| ***FY 2016 Base Plans:***<br>Continue to execute the The Advanced Electric Power and Propulsion Project, Project Arrangement (short title AEP3 PA or PA) ref DoD-MOD-N-12-0001 which is an agreement between the US and UK Governments to cooperate on a scope of work associated with characterising, developing, modelling, and de-risking electrical power and propulsion system architectures and equipment for future surface and submarine platforms to meet the needs of both Navies.<br><br>Continue to develop power and propulsion system configurations in support of future surface ship acquisition programs. Develop alternative power and propulsion solutions for future surface combatants and amphibious ships. Continue to improve baseline power system performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continue to analyze alternatives for supplying power to advanced radars, combat systems, and electric weapons power demands and potential interfaces to develop optimum alternative solutions. Continue assessments of Naval Power System alternate architectures to best meet emerging ship requirements.<br><br>Commence biennial update of the Naval Power Systems Technology Development Roadmap.<br><br>Continue to support maturation and transition of ONR Future Naval Capabilitites (FNC) products to meet TDR identified gaps.<br><br>Continue Combat Power and Energy System Overarching Integrated Product Team (OIPT).<br><br>Continue to generate strategy, technology development plan and resource requirements for future surface combatant integrated power system. | | | | | |
| ***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603573N / *Advanced Surface Machinery Sys* | **Project (Number/Name)**<br>2471 / *Integrated Power Systems (IPS)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 17.551 | 21.026 | 25.904 | - | 25.904 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

This program develops and transitions higher performance and more affordable electric power and propulsion systems to both new construction and back fit ship applications using an evolutionary acquisition approach. Full and open competition is utilized to the maximum extent possible to provide maximum benefit to the Navy at the lowest possible cost to the taxpayer. When able to meet Navy requirements, commercial technology is leveraged to further minimize cost to the Navy.

**E. Performance Metrics**

This project will execute 100% of the signed Technology Transition Agreements with ONR; complete 100% of the advanced developments currently planned for the Energy Storage Module and Power Generation Module; achieve up to 10% Specific Fuel Consumption (SFC) improvement for Advanced Power Generation Module; mature technology to Technology Readiness Level (TRL) 6 by milestone decisions for ship acquisition programs; and, realize up to a 3% improvement in existing gas turbine engine SFC over engine operating profile.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603573N / *Advanced Surface Machinery Sys* | **Project (Number/Name)**<br>2471 / *Integrated Power Systems (IPS)* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | C/FFP | DRS : DRS, Milwaukee WI | 6.850 | 0.849 | Mar 2014 | 3.700 | Jan 2015 | 2.900 | Oct 2015 | - | | 2.900 | Continuing | Continuing | Continuing |
| Product Development | SS/FFP | Rolls Royce : Walpole, MA | 8.042 | 4.899 | Jan 2014 | 2.845 | Jan 2015 | 4.000 | Nov 2015 | - | | 4.000 | Continuing | Continuing | Continuing |
| Product Development | SS/BOA | General Electric Company : Cincinatti, OH | 3.560 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Product Development | C/FFP | DRS (AMDR PCM) : DRS, Milwaukee WI | 0.000 | 2.378 | Sep 2014 | 8.122 | Feb 2015 | 11.375 | Oct 2015 | - | | 11.375 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | Various : Various | 28.205 | 3.838 | Oct 2013 | 2.437 | Oct 2014 | 2.688 | Nov 2015 | - | | 2.688 | Continuing | Continuing | Continuing |
| Product Development | WR | NSWCCD-SSES : Phila, PA | 36.985 | 4.535 | Oct 2013 | 3.272 | Oct 2014 | 4.141 | Oct 2015 | - | | 4.141 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 83.642 | 16.499 | | 20.376 | | 25.104 | | - | | 25.104 | - | - | - |

**Remarks**

The growth in Advanced Surface Machinery Sys from FY15 to FY16 is driven by the number of Air Missile Defense Radar (AMDR) Power Conversion Modules (PCM) planned to be built in FY16. Specifically, Mission Power FY16 Plans include building three (3) units vs. the FY15 Plan to build one (1) unit. Building 3 units vs. 1 in addition to ordering Long Lead Time Material (LLTM) for two (2) units, conducting factory acceptance testing, and the continuance of test planning efforts directly resulted in an increase cost in FY16 planned budget vs. FY15.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | NSWCCD-SSES : Phila, PA | 24.540 | 0.414 | Oct 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 24.540 | 0.414 | | - | | - | | - | | - | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603573N / *Advanced Surface Machinery Sys* | Project (Number/Name)<br>2471 / *Integrated Power Systems (IPS)* | |

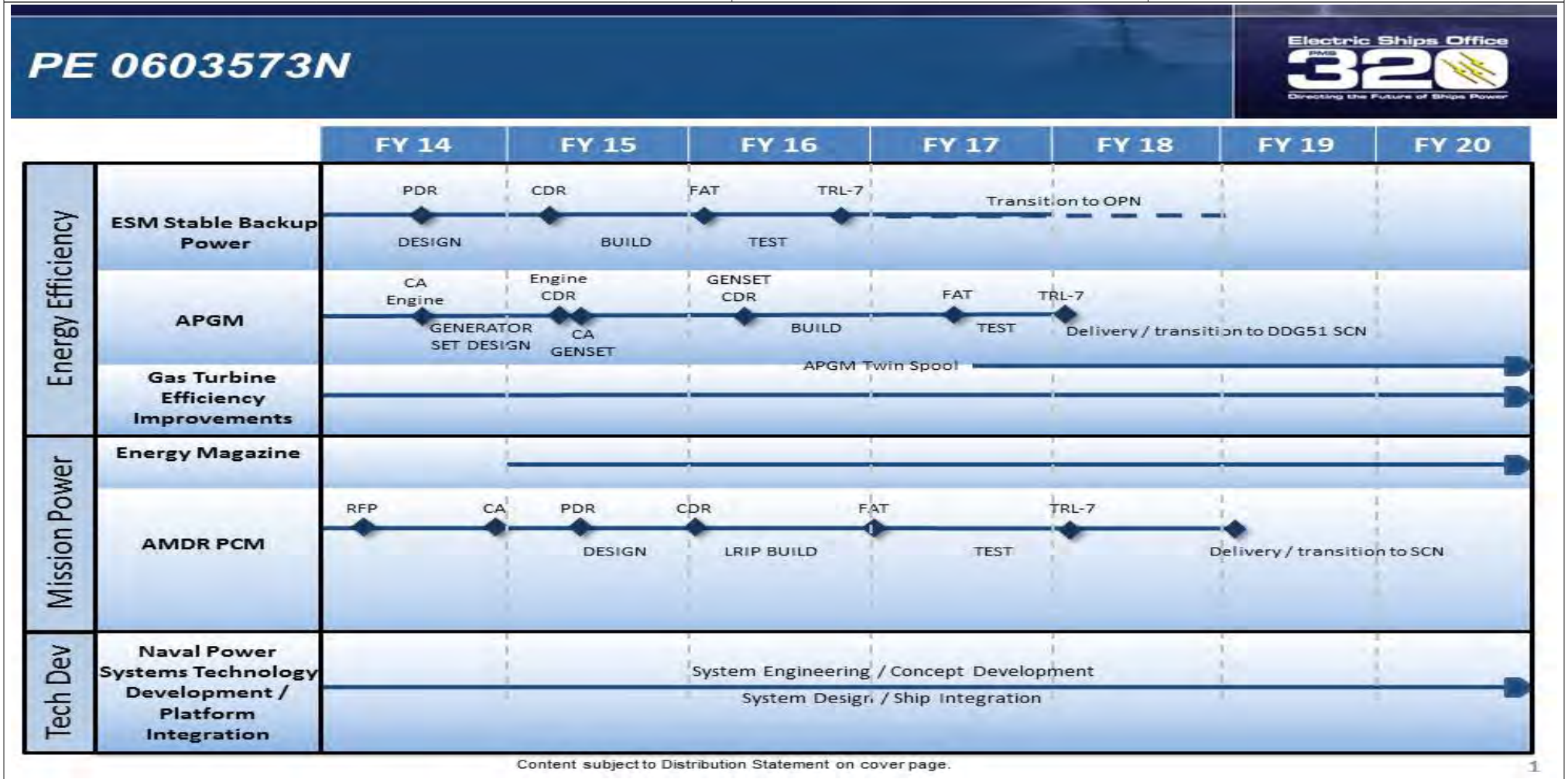
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management | C/CPFF | Herren Associates : Alexandria, VA | 1.079 | 0.638 | Oct 2013 | 0.650 | Oct 2014 | 0.800 | Oct 2015 | - | | 0.800 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.079 | 0.638 | | 0.650 | | 0.800 | | - | | 0.800 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 109.261 | 17.551 | | 21.026 | | 25.904 | | - | | 25.904 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603573N / *Advanced Surface Machinery Sys* | **Project (Number/Name)**<br>2471 / *Integrated Power Systems (IPS)* |




Content subject to Distribution Statement on cover page.

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603573N / *Advanced Surface Machinery Sys* | **Project (Number/Name)**<br>2471 / *Integrated Power Systems (IPS)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2471*** | | | | |
| Energy Efficiency | 1 | 2014 | 4 | 2020 |
| Mission Power | 1 | 2014 | 4 | 2020 |
| Naval Power Technology Development / Platforms Integration & transition | 1 | 2014 | 4 | 2020 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603576N *I (U)CHALK EAGLE* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 511.633 | 542.415 | 511.802 | - | 511.802 | 263.746 | 94.033 | 21.852 | 30.354 | Continuing | Continuing |
| 0000: *UNDIST* | 0.000 | - | 0.289 | - | - | - | - | - | - | - | - | 0.289 |
| 1578: *Chalk Eagle* | 0.000 | 511.633 | 542.126 | 511.802 | - | 511.802 | 263.746 | 94.033 | 21.852 | 30.354 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 518.804 | 542.700 | 430.379 | - | 430.379 |
| Current President's Budget | 511.633 | 542.415 | 511.802 | - | 511.802 |
| Total Adjustments | -7.171 | -0.285 | 81.423 | - | 81.423 |
| • Congressional General Reductions | - | -0.285 | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -7.171 | - | | | |
| • Program Adjustments | - | - | 40.138 | - | 40.138 |
| • Rate/Misc Adjustments | - | - | 41.285 | - | 41.285 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603576N / *(U)CHALK EAGLE* | Project (Number/Name)<br>0000 / *UNDIST* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0000: *UNDIST* | - | - | 0.289 | - | - | - | - | - | - | - | - | 0.289 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603576N / *(U)CHALK EAGLE* | Project (Number/Name)<br>1578 / *Chalk Eagle* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1578: *Chalk Eagle* | - | 511.633 | 542.126 | 511.802 | - | 511.802 | 263.746 | 94.033 | 21.852 | 30.354 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603581N *I (U)LITTORAL COMBAT SHIP* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 3,503.940 | 256.455 | 86.705 | 118.416 | - | 118.416 | 92.021 | 69.468 | 53.579 | 41.030 | Continuing | Continuing |
| 3096: *Littoral Combat Ship* | 954.376 | 160.587 | 86.705 | 110.209 | - | 110.209 | 75.391 | 66.168 | 51.279 | 40.030 | Continuing | Continuing |
| 3129: *LCS Mission Package Development* | 1,012.312 | 91.000 | - | - | - | - | - | - | - | - | - | 1,103.312 |
| 4018: *Littoral Combat Ship Construction* | 1,537.252 | 4.868 | - | - | - | - | - | - | - | - | - | 1,542.120 |
| 4506: *LCS Training* | 0.000 | - | - | 8.207 | - | 8.207 | 16.630 | 3.300 | 2.300 | 1.000 | Continuing | Continuing |
| **MDAP/MAIS Code:**<br>**Other MDAP/MAIS Code(s):** 374, 443 | | | | | | | | | | | | |

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

This Program Element (PE) provides funds for detailed design, development, construction, issue resolution, certification, integration, and testing of the Littoral Combat Ship (LCS). LCS is a fast, agile, and networked surface combatant with capabilities optimized to defeat asymmetric threats, and assure naval and joint force access into contested littoral regions. It uses open-systems architecture design, modular weapons, sensor systems, and a variety of manned and unmanned vehicles to expand the battle space and project offensive power into the littoral.

LCS operates with focused-mission packages that deploy manned and unmanned vehicles to execute a variety of missions, including littoral anti-submarine warfare (ASW), surface warfare (SUW), and mine countermeasures (MCM). LCS also possesses inherent capabilities, regardless of the mission package installed, including Intelligence, Surveillance, Reconnaissance (ISR), Homeland Defense, Maritime Interdiction/Interception Operations (MIO), Anti-Terrorism/Force Protection (AT/FP), air self-defense, joint littoral mobility, Special Operating Forces (SOF), and logistic support for movement of personnel and supplies. This relatively small, high-speed surface combatant complements the U.S. Navy's Surface Fleet by operating in environments where it is less desirable to employ larger, multi-mission ships. LCS can deploy independently to overseas littoral regions, remain on station for extended periods of time either with a battle group or through a forward-basing arrangement, and is capable of underway replenishment. LCS will operate with Carrier Strike Groups, Surface Action Groups, in groups of other similar ships, or independently for diplomatic and presence missions. Additionally, LCS can operate cooperatively with the U.S. Coast Guard and Allies.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | R-1 Program Element (Number/Name)<br>PE 0603581N *I (U)LITTORAL COMBAT SHIP* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | 210.217 | 88.734 | 109.146 | - | 109.146 |
| Current President's Budget | 256.455 | 86.705 | 118.416 | - | 118.416 |
| Total Adjustments | 46.238 | -2.029 | 9.270 | - | 9.270 |
| • Congressional General Reductions | - | -0.029 | | | |
| • Congressional Directed Reductions | - | -2.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 49.000 | - | | | |
| • SBIR/STTR Transfer | -2.761 | - | | | |
| • Program Adjustments | - | - | 10.000 | - | 10.000 |
| • Rate/Misc Adjustments | -0.001 | - | -0.730 | - | -0.730 |

**Change Summary Explanation**

FY14 changes result from Project Unit 3129 transferred to PE 0603596N and congressional SBIR reductions. The Consolidated Appropriations Act of 2014 directed the creation of a separate Program Element (PE) for Project 3129, LCS Mission Package Development, in FY14. This resulted in a transfer of Project 3129's budget from the LCS PE (0603581N) to LCS Mission Modules (PE 0603596N). In order to continue to execute Project 3129 (0603581N) while PE 0603596N was being created, $49M was reprogrammed back to PE 0603581N until PE 0603596N (3129) was created in FY14.

In FY16, LCS Total System Training Architecture transferred from Project Unit 3096 to Project Unit 4506.
The FY 2016 funding request was reduced by $20 million to account for the availability of prior year execution balances.
The FY 2016 funding request was increased by $30 million in order to support the RDTE efforts for the Modified LCS.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3096 / *Littoral Combat Ship* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3096: *Littoral Combat Ship* | 954.376 | 160.587 | 86.705 | 110.209 | - | 110.209 | 75.391 | 66.168 | 51.279 | 40.030 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**MDAP/MAIS Code:** 374

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

The RDT&E portion of the LCS Program is comprised of design and development efforts required to field the LCS Class Ships, including integration with the Mission Packages (MCM, ASW and SUW) activities both pre and post delivery. It includes the design and development effort required to support the introduction and deployment of a Flight 0+ baseline (LCS 3/4 And Follow) with incorporation of lessons learned from the design and construction of USS Freedom (LCS 1) and USS Independence (LCS 2). Additionally, it includes design, development, issue resolution, certification and testing efforts required to support the design baseline for the six year block buy in FY10-15. This baseline will include lessons learned from the LCS 1 through LCS 4.

The LCS design and development phases include platform design and development, experimentation, ship system design and integration, hull platform testing, development of Technical Data Packages (TDPs), total ship system engineering and integration, combat systems and warfare systems certification, and planning and conduct of system testing. These efforts include procurement of combat and warfare system elements and/or simulators to support production representative testing in support of design, development, and certification efforts and ordnance in support of testing.

The RDT&E portion of LCS funding is also comprised of formal Developmental and Operational Assessment testing of the LCS Ships and Mission Packages. Test and Evaluation (T&E) will concentrate on verifying integration and interoperability of employed technologies and systems in the LCS seaframe designs and modular mission packages to achieve the mission capabilities and performance requirements as defined in the LCS program's Flight 0 and Flight 0+ Capabilities Development Documents (CDD). T&E functions will include the evaluation of Critical Technical Parameters (CTP), Measures of Effectiveness (MOE), Measures of Suitability (MOS), and Key Performance Parameters (KPP) for the core seaframe and the focused missions.

The funding in FY16 for the Modified LCS includes efforts to conduct system engineering efforts to execute system requirements review (SRR) and prepare for future preliminary design review (PDR), including decomposing CDD requirements into system and warfare system element specifications, defining logical and physical interfaces, finalizing warfare system element selections, and conducting analyses to refine acquisition and contracting approaches for the modified LCS systems.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** LCS System-of-Systems Development, Engineering & Experimentation | 25.418 | 18.200 | 23.705 | - | 23.705 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provides for LCS Program systems engineering in support of Flight 0, Flight 0+, the FY10 Block Buy baseline design, and future procurement baseline design, development, certification, and production | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| (including ship system design and integration); combat system and C4I design, integration, and test; aviation (manned and unmanned) integration; modular mine countermeasure (MCM), anti-submarine warfare (ASW), and surface warfare (SUW) mission package (MP) integration; logistics product development; and various systems engineering activities required to perform risk analyses of new design and production technology concepts.<br><br>***FY 2014 Accomplishments:***<br>Flight 0 Baseline:<br>Provided systems engineering support for Seaframe and MCM Technical Evaluation (TECHEVAL) and Initial Operational Test and Evaluation (IOT&E) on USS Independence. Provided systems engineering support for the Seaframe and ASW capability integration on USS Freedom.<br><br>Flight 0+ and FY10 Block Buy Baselines:<br>Provided systems engineering support for Seaframe and SUW MP OT, TECHEVAL, IOT&E, and TSST on USS Fort Worth. Provided systems engineering support for Seaframe DT on USS Coronado. Began planning for TSST on USS Fort Worth and USS Coronado and for FSST on USS Milwaukee and USS Jackson. Conducted the Aluminum Compartmentalization on the Independence Variant to support LFT&E requirements. Provided Seaframe and Mission Systems engineering support to investigate, design, and develop technical solutions for design and production issues identified during USS Independence IOT&E. Provided Seaframe and Mission Systems engineering support for Combat Systems Software Development in support of USS Milwaukee and USS Jackson Builders Sea Trials preparations and execution. Continued support for Navy Classification design site including facility, IDE support, and engineering support for drawing review. Developed technical and performance baseline for future ship procurements based on systems design and testing execution. Conducted studies in support of development of future technical and performance baseline design upgrades.<br>***FY 2015 Plans:***<br>Flight 0 Baseline:<br>Provide systems engineering support for completion of Seaframe and MCM Technical Evaluation (TECHEVAL) and Initial Operational Test and Evaluation (IOT&E) on USS Independence. Continue systems engineering support for ASW capability integration on USS Freedom.<br><br>Flight 0+ and FY10 Block Buy Baselines:<br>Provide systems engineering support for Seaframe and SUW MP OT, TECHEVAL, and IOT&E on USS Coronado. Continue engineering support for planning and conduct TSST on LCS 4. Continue FSST planning | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| on LCS 5 and 6. Provide engineering support for MP/DT and ASW DT on USS Milwaukee. Provide Seaframe and Mission Systems engineering support to investigate, design, and develop technical solutions for design on both Freedom and Independence Class Ships. Finalize technical and performance baseline for future ship procurements based on systems design and testing execution. Continue conducting studies in support of development of future technical and performance baseline design upgrades.<br>***FY 2016 Base Plans:***<br>Flight 0+ and FY10 Block Buy Baselines:<br>Provide systems engineering support for Seaframe and ASW MP IOT&E on USS Milwaukee. Provide systems engineering support for Seaframe and ASW MP DT and ASW MP IOT&E on USS Jackson. Conduct FSST preparation, execution, and repairs on USS Milwaukee and USS Jackson. Provide systems engineering support for Seaframe and MCM MP DT, on USS Detroit. Provide Seaframe and Mission Systems engineering support to certify equipment to include oversight of design changes required for any re-certification. Finalize technical and performance baseline for future ship procurements based on systems design and testing execution. Continue conducting studies in support of development of future technical and performance baseline design upgrades.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** LCS Total System Training Architecture | 72.381 | 19.547 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** LCS is a minimally-manned ship, and the small crew size, combined with LCS's complex mission, does not allow adequate time for shipboard "on-the-job" training to achieve LCS operational availability. Consequently, LCS uses a Train-to-Qualify (T2Q)/Train- to-Certify (T2C) training process in an off-ship/shore-based virtual ship trainer environment, using simulators, and blended training solutions focused on both tactical and equipment operations and maintenance training. When completed, the LCS shore-based training capability will satisfy individual, team, unit, and force training, with an objective of meeting Capability Development Document (CDD) T2Q Key Performance Parameter (KPP) requirements.<br>***FY 2014 Accomplishments:***<br>Through the Training System Executive Agent (TSEA), Mission Bay Trainer development contract efforts culminated in contract award in Nov 2013 and execution is under way. Awarded a contract for development of Virtual Ship Training System (VSTS) electronic classrooms. Conducted the Combat Systems JDTA and continued to pursue instructor-led and interactive courseware development, coordinated LCS Training | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Facility Electronic Infrastructure and Infrastructure Integrated Product Team (LTF EII IPT) efforts, completed development of Learning Management System (LMS) installation and configuration requirements, and continued LCS Training Facility (LTF) San Diego Department of Defense (DoD) Information Assurance (IA) Certification and Accreditation (C&A) Package (DIACAP) development/management. Continued development of courseware in support of Hull, Mechanical, and Electrical (HM&E) system operations and preventative maintenance courses. Executing Phase II of the LCS 1 Integrated Tactical Trainer upgrade.<br>***FY 2015 Plans:***<br>RDTE funding for NAWCTSD goes to Contracting, Research and Engineering, Test and Evaluation, Logistics and Industrial Ops, and Finance management support and travel requirements as the LCS Training System Executive Agent. Funding is provided for completion of VSTS development and development and oversight of Virtual Reality (VR) Deck courseware for the LCS. CSCS is funded as the Training Support Agent (TSA) for fielding LCS 1 and LCS 2 Integrated Tactical Trainers (ITTs) and delivery of instruction. Delivery of instruction tasks include: oversight/management, curriculum maintenance, oversight of simulator maintenance, facility operating costs (phones, building maintenance etc.), and repair parts support for Littoral Combat Ship Training Facility (LTF) Level One trouble tickets. Funding also goes to continued LCS training Facility (LTF) San Diego Department of Defense (DoD) Information Assurance (IA) Certification and Accreditation (C&A) Package (DIACAP) development/management.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** LCS Test & Evaluation | 62.788 | 48.958 | 56.504 | - | 56.504 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Execute formal LCS Developmental Testing and Operational Testing (DT/OT), including Live Fire Test and Evaluation (LFT&E), and procurement of T&E Ordnance. Execute DT and C4I integration, and test; aviation (manned and unmanned) integration; modular mine countermeasure (MCM), anti-submarine warfare (ASW), and surface warfare (SUW) mission package (MP) integration.<br>***FY 2014 Accomplishments:***<br>Flight 0 baseline: | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Conducted DT/Rough Water trials on USS Independence. Continued Surface Warfare (SUW), Air Defense (AD) and Mine Counter Measure (MCM) developmental testing on USS Independence.<br><br>Flight 0+ baseline:<br>Conducted Vertical Takeoff Unmanned Aerial Vehicle (VTUAV) Dynamic Interface testing on LCS 3 and LCS 4. Conducted seaframe and SUW DT events for LCS 3 and LCS 4. Conducted Techeval and IOT&E for the Seaframe and SUW MP on LCS 3. Continued planning for LCS 3 and LCS 4 TSST. Conducted TSST on LCS 3. Began planning and pre trial analysis for FSST on LCS 5 and 6. Continued planning for Multi-Compartment Surrogate test (fire and blast) to support LFT&E. Conducted other LFT&E related surrogate tests: Tensile Tearing tests and Intermediate Scale Fire tests related to welded aluminum structures. Began developing Detailed Design Integrated Survivability Assessment Reports (DDISAR) for LCS Freedom and LCS Independence. Planned and conducted sea-based 57mm lethality testing.<br>***FY 2015 Plans:***<br>Flight 0 Baseline:<br>Complete DT/Rough Water Trials on USS Freedom. Complete TECHEVAL and Initial Operability Test and Evaluation (IOT&E) on USS Independence with the MCM MP.<br><br>Flight 0+ Baseline:<br>Conduct SUW MP DT, TECHEVAL, and IOT&E on LCS 4 with the SUW MP. Continue planning for TSST on LCS 4. Continue planning and pre-trial analysis for LCS 5 and LCS 6 FSST. Complete planning for Multi-Compartment Surrogate test to support LFT&E. Continue developing Detailed Design Integrated Survivability Assessment Report (DDISAR) for LCS Freedom and LCS Independence.<br>***FY 2016 Base Plans:***<br>Flight 0+ Baseline:<br>Conduct LCS 4 TSST. Conduct ASW MP/DT on LCS 5 and LCS 6. Continue planning for LCS 5 and LCS 6 FSST. Conduct LCS 5 and LCS 6 FSST. Conduct Multi-Compartment Surrogate test (fire and blast) to support LFT&E. Complete Detailed Design Integrated Survivability Assessment Report (DDISAR) for LCS Freedom and LCS Independence. Begin developing the final Survivability Assessment Report (SAR).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Modified LCS | - | - | 30.000 | - | 30.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Modified LCS (M-LCS) will be a more lethal and survivable multi-mission warship focusing on anti-surface warfare and anti-submarine warfare capabilities (SUW/ASW) but maintaining the ability to reconfigure with mission modules for increased capability as desired. M-LCS adds significant capability while maximizing LCS investments made to date in the small surface combatant force. Modifications will likely include over-the-horizon surface-to-surface missile system, upgraded Air Defense weapons and sensors, advanced electronic warfare system and improved decoys, towed array system for ASW and torpedo defense, and 25mm guns.<br><br>***FY 2014 Accomplishments:***<br>N/A<br><br>***FY 2015 Plans:***<br>N/A<br><br>***FY 2016 Base Plans:***<br>Conduct system engineering efforts to execute system requirements review (SRR) and prepare for future preliminary design review (PDR), including decomposing CDD requirements into system and warfare system element specifications, defining logical and physical interfaces, finalizing warfare system element selections, and conducting analyses to refine acquisition and contracting approaches for the modified LCS systems. Conduct ship preliminary design, naval architecture, machinery engineering, trade-off studies, and topside design analysis for both LCS ship variants to integrate warfare system, vulnerability, and recoverability improvements. Fund LCS shipbuilders and prime integrators to assess weight reduction initiatives and design feasibility of improved systems on LCS Class ships no later than FY19.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 160.587 | 86.705 | 110.209 | - | 110.209 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 2127: *Littoral Combat Ship* | 1,829.174 | 1,427.049 | 1,436.991 | - | 1,436.991 | 1,510.341 | 1,544.144 | 1,273.343 | 1,733.929 | 10,564.968 | 28,565.740 |
| • 1600: *LCS Common Mission Modules Equipment* | 35.966 | 30.938 | 23.500 | - | 23.500 | 23.991 | 14.775 | 15.844 | 17.083 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 5110: *Outfitting/Post Delivery* | 68.165 | 112.016 | 200.370 | - | 200.370 | 191.789 | 179.514 | 219.624 | 122.649 | 1,506.200 | 2,683.800 |
| • 1320: *LCS Training Equipment* | 23.426 | 9.630 | 59.031 | - | 59.031 | 3.117 | 4.060 | 18.076 | 18.466 | Continuing | Continuing |
| • 0944: *LCS Class Support Equipment* | 47.078 | 25.742 | 48.399 | - | 48.399 | 90.113 | 84.384 | 89.685 | 85.860 | Continuing | Continuing |
| • 1601: *LCS MCM Mission Modules* | 34.885 | 15.270 | 85.151 | - | 85.151 | 151.019 | 139.386 | 144.697 | 67.338 | Continuing | Continuing |
| • 1602: *LCS AWS Mission Modules* | - | - | - | - | - | 32.681 | 53.750 | 54.025 | 55.013 | Continuing | Continuing |
| • 1603: *LCS SUW Mission Modules* | 19.481 | 14.750 | 35.228 | - | 35.228 | 35.587 | 38.040 | 39.008 | 40.164 | Continuing | Continuing |
| • 1605: *Remote Minehunting System (RMS)* | - | - | - | 87.627 | 87.627 | 68.409 | 58.457 | 58.003 | 37.371 | Continuing | Continuing |
| • 3129: *LCS Mission Modules* | 105.682 | 176.948 | 206.149 | - | 206.149 | 125.761 | 57.067 | 46.582 | 39.463 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The LCS program takes an evolutionary approach to acquisition that emphasizes competition as a key to achieving affordability. Initially, two industry teams competed against each other with two distinctly different LCS designs. The decision produced two flights with a vessel from each design: Flight 0 (LCS 1 and LCS 2); and Flight 0+ (LCS 3 and out). The Flight 0+ baseline incorporates lessons learned from the design, construction, and testing of the Flight 0 ships. The Navy conducted a limited competition amongst the existing LCS industry teams or team participants for the award of a contract for the construction of a block buy of up to ten (10) LCS Flight 0+ Class ships, with an objective of competitively awarding a single contract to a single industry team.

By Acquisition Decision Memorandum of December 23, 2010, the USD (AT&L) authorized execution of an alternative acquisition strategy for the FY 2010 through FY 2015 procurement of 20 seaframes through two ten-ship block buy contracts. On December 29, 2010, the Navy awarded two contracts for block buys of up to ten ships, beginning with the award to each contractor of one FY 2010 ship and associated non-recurring engineering, the development of the Technical Data Package (TDP), core class services, and associated data. This was followed by the contractual funding of one ship to each contractor in FY 2011 and two ships each funded in FY 2012 through FY 2014.

On October 17, 2014 USD(AT&L) approved the Navy's plan to procure three ships in FY 2015 and three ships in FY 2016 by modifying the current block buy contracts. The modification to each of the block buy contracts will complete the previously approved 20 ship block buy and add options for the remaining two FY 2016 ships for a total of 26 LCS. The Navy is developing a follow on Acquisition Strategy for FY 2017 - 2018 which will complete the 32 ship portion of the LCS program. As required by the December 10, 2014 SECDEF Memo on the Littoral Combat Ship Program Way Ahead, the Navy is currently developing an Acquisition Strategy to support design and procurement of Modified LCSs no later than FY 2019.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |

**E. Performance Metrics**

The LCS Program achieved Milestone A and Program Initiation in May 2004 and Milestone B in February 2011. The LCS program conducts annual Defense Acquisition Board In-Process Reviews (DAB IPRs). The first Seaframe and Mission Module integrated program DAB IPR was conducted in January 2013 and is held in September thereafter.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3096 / *Littoral Combat Ship* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LCS 1 & 2 Shore Trainers | C/CPAF | LM, BIW : Various | 56.536 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Program Office Support | Various | Various : Various | 9.100 | 10.600 | Jul 2014 | 4.460 | Mar 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Training Development - Support | WR | NAWC TSD : Orlando, FL | 10.413 | 5.618 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| LCS1 & LCS2 Bridge Part Task Trainers | SS/FFP | Computer Sciences Corp. (CSC) : Falls Church, VA | 4.578 | - | | 2.404 | May 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| LCS1 & LCS2 TAO Trainers | C/CPFF | Northrop Grumman Corp. : Falls Church, VA | 2.531 | 3.673 | May 2014 | 2.107 | May 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| LCS Mission Bay Trainer | C/FFP | Cubic Corp : Orlando, FL | 3.112 | 25.171 | May 2014 | 5.576 | May 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Training Development - Support | WR | Various : Various | 8.266 | 4.995 | Nov 2013 | 1.600 | Nov 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Training Development - Industry | C/CPAF | Lockheed Martin : Various | 10.800 | 2.500 | May 2014 | 1.000 | May 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Training Operations | WR | NSWC DD/CSCS : Various | 2.340 | 3.250 | Nov 2013 | 2.400 | Nov 2014 | - | | - | | - | - | 7.990 | - |
| Distance Support | WR | NAWC TSD : Orlando, FL | 4.900 | - | | - | | - | | - | | - | - | 4.900 | - |
| Virtual Ship Training System (VSTS) | C/FFP | TBD : TBD | 0.000 | 9.475 | Jul 2014 | - | | - | | - | | - | 9.170 | 18.645 | - |
| Deck IVSE | C/FFP | TBD : TBD | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Combat Systems IVSE | C/FFP | TBD : TBD | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Readiness Control Officer LCS 1 IVSE | C/FFP | Cubic Corp : Orlando, FL | 2.472 | - | | - | | - | | - | | - | - | 2.472 | - |
| Readiness Control Officer LCS 2 IVSE | C/FFP | Cubic Corp : Orlando, FL | 0.000 | 2.503 | Dec 2013 | - | | - | | - | | - | - | 2.503 | - |
| Mission Bay Trainer Haptics IVSE | C/FFP | Cubic Corp : Orlando, FL | 0.000 | 4.596 | Mar 2014 | - | | - | | - | | - | - | 4.596 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3096 / *Littoral Combat Ship* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Plant Technician (EPT) LCS 1 IVSE | C/FFP | Cubic Corp : Orlando, FL | 15.483 | - | | - | | - | | - | | - | - | 15.483 | - |
| Engineering Plant Technician (EPT) LCS 2 IVSE | C/FFP | Cubic Corp : Orlando, FL | 15.174 | - | | - | | - | | - | | - | - | 15.174 | - |
| Class Design Services | SS/CPAF | LM, GD : Various | 48.340 | - | | - | | - | | - | | - | - | 48.340 | - |
| Final Design(Flight 0) | C/CPAF | LM, BIW : Various | 175.263 | - | | - | | - | | - | | - | - | 175.263 | - |
| Flight 0 C41 | WR | PEO C41 : Various | 5.506 | - | | - | | - | | - | | - | - | 5.506 | - |
| SH-60B Datalink | C/CPAF | LM, BIW : Various | 2.435 | - | | - | | - | | - | | - | - | 2.435 | - |
| Modified LCS Common Software Architecture | C/BA | Industry : TBD | 0.000 | - | | - | | 5.000 | Mar 2016 | - | | 5.000 | - | 5.000 | - |
| Modified LCS Software Integration | C/BA | Industry : TBD | 0.000 | - | | - | | 14.000 | Mar 2016 | - | | 14.000 | - | 14.000 | - |
| | | **Subtotal** | 377.249 | 72.381 | | 19.547 | | 19.000 | | - | | 19.000 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | NSWC/DD : Dahlgren, VA | 53.029 | 6.490 | Mar 2014 | 5.521 | Nov 2014 | 7.229 | Nov 2015 | - | | 7.229 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | NSWC/PC : Panama City, FL | 25.682 | 1.854 | Mar 2014 | 0.451 | Feb 2015 | 0.369 | Nov 2015 | - | | 0.369 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | NUWC : Newport, RI | 9.311 | 0.265 | Dec 2013 | 0.098 | Feb 2015 | 0.457 | Nov 2015 | - | | 0.457 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | NAWC AD : Pax River, VA | 22.533 | 1.456 | Mar 2014 | 1.073 | Feb 2015 | 0.752 | Nov 2015 | - | | 0.752 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | NSWC/CR : Crane, IN | 16.776 | 0.625 | Jan 2014 | 0.321 | Feb 2015 | 0.122 | Nov 2015 | - | | 0.122 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | NSWC/SSES : Philadelphia, PA | 56.745 | 9.043 | Dec 2013 | 4.000 | Feb 2015 | 6.440 | Nov 2015 | - | | 6.440 | Continuing | Continuing | Continuing |
| Government Engineering Support | Various | Government Activities : Various | 35.898 | 6.596 | Mar 2014 | 5.526 | Nov 2014 | 7.436 | Nov 2015 | - | | 7.436 | Continuing | Continuing | Continuing |
| Contractor Engineering Support | C/CPAF | Alion/CSC : Arlington, VA | 46.613 | 0.600 | Mar 2014 | 1.210 | Feb 2015 | 0.900 | Nov 2015 | - | | 0.900 | Continuing | Continuing | Continuing |
| Contractor Engineering Support | C/CPAF | Various : Various | 18.473 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Modified LCS Design | C/BA | Industry : TBD | 0.000 | - | | - | | 1.500 | Mar 2016 | - | | 1.500 | - | 1.500 | - |
| Modified LCS Design | WR | NSWC/DD : Dahlgren, VA | 0.000 | - | | - | | 4.000 | Nov 2015 | - | | 4.000 | - | 4.000 | - |
| Modified LCS Design | WR | NSWC/PHD : Port Hueneme, CA | 0.000 | - | | - | | 0.500 | Nov 2015 | - | | 0.500 | - | 0.500 | - |
| | | **Subtotal** | 285.060 | 26.929 | | 18.200 | | 29.705 | | - | | 29.705 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation | C/CPAF | Alion/CSC : Arlington, VA | 22.290 | 7.931 | Dec 2013 | 1.623 | Feb 2015 | 1.256 | Jul 2016 | - | | 1.256 | Continuing | Continuing | Continuing |
| Test & Evaluation | WR | NSWC/PHD : Port Hueneme, CA | 41.441 | 9.652 | Dec 2013 | 4.285 | Oct 2014 | 3.238 | Nov 2015 | - | | 3.238 | Continuing | Continuing | Continuing |
| Test & Evaluation | WR | NSWC/SSES : Philadelphia, PA | 43.990 | 11.911 | Dec 2013 | 13.288 | Feb 2015 | 17.229 | Nov 2015 | - | | 17.229 | Continuing | Continuing | Continuing |
| Test & Evaluation | WR | NSWC/PC : Panama City, FL | 12.898 | 2.955 | Mar 2014 | 0.475 | Oct 2014 | 0.480 | Nov 2015 | - | | 0.480 | Continuing | Continuing | Continuing |
| Test & Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 10.011 | 2.845 | Dec 2013 | 1.278 | Nov 2014 | 0.834 | Nov 2015 | - | | 0.834 | Continuing | Continuing | Continuing |
| Test & Evaluation | WR | NSWC/COR : Corona, CA | 10.837 | 2.950 | Jan 2014 | 3.203 | Feb 2015 | 1.800 | Nov 2015 | - | | 1.800 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3096 / *Littoral Combat Ship* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation | WR | Various : Various | 54.098 | 9.274 | May 2014 | 5.404 | Oct 2014 | 0.785 | Nov 2015 | - | | 0.785 | Continuing | Continuing | Continuing |
| Test & Evaluation | C/CPAF | LM/GD : Various | 45.576 | 10.745 | May 2014 | 7.949 | Apr 2015 | 30.882 | Feb 2016 | - | | 30.882 | Continuing | Continuing | Continuing |
| Test & Evaluation | WR | PEO C4I : Charleston, SC | 8.808 | 2.754 | Dec 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| T&E Ordnance | WR | PEO IWS : Various | 7.277 | 0.260 | Dec 2013 | 11.453 | Oct 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Modified LCS LFT&E | C/BA | Industry : TBD | 0.000 | - | | - | | 2.000 | Mar 2016 | - | | 2.000 | - | 2.000 | - |
| | | **Subtotal** | 257.226 | 61.277 | | 48.958 | | 58.504 | | - | | 58.504 | - | - | - |

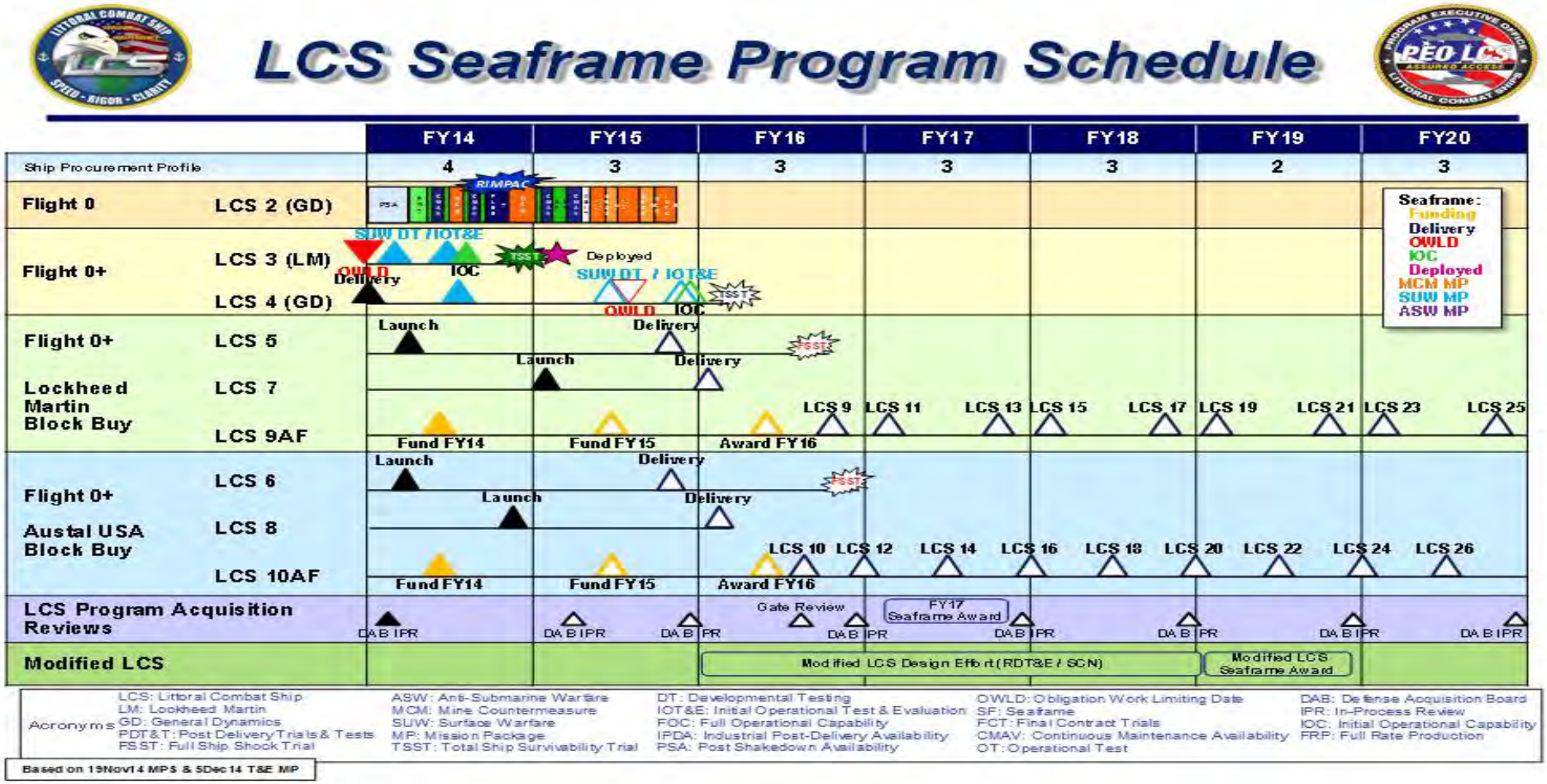
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Modified LCS Prog Mgmt Spt | C/CPFF | CSC : Arlington, VA | 0.000 | - | | - | | 1.500 | Nov 2015 | - | | 1.500 | - | 1.500 | - |
| Modified LCS Prog Mgmt Spt | WR | NSWC/SSES : Philadelphia, PA | 0.000 | - | | - | | 1.500 | Nov 2015 | - | | 1.500 | - | 1.500 | - |
| Program Management Support- SEAPORT | C/CPAF | Alion/CSC : Arlington, VA | 20.593 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Program Management Support | Various | Various : Various | 12.212 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Program Management Support - Design | C/CPAF | Various : Arlington, VA | 2.036 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 34.841 | - | | - | | 3.000 | | - | | 3.000 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 954.376 | 160.587 | | 86.705 | | 110.209 | | - | | 110.209 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3096 / *Littoral Combat Ship* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3096*** | | | | |
| Post Delivery DT 3- LCS 2: Flight 0: Post Delivery Developmental Testing (DT) with MCM MP | 2 | 2014 | 3 | 2014 |
| Post Delivery DT 3- LCS 4: Flight 0: Post Delivery Developmental Testing (DT) with SUW MP | 2 | 2014 | 3 | 2015 |
| TECHEVAL- LCS 2: Flight 0: Technical Evaluation(TECHEVAL) with MCM MP | 3 | 2015 | 3 | 2015 |
| TECHEVAL - LCS 4: Flight 0: Technical Evaluation(TECHEVAL) with SUW MP | 3 | 2015 | 3 | 2015 |
| IOT&E- LCS 2: Flight 0: Initial Operational Test and Evaluation (IOT&E) with MCM MP | 4 | 2015 | 4 | 2015 |
| IOT&E - LCS 4: Flight 0: Initial Operational Test and Evaluation (IOT&E) with SUW MP | 4 | 2015 | 4 | 2015 |
| Post Delivery DT 4- LCS 2: Flight 0: Post Delivery Developmental Testing (DT) | 1 | 2015 | 1 | 2015 |
| TSST - LCS 3: Total Ship Survivability Trial (TSST) LCS 3 | 4 | 2014 | 1 | 2015 |
| TSST - LCS 4: Total Ship Survivability Trial (TSST) LCS 4 | 1 | 2016 | 1 | 2016 |
| FSST - LCS 5: LCS 5 FSST | 3 | 2016 | 4 | 2016 |
| FSST - LCS 6: LCS 6 FSST | 4 | 2016 | 1 | 2017 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | | | | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 3129: *LCS Mission Package Development* | 1,012.312 | 91.000 | - | - | - | - | - | - | - | - | - | 1,103.312 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**MDAP/MAIS Code:** 443

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

Program provides focused war fighting capabilities in littoral mine countermeasures, countering small boat threats and littoral anti-submarine warfare to provide assured access to enable the US Joint Force operations in the littorals. A mission package is a combination of warfare mission modules with specialized crew, support equipment, and vehicles including manned helicopters and unmanned maritime systems. They are packaged in a modular fashion so that they can be quickly swapped out pier side. Mission module development includes architectures, interfaces and integration of mission systems. Mission systems integration also includes the procurement of the first mission packages to be used on the Flight 0 Littoral Combat Ships (LCS). The program has an inventory objective of 24 MCM mission packages, 24 SUW mission packages, and 16 ASW mission packages. Mission package procurement and delivery are aligned with the ship delivery schedule, mission area demand signal from the combatant commanders, and the retirement of legacy platforms. This means that 64 interchangeable mission packages will be available for use among the seaframe variants of the LCS class to support global warfighting and peacetime presence requirements.

An incremental development approach to delivering capability allows the continued insertion of mature capabilities throughout the life of the program without the need for modifications to the sea frames. Future mission package increments will be considered when joint warfighting objectives or changing threats create new operational capability requirements that cannot be met by current mission package designs, or when new technological opportunities allow significant progress toward delivering cost effective, enhanced capabilities. Future mission module increments can be tested, constructed, and incorporated into existing mission packages, one of the most important benefits of LCS modular design.

The LCS MCM mission package will counter deep, shallow, and tethered mines in the littoral without putting Sailors in the minefield. When the MCM mission package is embarked, LCS is capable of conducting detect-to-engage operations (hunting, sweeping, and neutralization) against very shallow and deep-water sea mine threats. The MCM mission package provides these capabilities through the use of sensors and weapons deployed from an MH-60S multi-mission helicopter and unmanned off-board vehicles. The MCM package consists of the following systems: Coastal Battlefield Reconnaissance & Analysis (COBRA), Airborne Laser Mine Detection System (ALMDS), Remote Multi-Mission Vehicle (RMMV), AQS-20A Mine hunting Sonar, Airborne Mine Neutralization System (AMNS), Unmanned Integrated Sweep System (UISS)(which is comprised of the Unmanned Surface Vehicle (USV) and the Unmanned Surface Sweep System (US3)), Surface Mine Countermeasures (SMCM) Unmanned Undersea Vehicle (UUV) with Low Frequency Broad Band (LFBB), support equipment and support containers. The individual systems are combined into five modules: Organic Airborne Mine Countermeasures (OAMCM) Module, Remote Mine Hunting Module, Unmanned Influence Sweep Module, Coastal Mine Reconnaissance Module and the Buried Mine Module. The Organic Airborne Mine Countermeasures Module provides rapid mine hunting and clearing using the embarked MH-60 helicopter and Mine Countermeasure systems. The Remote Mine Hunting Module uses a Remote Multi-Mission Vehicle (RMMV) and AQS-20A to provide sustained mine hunting and clearing from the surface. The Influence Sweep Module provides endurance bottom sweep capability, the Coastal Mine

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

Reconnaissance Module (CMRM) will allow detection of minefield patterns and obstacles from an embarked Fire Scout VTUAV, and the Buried Mine Module will allow detection of buried mines. When complete, the MCM mission package will provide full capability against floating, tethered, bottom, and buried mines.

The ASW mission package enables LCS to conduct detect-to-engage operations against modern submarines that pose a threat. Specific ASW capabilities include protecting forces in transit, protecting joint operating areas, and establishing ASW barriers.

ASW modules developed to provide the warfighter capabilities that can be employed for ASW area search as well as high value unit escort missions. Module components include a torpedo countermeasures system, a Variable Depth Sonar, and a Multi-Function Towed Array. The Aviation Module offers airborne threat localization and engagement capability through a Fire Scout VTUAV and an MH-60R with MK54 torpedoes. The individual systems are combined into three modules: Torpedo Defense Countermeasure; ASW Escort/Large area Clearance; and Aviation Module.

The SUW mission package increases firepower and offensive/defensive capabilities against large numbers of highly maneuverable, fast, small craft threats, giving LCS the ability to protect the sea lanes and move a force quickly through a choke point or other strategic waterway. With the SUW mission package embarked, LCS has enhanced detection and engagement capability against enemy small craft and similar littoral surface threats.

The SUW mission package is comprised of several modules including the Gun Mission Module (GMM). The GMM is comprised of two high velocity 30mm cannons and is augmented with the ship's 57mm gun to counter close in to mid-range threats. The Aviation Module uses the embarked MH-60R helicopter with Hellfire missile and the MQ-8B Fire Scout Vertical Take-off and Landing Tactical Unmanned Aerial Vehicle (VTUAV) - for the detection, identification, and classification of surface contacts and to engage long range threats. The Maritime Security Module supports the embarkation of a Visit, Board, Search, and Seizure (VBSS) team. The Surface to Surface Missile Module (SSMM) will provide missile coverage for mid-range threats and small boats.

The LCS Mission Modules Common Equipment consists of enabling products required by all mission packages to provide common hardware interfaces, computer operating environment, communications systems, aviation interface systems and portable development & integration test-sets. Common hardware interfaces include definition, installation and control of mechanical, electrical and cooling requirements common to all mission packages. The Mission Package Computing Environment (MPCE) provides common services and Operating Environment to support all Mission Package Application Software and Open Architecture Products. The Multi-Vehicle Communications System (MVCS) enables the control and data exchange of simultaneous unmanned mission vehicles and the Seaframes. Aviation interface systems include integration and management of data communications, data processing and physical hardware interfaces such as common equipment and containers used by all mission packages. Development and integration test-sets provide a mobile operating environment installed in the Mission Package Portable Control Stations (MP-PCS) to serve as a surrogate Seaframe during mission package development and integration test events at test ranges.

Per the FY14 Appriopriations Act, the LCS Mission Modules Program has been assigned its own PE of 0603596N. Prior year funding is located in PE 0603581N. FY14 funding was transferred to the greatest extent practicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** System Engineering | 4.859 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |

***FY 2014 Accomplishments:***
Supported Capability Production Document (CPD) for SUW Increment III, MCM Increment II/III development. Provided SE guidance to the TSRs, CCBs, RMB, PPP and RAM-C Working group and others as identified in the LCS MM SEP. Coordinated and provide guidance for all LCS MP SETR events including but not limited to the following: PDR, CDR, SRR, TRR. Provided management oversight for the Configuration Control Board including reviewing and approving ECPs. Negotiate connection agreements with Littoral Combat Ship (LCS) Squadron One (LCSRON) Class IA Manager (IAM) allowing mission packages to operate on LCS. Support all Certification Test and Evaluation (CT&E) events conducted which include MPAS, results will be used to develop revised PRA package/risk deficiency database. Updated the LCS Mission Modules Program Protection Plan and the Information Assurance Strategy to support MPCE 2.0 development. Supported the SSSTRP and WSESRB Review of mission packages and prepare the closure of findings. Develop MAR package for risk acceptance. Updated the PMS 420 System Safety Management Plan (SSMP) Plan. Completed mission package Integration System Hazard Analysis (SHA). Update the PMS 420 Hazardous Material Management Program (HMMP) Plan. Identified and manage ESOH mishap risk maintained within the Program Hazard Tracking Database. Coordinate HSI activities across MPs and integrate MPs with seaframe HSI activities. Monitor the implementation of the PMS 420 MM HSI Plan. Updated the following SE documents including: LCS MM SEP; Corrosion Prevention Control Plan (CPCP), PESHE, Life Cycle Signature Support Plan. Continued supporting opportunities for technology transition identified in the S&T Notebook to include at-sea refueling, data mission payload, and lightweight container. Supported and track weight against the Weight Management Plan. Leverage modeling and simulation to support CPD development for mission packages. Continued tracking SE Metrics including requirements and engineering change volatility and LCS MM Systems Readiness Level (SRL) assessment. Continued implementation of M&S Plan to certify the following: NMWS M&S in support of MCM IOT&E; ATRT to support SUW MPAS regression testing; SUW MM Increment I/II modeling; ASW modeling for developmental testing.

***FY 2015 Plans:***
N/A

***FY 2016 Base Plans:***
N/A

***FY 2016 OCO Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Program Management | 8.600 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Supported all efforts associated with Milestone C. Continued PM efforts: business and administrative planning, organizing, directing, coordinating, controlling, and approval actions designated to accomplish overall program objectives that are not associated with specific hardware elements or included in systems engineering.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** System Test and Evaluation | 16.706 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Conducted SUW MP TECHEVAL/IOT&E aboard LCS 1 variant. Completed Planning, and conducted Execution, Data Analysis and Reporting for SUW MP TECHEVAL with increasing stress scenarios to characterize performance of SUW MP against requirements and in preparation and readiness for IOT&E. Completed test planning and OTRR preparation and executed both events for SUW MP IOT&E on LCS 1 variant. Conducted data analysis and reporting for SUW MP TECHEVAL. Conducted SUW MP DT on LCS 2 variant. Began SUW MP SSMM planning. Commenced conduct of SSMM live fire test program and completed GMM live fire test program to include data analysis and report. Conducted MCM MP AMCM Phase B Operational Assessment. Conducted MCM MP Unmanned Systems Operational Assessment. Continued test planning and OTRR preparation to support execution of both events for MCM MP TECHEVAL and IOT&E. Conducted data analysis and reporting for MCM MP TECHEVAL and IOT&E. Continued test planning, conducted initial integration test, transition from engineering to DT testing of the ASW MP on the LCS platform; Performed data analysis of initial ASW MP testing. Conducted National Environmental Policy Act (NEPA) and environmental planning and coordination to support DT/TECHEVAL/IOT&E. Conducted and Support Certification Test and Evaluation to include software certification/assessment testing, reporting, and events such as MPRAs, MRAs, Test Readiness | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Reviews, WSESRB, etc. and in order to support fleet deployment upon completion of the DT/TECHEVAL/IOT&E events.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Integration, Assemble, Test and Checkout | 7.612 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Performed Mission Package - Seaframe Integration and Aviation Integration.<br>Seaframe Integration provided services that support the successful integration of the MCM, SUW, and ASW Mission Packages into both variants of LCS seaframes. Mission Package (MP) - Seaframe integration engineering includes: Hardware integration engineering, Software integration engineering, Launch handling & recovery integration engineering, Waterfront integration, Mission Systems and Ship Integration Team (MSSIT), Communications integration, Seaframe studies, and ship modification technical data package development. Aviation Integration: Continued to integrate new capabilities of VTUAV onto LCS, such as weapons and radar. Integrated the larger and higher endurance MQ-8C with LCS. Integrated new Mission Package driven payloads onto the VTUAV. Provided HSF or CV-TSC/PLA functionality as MP solution. Integrated MH-60S SUW enhancements into SUW MP (20mm gun, missiles, radar, data link). Conducted systems engineering for VTUAV and MH-60S ASW enhancements into ASW MP. Conducted systems engineering analysis of alternatives for integrating new Unmanned Aerial Systems into MPs. Continued program level Integration, Assembly, Test & Checkout efforts of ECPs required to correct findings from Developmental and Operational test events.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Training Systems Development | 8.100 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Achieved partial Ready for Training (RFT) at NETC facility for MCM MM training using Common Mission Package Trainer (CMPT) team trainer and Networked Tactical Trainer System (NTTS) part task trainers. Continued Mine Warfare Evaluator (MIWE), Remote Vehicle Operator (RVO) and Remote Sensor Operator (RSO) training precursors to LCS MCM MM Fundamentals and Capstone courses. Updated interim and formal curriculum to incorporate findings from program test events, operations and classroom experience. Updated CMPT MCM and SUW integrated team trainer software for delivery of incremental capability to support MM Fundamentals, MM Operations and MM Planning curriculum. Updated Information Assurance posture as required to support integrated training using Fleet Synthetic Training in the Navy Cooperative Training Environment (NCTE). Continued SUW formal training curriculum instruction development for MM Fundamentals, Capstone and Planning Courses necessary to achieve partial RFT in FY15. Performed vendor and interim training for formal MCM, SUW, and ASW test events. Funded training related detachment travel and provided Vendor and interim formal training to MCM, ASW, and SUW MM replacement Sailors and new MCM and SUW detachments in accordance with CSPPs. | | | | | |
| ***FY 2015 Plans:***<br>N/A | | | | | |
| ***FY 2016 Base Plans:***<br>N/A | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Program Technical Data | 0.932 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Updated Program Technical Data packages to incorporate findings from SUW MP and MCM MP OT events. Finalized initial Integrated Logistics Support products in support of SUW MP FY14 IOC. Prepared for the MCM MP IOC late FY 14 / early FY 15. Continued Technical Manual Management Activity to review, produce, and distribute technical documentation for the program. Continued development of MPSF automated inventory | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| management system (IMS) based on pRFID solution. Started integrated logistics overarching support for the ASW MP and the new increments. Provided overarching provision for Program.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Common Equipment | 7.200 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Mission Package Computing: Continued MPCE v1.9 hardware production and tech refresh activities. INCO of CMPT #3 on LCS 6. Prepared tech refresh for the shore sites (MPPCS #1 and #2) and for LCS 1and LCS 2. Provided maintenance deliveries for MPS/MPOE. PMS 420 CM delivery of MUS v1.0.1p occurred. Conducted quarterly IPRs. Continued development activities to evolve MPCE software architecture to a Service Oriented Architecture (SOA), MPCE v2.0, in support of the CSA Baseline. Mission Package Communications: Supported MCM MPT TECHEVAL workups with MVCS v1.0.0. Prepared for the delivery of MVCS HW and SW builds v2.6. Supported testing of MVCS v1.0.0 on SMCM UUV and UISS.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Mine Countermeasures (MCM) Mission Package | 6.800 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Procured USV EDMs. Finalized design for Surface Mine Countermeasures (SMCM) UUV container and procured EDM support container. Designed and integrated the SMCM UUV into MCM MPs. Conducted MCM | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| mission package TECHEVAL and OPEVAL. Conducted KPP modeling analysis. Resolved hardware PTRs identified during testing through development of ACSNs. Complete the integration of RMMV v4.2.1 with MCM MP Increment I. Prepare for and conduct Systems Engineering Technical Reviews (SETR) (SRR/PDR) for MCM MP Increment III. In support of MCM mission package, incorporated the following items into MPAS: RMMV RGP V4.3 improvements, correction of software PTRs identified during MCM MP testing, and MEDAL EA integration. Performed systems engineering (risk management, information assurance, human systems integration, safety), configuration management, and Integrated Logistics Support efforts.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Anti-Submarine Warfare (ASW) Mission Package | 18.100 | - | - | - | - |
| ***Articles:*** | 1 | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Conducted a System Functional Review (SFR) which defined system requirements and functional performance requirements. Conducted required systems engineering technical reviews to ensure system design meets the total CDD requirement. Conducted component and system level testing and related predictive performance modeling and simulation to establish system and module performance and reliability baselines. Provided developmental engineering support for logistical engineering data and technical documentation. Continued Mission Module development and LCS integration to include Mission Module level at-sea testing.<br><br>Completed the preliminary ASW System Subsystem Specification (SSS) and draft Mission Module SSS. SSS conditionally approved by Technical Scope Review board on 15 July. Completed DoDAF products and Interface Requirements Specification.<br><br>Collected data and performed analyses associated with the ASW MP Reliability, Maintainability, and Availability (RMA) program. Successfully completed the Combat Management System (CMS) testing at Lockheed Martin (LM) Moorestown Mission System Integration Center (MSIC). Provided Find/Fix/Repair for technical issues associated with Mission Package Application Software (MPAS) identified during integration and developmental | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| testing and conducted necessary regression testing on proposed fixes. Provided developmental engineering support, equipment, and documentation for logistical engineering data and technical publications to include training (ship's crew and Mission Package Support Facility (MPSF) personnel), maintenance and provisioning. Conducted mission package certification, obtained Information Assurance (IA) approvals (i.e. IATT for LBIT), and conducted land based test events. Supported the planning and preparations for the pre Developmental Test (DT) of ASW MP ADM. Conducted studies and analyses on emerging technologies for incorporation into future ASW MP Increments.<br><br>Completed and executed Ship Control Document #14658 to support modifications required to install the ASW MP Advanced Development Model (ADM) on LCS 1 to conduct testing in 4QFY14.<br><br>Released solicitation requesting white papers on project concepts to support release of a Request for Proposal (RFP) for the Rapid Technology Insertion (RTI) process, which will solicit technology solutions to enhance the successful completion of the primary Littoral Combat Ships (LCS) missions. Reviewed 12 whitepapers submitted in responses to the solicitation.<br><br>Kicked off and completed NAVAIR study.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Surface Warfare (SUW) Mission Package | 11.249 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>SSMM Inc 1 formal technical data package will be finalized. Continued SSMM Increment I development. Initiated developmental testing to categorize modifications to the current MPAS baseline. Initiated modifications to MPAS to support continued SSMM Increment I development. Conducted appropriate systems engineering technical reviews to ensure missile system design meets the total CDD requirement. Continued planning the SSMM Increment I environmental confidence level testing. Continued development of the detailed launcher design that | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| supports the SSMM Increment I concept. Completed DT/OT/IOT&E for the Gun Mission Module onboard LCS 1 variant. Completed STF and DT of the Gun Mission Module on USS Independence (LCS 2) variant. Participated in RIMPAC on USS Independence (LCS 2). Find/Fix/Repair technical issues associated with GMM and MPAS identified during STF and DT/OT events. Maintained configuration control of SUW MP data, hardware, and software. Collected data and perform analysis associated with the SUW MP Reliability, Maintainability, and Availability (RMA) program. Conducted combat system certification, MP certification, obtain WSESRB/SSSTRP approval, IA approvals, and conduct shipboard test events with each seaframe manufacturer. Supported formal testing of the SUW MP for LCS 1 variant OT events, STF from LCS 2 variant, DT from LCS 2 variant, and OT from LCS 2 variant.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Reliability, Availability and Maintainability | 0.842 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued to monitor Reliability Growth and update plans as necessary. Continued to refine RAM model assumptions based on actual data and conduct multiple sensitivity analysis to quantify the effect of alternate sparing philosophies (i.e. more onboard spares, complete spare system, etc.) based on mission module availability. Determined the maintenance throughput capability for the mission systems at the Mission Package Support Facility/Mission Module Readiness Center (MPSF/MMRC) depot. Refined modeling of ASW MP. Continued utilizing FRACAS to feed back product and process improvements to the Systems Engineering and ILS organizations.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 91.000 | - | - | - | - |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 2127: *Littoral Combat Ship* | 1,829.174 | 1,427.049 | 1,436.991 | - | 1,436.991 | 1,510.341 | 1,544.144 | 1,273.343 | 1,733.929 | 10,564.968 | 28,565.740 |
| • 1600: *LCS Common Mission Modules Equipment* | 35.966 | 30.938 | 23.500 | - | 23.500 | 23.991 | 14.775 | 15.844 | 17.083 | Continuing | Continuing |
| • 5110: *Outfitting/Post Delivery* | 68.165 | 112.016 | 200.370 | - | 200.370 | 191.789 | 179.514 | 219.624 | 122.649 | 1,506.200 | 2,683.800 |
| • 1320: *LCS Training Equipment* | 23.426 | 9.630 | 59.031 | - | 59.031 | 3.117 | 4.060 | 18.076 | 18.466 | Continuing | Continuing |
| • 0944: *LCS Class Support Equipment* | 47.078 | 25.742 | 48.399 | - | 48.399 | 90.113 | 84.384 | 89.685 | 85.860 | Continuing | Continuing |
| • 1601: *LCS MCM Mission Modules* | 34.885 | 15.270 | 85.151 | - | 85.151 | 151.019 | 139.386 | 144.697 | 67.338 | Continuing | Continuing |
| • 1602: *LCS ASW Mission Modules.* | - | - | - | - | - | 62.681 | 53.750 | 54.025 | 55.013 | Continuing | Continuing |
| • 1603: *LCS SUW Mission Modules* | 19.481 | 14.750 | 35.228 | - | 35.228 | 35.587 | 38.040 | 39.008 | 40.164 | Continuing | Continuing |
| • 1605: *Remote Minehunting System (RMS)* | - | - | 87.627 | - | 87.627 | 68.409 | 58.457 | 58.003 | 37.371 | Continuing | Continuing |
| • 3129: *LCS Mission Modules* | 105.682 | 176.948 | 206.149 | - | 206.149 | 125.761 | 57.067 | 46.582 | 39.463 | Continuing | Continuing |
| • PE/LI: *LCS Training* | - | - | 8.207 | - | 8.207 | 16.630 | 3.300 | 2.300 | 1.000 | - | 31.437 |

**Remarks**

**D. Acquisition Strategy**

The LCS Mission Module Acquisition Strategy is employing an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability through the introduction of mature programs of record into the respective Mission Packages until the full baseline capability defined in the Capability Development Document (CDD) is reached.

**E. Performance Metrics**

Milestone Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1 System Engineering | WR | NSWC PC : Panama City, FL | 7.144 | 0.902 | Oct 2013 | - | | - | | - | | - | - | 8.046 | - |
| 1.1 System Engineering | WR | NSWC DD : Dahlgren, VA | 7.028 | 0.475 | Oct 2013 | - | | - | | - | | - | - | 7.503 | - |
| 1.1 System Engineering | C/CPFF | Northrop Grumman : Bethpage, NY | 11.176 | 1.664 | Oct 2013 | - | | - | | - | | - | - | 12.840 | - |
| 1.1 System Engineering | WR | SPAWAR PAC : San Diego, CA | 3.584 | 0.848 | Oct 2013 | - | | - | | - | | - | - | 4.432 | - |
| 1.1 System Engineering | WR | NUWC NPT : Newport, RI | 3.507 | 0.200 | Oct 2013 | - | | - | | - | | - | - | 3.707 | - |
| 1.1 System Engineering | C/CPFF | CACI : Fairfax, VA | 3.137 | 0.220 | Oct 2013 | - | | - | | - | | - | - | 3.357 | - |
| 1.1 System Engineering | C/CPFF | AAC : Uniontown, PA | 6.979 | - | | - | | - | | - | | - | - | 6.979 | - |
| 1.1 System Engineering | WR | NSWC PHD : Port Hueneme, CA | 1.362 | - | | - | | - | | - | | - | - | 1.362 | - |
| 1.1 System Engineering | WR | NSWC Carderock : Bethesda, MD | 0.000 | 0.198 | Oct 2013 | - | | - | | - | | - | - | 0.198 | - |
| 1.1 System Engineering | C/CPFF | JHU/APL : Laurel, MD | 0.000 | 0.198 | Dec 2013 | - | | - | | - | | - | - | 0.198 | - |
| 1.1 System Engineering | WR | NUWC KPT : Keyport, WA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.1 System Engineering | WR | CDSA Dam Neck : Virginia Beach, VA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.1 System Engineering | WR | NSWC Corona : Corona, CA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.1.7 System Engineering RAM-C Project | WR | Various : Various | 1.500 | - | | - | | - | | - | | - | - | 1.500 | - |
| 1.4 Integration, Assembly, Test and Check | WR | NAWC AD : Patuxent River, MD | 1.620 | 0.352 | Oct 2013 | - | | - | | - | | - | - | 1.972 | - |
| 1.4 Integration, Assembly, Test and Checkout | C/CPFF | Northrop Grumman : Bethpage, NY | 0.857 | 0.176 | Oct 2013 | - | | - | | - | | - | - | 1.033 | - |
| 1.4 Integration, Assembly, Test and Check | WR | SPAWAR PAC : San Diego, CA | 2.433 | - | | - | | - | | - | | - | - | 2.433 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.4 Integration, Assembly, Test and Check | WR | NUWC NPT : Newport, RI | 1.146 | - | | - | | - | | - | | - | - | 1.146 | - |
| 1.4 Integration, Assembly, Test and Check | WR | NSWC PC : Panama City, FL | 2.128 | 0.198 | Oct 2013 | - | | - | | - | | - | - | 2.326 | - |
| 1.4 Integration, Assembly, Test and Check | WR | SUPSHIP Gulfcoast : Pascagoula, MS | 2.043 | - | | - | | - | | - | | - | - | 2.043 | - |
| 1.4 Integration, Assembly, Test and Check | WR | SUPSHIP Bath : Bath, ME | 2.050 | - | | - | | - | | - | | - | - | 2.050 | - |
| 1.4 Integration, Assembly, Test and Check | WR | NSWC DD : Dahlgren, VA | 5.560 | 0.490 | Oct 2013 | - | | - | | - | | - | - | 6.050 | - |
| 1.4 Integration, Assembly, Test and Checkout | WR | NSWC PHD : Port Hueneme, CA | 0.850 | - | | - | | - | | - | | - | - | 0.850 | - |
| 1.4 Integration, Assembly, Test and Checkout | WR | NSWC Crane : Crane, Indiana | 0.000 | 0.264 | Oct 2013 | - | | - | | - | | - | - | 0.264 | - |
| 1.4 Integration, Assembly, Test and Checkout | WR | NSWC Carderock : Bethesda, MD | 0.000 | 0.425 | Oct 2013 | - | | - | | - | | - | - | 0.425 | - |
| 1.4 Integration, Assembly, Test and Checkout | C/CPFF | CACI : Fairfax, VA | 0.000 | 0.176 | Oct 2013 | - | | - | | - | | - | - | 0.176 | - |
| 1.4 Integration, Assembly, Test and Checkout | Sub Allot | CECOM Bldg 1207 : Various | 0.000 | 0.176 | Oct 2013 | - | | - | | - | | - | - | 0.176 | - |
| 1.12 Common Equipment Development | WR | NSWC PC : Panama City, FL | 84.326 | 2.068 | Oct 2013 | - | | - | | - | | - | - | 86.394 | - |
| 1.12 Common Equipment Development | C/CPFF | Northrop Grumman : Bethpage, NY | 21.728 | 0.761 | Oct 2013 | - | | - | | - | | - | - | 22.489 | - |
| 1.12 Common Equipment Development | WR | NUWC NPT : Newport, RI | 8.669 | 0.215 | Oct 2013 | - | | - | | - | | - | - | 8.884 | - |
| 1.12 Common Equipment Development | WR | NSWC DD : Dahlgren, VA | 4.608 | 0.548 | Oct 2013 | - | | - | | - | | - | - | 5.156 | - |
| 1.12 Common Equipment Development | WR | NAVAIR PMA266 : Patuxent River, MD | 6.500 | - | | - | | - | | - | | - | - | 6.500 | - |
| 1.12 Common Equipment Development | C/CPFF | AAC : Uniontown, PA | 0.000 | 0.410 | Oct 2013 | - | | - | | - | | - | - | 0.410 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.12 Common Equipment Development | WR | PMW 760 : Various | 0.000 | 0.157 | Oct 2013 | - | | - | | - | | - | - | 0.157 | - |
| 1.12 Common Equipment Development | WR | SPAWAR PACIFIC : San Diego, CA | 0.000 | 0.471 | Oct 2013 | - | | - | | - | | - | - | 0.471 | - |
| 1.12 Common Equipment Development | C/CPFF | ARL/UT : Austin, TX | 0.000 | 0.115 | Dec 2013 | - | | - | | - | | - | - | 0.115 | - |
| 1.13 MCM MP | WR | NSWC PC : Panama City, FL | 142.161 | 6.612 | Oct 2013 | - | | - | | - | | - | - | 148.773 | - |
| 1.13 MCM MP | WR | NSWC CD : Little Creek, VA | 6.000 | - | | - | | - | | - | | - | - | 6.000 | - |
| 1.13 MCM MP | Sub Allot | PMS 406 : Various | 5.999 | 2.645 | Dec 2013 | - | | - | | - | | - | - | 8.644 | - |
| 1.13 MCM MP | C/CPFF | Lockheed Martin : Riviera Beach, FL | 38.540 | 3.409 | Dec 2013 | - | | - | | - | | - | - | 41.949 | - |
| 1.13 MCM MP | C/CPFF | Raytheon : Tewksbury, MA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.14 ASW MP | Sub Allot | PEO IWS5 : Various | 10.734 | 12.846 | Oct 2013 | - | | - | | - | | - | - | 23.580 | - |
| 1.14 ASW MP | WR | NUWC NPT : Newport, RI | 11.000 | 4.270 | Oct 2013 | - | | - | | - | | - | - | 15.270 | - |
| 1.14 ASW MP | TBD | Various : Various | 163.543 | - | | - | | - | | - | | - | - | 163.543 | - |
| 1.14 ASW MP | WR | NSWC Dam Neck : Virginia Beach, VA | 0.920 | 0.607 | Oct 2013 | - | | - | | - | | - | - | 1.527 | - |
| 1.14 ASW MP | C/CPFF | Northrop Grumman : Bethpage, NY | 1.300 | 0.704 | Oct 2013 | - | | - | | - | | - | - | 2.004 | - |
| 1.14 ASW MP | C/CPFF | SPA : Washington, DC | 0.000 | 0.308 | Oct 2013 | - | | - | | - | | - | - | 0.308 | - |
| 1.14 ASW MP | Sub Allot | TBD Activity Placeholder : TBD | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.14 ASW MP | WR | NSWC PCD : Panama City, FL | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.14 ASW MP | WR | NSWC DD : Dahlgren, VA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.14 ASW MP | C/CPFF | CACI : Arlingrton, VA | 0.000 | - | | - | | - | | - | | - | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.14 ASW MP | WR | NUWC KPT : Keyport, WA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.14 ASW MP | WR | SSC PAC : San Diego, CA | 0.000 | 0.154 | Oct 2013 | - | | - | | - | | - | - | 0.154 | - |
| 1.14 ASW MP | WR | Lockheed Martin : Riviera Beach, FL | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.15 SUW MP | WR | NSWC DD : Dahlgren, VA | 199.569 | 10.428 | Oct 2013 | - | | - | | - | | - | - | 209.997 | - |
| 1.15 SUW MP | WR | NSWC PHD : Port Hueneme, CA | 11.058 | 2.810 | Oct 2013 | - | | - | | - | | - | - | 13.868 | - |
| 1.15 SUW MP | WR | SPAWAR PACIFIC : San Diego, CA | 3.259 | - | | - | | - | | - | | - | - | 3.259 | - |
| 1.15 SUW MP | C/CPFF | Northrop Grumman : Bethpage, NY | 10.995 | 6.598 | Oct 2013 | - | | - | | - | | - | - | 17.593 | - |
| 1.15 SUW MP | WR | NAWC WD : Ridgecrest, CA | 0.000 | 2.639 | Oct 2013 | - | | - | | - | | - | - | 2.639 | - |
| 1.15 SUW MP | WR | NSWC CD : Crane, IN | 0.000 | 0.088 | Oct 2013 | - | | - | | - | | - | - | 0.088 | - |
| 1.15 SUW MP | WR | NSWC Corona : Corona, CA | 0.000 | 0.110 | Oct 2013 | - | | - | | - | | - | - | 0.110 | - |
| 1.15 SUW MP | WR | NSWC PC : Panama City, FL | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.15 SUW MP | WR | PEO IWS 3 : Various | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.16 MP-PCS Equipment | WR | Various : Various | 3.547 | - | | - | | - | | - | | - | - | 3.547 | - |
| 1.19 Pre-Production Engineering | WR | Various : Various | 8.425 | - | | - | | - | | - | | - | - | 8.425 | - |
| 1.20 Irregular Warfare Module | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.20 Irregular Warfare Module | WR | SPARWAR PAC : San Diego, CA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 806.985 | 65.935 | | - | | - | | - | | - | - | 872.920 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1.10 Reliability, Maintainability, and Availability | C/CPFF | CACI : Fairfax, VA | 0.000 | 0.138 | Oct 2013 | - | | - | | - | | - | - | 0.138 | - |
| 1.1.10 Reliability, Maintainability, and Availability | WR | NSWC PC : Panama City, FL | 0.881 | 0.208 | Oct 2013 | - | | - | | - | | - | - | 1.089 | - |
| 1.1.10 Reliability, Maintainability, and Availability | WR | NUWC, NPT : Newport, RI | 0.000 | 0.091 | Oct 2013 | - | | - | | - | | - | - | 0.091 | - |
| 1.1.10 Reliability, Maintainability, and Availability | WR | NSWC, Dahlgren : Dahlgren, VA | 1.080 | 0.091 | Oct 2013 | - | | - | | - | | - | - | 1.171 | - |
| 1.1.10 Reliability, Maintainability, and Availability | WR | NUWC KPT : Keyport, WA | 0.000 | 0.298 | Oct 2013 | - | | - | | - | | - | - | 0.298 | - |
| 1.5 Training Systems Development | WR | NSWC Corona : Corona, CA | 0.000 | 0.065 | Oct 2013 | - | | - | | - | | - | - | 0.065 | - |
| 1.5 Training Systems Development | WR | NAWC TSD : Orlando, FL | 14.399 | 0.770 | Oct 2013 | - | | - | | - | | - | - | 15.169 | - |
| 1.5 Training Systems Development | WR | NSWC PC : Panama City, FL | 16.753 | 0.704 | Oct 2013 | - | | - | | - | | - | - | 17.457 | - |
| 1.5 Training Systems Development | WR | NSWC PHD : Port Hueneme, CA | 6.454 | 0.660 | Oct 2013 | - | | - | | - | | - | - | 7.114 | - |
| 1.5 Training Systems Development | C/CPFF | AAC : Uniontown, PA | 10.810 | 0.669 | Oct 2013 | - | | - | | - | | - | - | 11.479 | - |
| 1.5 Training Systems Development | C/CPFF | CACI : Fairfax, VA | 0.576 | 0.330 | Oct 2013 | - | | - | | - | | - | - | 0.906 | - |
| 1.5 Training Systems Development | WR | CSCS : Dahlgren, VA | 2.083 | 0.804 | Oct 2013 | - | | - | | - | | - | - | 2.887 | - |
| 1.5 Training Systems Development | C/CPFF | Northrop Grumman : Bethpage, NY | 1.934 | 0.442 | Oct 2013 | - | | - | | - | | - | - | 2.376 | - |
| 1.5 Training Systems Development | WR | CNSF : San Diego, CA | 2.100 | 0.330 | Oct 2013 | - | | - | | - | | - | - | 2.430 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5 Training Systems Development | WR | NSWC, Dahlgren : Dahlgren, VA | 0.000 | 0.055 | Oct 2013 | - | | - | | - | | - | - | 0.055 | - |
| 1.5 Training Systems Development | WR | NUWC, Newport : Newport, RI | 0.000 | 0.026 | Oct 2013 | - | | - | | - | | - | - | 0.026 | - |
| 1.5 Training Systems Development | WR | JHU/APL : Laurel, MD | 0.000 | 0.220 | Dec 2013 | - | | - | | - | | - | - | 0.220 | - |
| 1.5 Training Systems Development | C/BA | CDSA, Dam Neck : Dam Neck, VA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.6 Program Technical Data | WR | NSWC PC : Panama City, FL | 1.361 | 0.118 | Oct 2013 | - | | - | | - | | - | - | 1.479 | - |
| 1.6 Program Technical Data | C/CPFF | Northrop Grumman : Bethpage, NY | 0.750 | 0.118 | Oct 2013 | - | | - | | - | | - | - | 0.868 | - |
| 1.6 Program Technical Data | WR | CACI : Fairfax, VA | 0.250 | 0.118 | Oct 2013 | - | | - | | - | | - | - | 0.368 | - |
| 1.6 Program Technical Data | WR | NUWC KPT : Keyport, WA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 59.431 | 6.255 | | - | | - | | - | | - | - | 65.686 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.3 System Test and Evaluation | WR | NSWC PCD : Panama City, FL | 37.009 | 6.307 | Oct 2013 | - | | - | | - | | - | - | 43.316 | - |
| 1.3 System Test and Evaluation | WR | NSWC DD : Dahlgren, VA | 34.513 | 3.487 | Oct 2013 | - | | - | | - | | - | - | 38.000 | - |
| 1.3 System Test and Evaluation | WR | NUWC NPT : Newport, RI | 6.200 | 0.330 | Oct 2013 | - | | - | | - | | - | - | 6.530 | - |
| 1.3 System Test and Evaluation | WR | NSWC PHD : Port Hueneme, CA | 16.570 | 3.681 | Oct 2013 | - | | - | | - | | - | - | 20.251 | - |
| 1.3 System Test and Evaluation | WR | SPAWAR PAC : San Diego, CA | 5.697 | 0.550 | Oct 2013 | - | | - | | - | | - | - | 6.247 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.3 System Test and Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 3.083 | 0.550 | Oct 2013 | - | | - | | - | | - | - | 3.633 | - |
| 1.3 System Test and Evaluation | WR | PMA 266 : Patuzent River, MD | 0.344 | 0.154 | Oct 2013 | - | | - | | - | | - | - | 0.498 | - |
| 1.3 System Test and Evaluation | C/BA | Silver Ships : Theodore, AL | 0.550 | 0.242 | Dec 2013 | - | | - | | - | | - | - | 0.792 | - |
| 1.3 System Test and Evaluation | C/BA | CNSF : Norfolk, VA | 0.264 | 0.110 | Oct 2013 | - | | - | | - | | - | - | 0.374 | - |
| 1.3 System Test and Evaluation | C/BA | NAWC WD : Point Mugu, CA | 2.420 | 1.100 | Oct 2013 | - | | - | | - | | - | - | 3.520 | - |
| 1.3 System Test and Evaluation | C/BA | NSWC Corona : Corona, CA | 0.000 | 0.220 | Oct 2013 | - | | - | | - | | - | - | 0.220 | - |
| | | **Subtotal** | 106.650 | 16.731 | | - | | - | | - | | - | - | 123.381 | - |

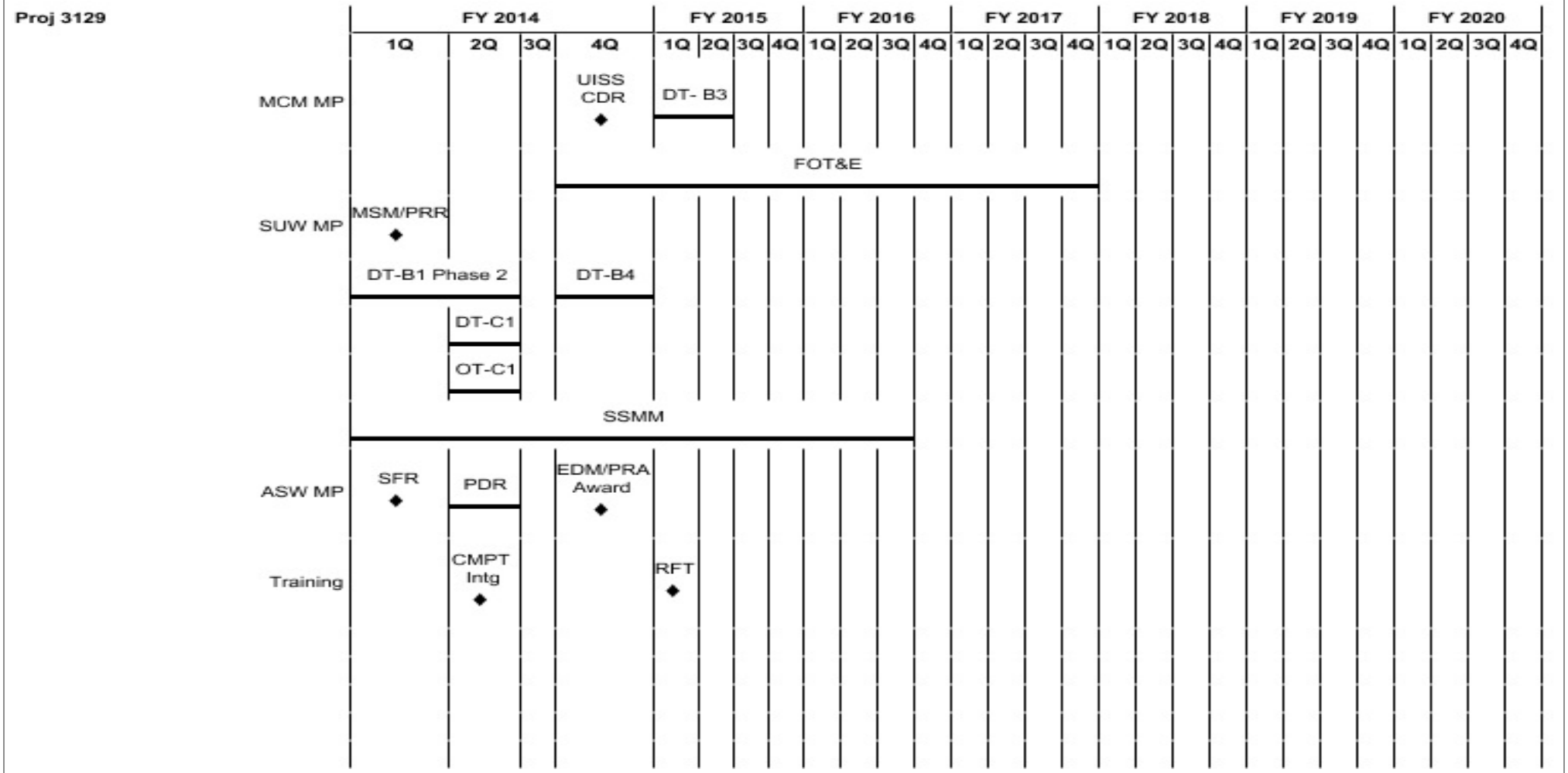
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Workforce | Various | Various : Various | 1.047 | - | | - | | - | | - | | - | - | 1.047 | - |
| 1.2 Program Management | C/CPFF | CACI : Fairfax, VA | 35.266 | 2.079 | Oct 2013 | - | | - | | - | | - | - | 37.345 | - |
| 1.2 Program Management | WR | NSWC PCD : Panama City, FL | 1.453 | - | | - | | - | | - | | - | - | 1.453 | - |
| 1.2 Program Management | WR | NSWC DD : Dahlgren, VA | 1.480 | - | | - | | - | | - | | - | - | 1.480 | - |
| | | **Subtotal** | 39.246 | 2.079 | | - | | - | | - | | - | - | 41.325 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,012.312 | 91.000 | | - | | - | | - | | - | - | 1,103.312 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3129*** | | | | |
| MCM MP: MCM MP Increment I DT - B3 (Freedom Variant) | 1 | 2015 | 2 | 2015 |
| MCM MP: MCM UISS CDR | 4 | 2014 | 4 | 2014 |
| MCM MP: MCM FOT&E | 4 | 2014 | 4 | 2017 |
| SUW MP: SUW MP Increment II PRR (MSM) | 1 | 2014 | 1 | 2014 |
| SUW MP: SUW MP Increment I & II DT-B1 Phase 2 (Freedom Variant) | 1 | 2014 | 2 | 2014 |
| SUW MP: SUW MP Increment I & II DT-B4 (Independence Variant) | 4 | 2014 | 4 | 2014 |
| SUW MP: SUW MP Increment I & II TECHEVAL DT-C1 | 2 | 2014 | 2 | 2014 |
| SUW MP: SUM MP Increment I & II IOT&E OT-C1 (Freedom VAriant | 2 | 2014 | 2 | 2014 |
| SUW MP: SUW MP SSMM Development | 1 | 2014 | 3 | 2016 |
| ASW MP: ASW MP Increment II SFR | 1 | 2014 | 1 | 2014 |
| ASW MP: ASW MP Increment II PDR | 2 | 2014 | 2 | 2014 |
| ASW MP: ASW MP Increment II EDM/PRA Award | 4 | 2014 | 4 | 2014 |
| Training: CMPT - GD Tactical Team Trainer Integration Complete | 2 | 2014 | 2 | 2014 |
| Training: MCM Couserware Update to support MCM TECHEVAL AND IOT&E | 1 | 2015 | 1 | 2015 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | | | | Project (Number/Name)<br>4018 / *Littoral Combat Ship Construction* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 4018: *Littoral Combat Ship Construction* | 1,537.252 | 4.868 | - | - | - | - | - | - | - | - | - | 1,542.120 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**MDAP/MAIS Code:** 374

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

The Littoral Combat Ship (LCS) is a fast, agile, and networked surface combatant with capabilities optimized to defeat asymmetric threats, and assure naval and joint force access into contested littoral regions. It uses open-systems-architecture design, modular weapons, sensor systems, and a variety of manned and unmanned vehicles to expand the battle space and project offensive power into the littoral. LCS operates with focused-mission packages that deploy manned and unmanned vehicles to execute a variety of missions, including littoral anti-submarine warfare (ASW), surface warfare (SUW), and mine countermeasures (MCM). LCS also possesses inherent capabilities, regardless of mission package installed, including Intelligence Surveillance Reconnaissance (ISR), homeland defense, Maritime Interdiction/Interception Operations (MIO), anti-terrorism/force protection (AT/FP), air self-defense, joint littoral mobility, and Special Operating Forces (SOF) and logistic support for movement of personnel and supplies. This relatively small, high-speed surface combatant will complement the U.S. Navy's AEGIS fleet by operating in environments where it is less desirable to employ larger, multi-mission ships. It can deploy independently to overseas littoral regions, remain on station for extended periods of time either with a battle group or through a forward-basing arrangement, and is capable of underway replenishment. It will operate with Carrier Strike Groups, Surface Action Groups, in groups of other similar ships, or independently for diplomatic and presence missions. Additionally, it can operate cooperatively with the U.S. Coast Guard and Allies. The LCS construction phase includes the construction of two LCS Flight 0 Class Ships, one each of two designs, and includes Government Furnished Equipment (GFE) for ships systems, Final System Design (FSD), Detail Design, introduction of final interface requirements for integration with mission packages from the Mission Systems and Ship Integration Team (MSSIT), and Outfitting and Post Delivery (OF/PD).

Data as of Feb 2014:
USS Freedom (LCS 1)
Basic Construction: 521.0
Change Orders: 0.5
GFE: 12.0
Other: 3.5
Total Cost*: 537.0

USS Independence (LCS 2)
Basic Construction: 635.0
Change Orders: 3.5
GFE: 7.0

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>4018 / *Littoral Combat Ship Construction* |

Other: 7.5
Total Cost*: 653.0

* Does not include OF/PD and FSD/MSSIT.

Non End Cost Item: FSD/MSSIT 25.0 (LCS1), 54.0 (LCS2) Non End Cost Item: OF/PD 120.3 (LCS1), 145.6 (LCS2);FSD/MSSIT costs for USS Freedom and USS Independence are not true construction costs and are costs associated with design completion.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Outfitting and Post Delivery | 4.868 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provides for the completion of ship outfitting to include: (a) ship provisioning and fuel, (b) initial load-out of repair parts, spares, and test equipment in accordance with allowance list, (c) provision of technical manuals and required drawings, (d) installation and validation of PMS and EOSS, and (e) crew training and completion of ship system certification requirements. Implements instrumentation packages and validates structural, sea keeping, and hydrodynamic performance. Provides emergent support during the execution of Post Delivery Test & Trials (PDT&T) and Post-Shakedown Availability (PSA). Incorporates Engineering Change Proposals (ECPs) to correct trial card deficiencies, and mission critical upgrades (as required).<br><br>***FY 2014 Accomplishments:***<br>For USS Independence (LCS 2): Conducted Special Trials (ST) and provided technical support for the Board of Inspection and Survey (INSURV). Completed PSA 2 to accomplish engineering changes, mission critical upgrades, and correction of trial cards and seaframe discrepancies identified during PDT&T.<br><br>***FY 2015 Plans:***<br>N/A<br><br>***FY 2016 Base Plans:***<br>N/A<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.868 | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>4018 / *Littoral Combat Ship Construction* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 2127: *Littoral Combat Ship* | 1,829.174 | 1,427.049 | 1,436.991 | - | 1,436.991 | 1,510.341 | 1,544.144 | 1,273.343 | 1,733.929 | 10,564.968 | 28,565.740 |
| • 1600: *LCS Modules* | 35.966 | 30.938 | 23.500 | - | 23.500 | 23.991 | 14.775 | 15.844 | 17.083 | Continuing | Continuing |
| • 5110: *Outfitting/Post Delivery* | 68.165 | 112.016 | 200.370 | - | 200.370 | 191.789 | 179.514 | 219.624 | 122.649 | 1,503.200 | 2,680.800 |
| • 1320: *LCS Training* | 23.426 | 9.630 | 59.031 | - | 59.031 | 3.117 | 4.060 | 18.076 | 18.466 | Continuing | Continuing |
| • 0944: *LCS Class Support Equipment* | 47.078 | 25.742 | 48.399 | - | 48.399 | 90.113 | 84.384 | 89.685 | 85.860 | Continuing | Continuing |
| • 1601: *MCM Mission Modules* | 34.885 | 15.270 | 85.151 | - | 85.151 | 151.019 | 139.386 | 144.697 | 67.338 | Continuing | Continuing |
| • 1602: *ASW Mission Modules* | - | - | - | - | - | 32.681 | 53.750 | 54.025 | 55.013 | Continuing | Continuing |
| • 1603: *SUW Mission Modules* | 19.481 | 14.750 | 35.228 | - | 35.228 | 35.587 | 38.040 | 39.008 | 40.164 | Continuing | Continuing |
| • 1605: *Remote Minehunting System (RMS)* | - | - | 87.627 | - | 87.627 | 68.409 | 58.457 | 58.003 | 37.371 | Continuing | Continuing |
| • 3129: *LCS Mission Package Development* | 105.682 | 176.948 | 206.149 | - | 206.149 | 125.761 | 57.067 | 46.582 | 39.463 | - | 757.652 |

**Remarks**

**D. Acquisition Strategy**

The LCS program takes an evolutionary approach to acquisition that emphasizes competition as a key to achieving affordability. Initially, two industry teams competed against each other with two distinctly different LCS designs. The decision produced two flights with a vessel from each design: Flight 0 (LCS 1 and LCS 2); and Flight 0+ (LCS 3 and out). The Flight 0+ baseline incorporates lessons learned from the design, construction, and testing of the Flight 0 ships. The Navy conducted a limited competition amongst the existing LCS industry teams or team participants for the award of a contract for the construction of a block buy of up to ten (10) LCS Flight 0+ Class ships, with an objective of competitively awarding a single contract to a single industry team. By Acquisition Decision Memorandum of December 23, 2010, the USD (AT&L) authorized execution of an alternative acquisition strategy for the FY 2010 through FY 2015 procurement of 20 seaframes through two ten-ship block buy contracts. On December 29, 2010, the Navy awarded two contracts for block buys of up to ten ships, beginning with the award to each contractor of one FY 2010 ship and associated non-recurring engineering, the development of the Technical Data Package (TDP), core class services, and associated data. This was followed by the contractual funding of one ship to each contractor in FY 2011 and two ships each funded in FY 2012 through FY 2014.

On October 17, 2014 USD(AT&L) approved the Navy's plan to procure three ships in FY 2015 and three ships in FY 2016 by modifying the current block buy contracts. The modification to each of the block buy contracts will complete the previously approved 20 ship block buy and add options for the remaining two FY 2016 ships for a total of 26 LCS.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>4018 / *Littoral Combat Ship Construction* |

The Navy is developing a follow on Acquisition Strategy for FY 2017 - 2018 which will complete the 32 ship portion of the LCS program. As required by the December 10, 2014 SECDEF Memo on the Littoral Combat Ship Program Way Ahead, the Navy is currently developing an Acquisition Strategy to support design and procurement of Modified LCSs no later than FY 2019.

**E. Performance Metrics**

The LCS Program achieved Milestone A and Program Initiation in May 2004 and Milestone B in February 2011. The LCS program conducts annual Defense Acquisition Board In-Process Reviews (DAB IPRs). The first Seaframe and Mission Module integrated program DAB IPR was conducted in January 2013 and is held in September thereafter.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>4018 / *Littoral Combat Ship Construction* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LCS Ship 1 Construction | C/CPAF | Lockheed Martin : Moorestown, NJ | 521.000 | - | | - | | - | | - | | - | - | 521.000 | 521.000 |
| LCS Ship 1 Change Orders | C/CPAF | Lockheed Martin : Moorestown, NJ | 0.500 | - | | - | | - | | - | | - | - | 0.500 | 0.500 |
| LCS Ship 1 GFE | C/CPAF | Lockheed Martin : Moorestown, NJ | 12.000 | - | | - | | - | | - | | - | - | 12.000 | 12.000 |
| LCS Ship 2 Construction | C/CPAF | General Dynamics : Bath, ME | 635.000 | - | | - | | - | | - | | - | - | 635.000 | 635.000 |
| LCS Ship 2 Change Orders | C/CPAF | General Dynamics : Bath, ME | 3.500 | - | | - | | - | | - | | - | - | 3.500 | 3.500 |
| LCS Ship 2 GFE | C/CPAF | General Dynamics : Bath, ME | 7.000 | - | | - | | - | | - | | - | - | 7.000 | 7.000 |
| LCS Ship 1 FSD/MSSIT | C/CPAF | Lockheed Martin : Moorestown, NJ | 25.000 | - | | - | | - | | - | | - | - | 25.000 | 25.000 |
| LCS Ship 2 FSD/MSSIT | C/CPAF | General Dynamics : Bath, ME | 54.000 | - | | - | | - | | - | | - | - | 54.000 | 54.000 |
| Initial Outfitting/Logistics | Various | Various : Various | 21.601 | - | | - | | - | | - | | - | - | 21.601 | 21.601 |
| Test and Trials | WR | Various : Various | 40.725 | 0.400 | Dec 2013 | - | | - | | - | | - | - | 41.125 | - |
| Post Delivery ECP | C/CPAF | Lockheed Martin - General Dynamics : Various | 47.857 | 0.700 | Dec 2013 | - | | - | | - | | - | - | 48.557 | 57.457 |
| PSA/PSA Planning/ INSURV/OPTAR | WR | Various : Various | 157.388 | 3.768 | Mar 2014 | - | | - | | - | | - | - | 161.156 | - |
| | | **Subtotal** | 1,525.571 | 4.868 | | - | | - | | - | | - | - | 1,530.439 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | SUPSHIP : Various | 0.460 | - | | - | | - | | - | | - | - | 0.460 | - |
| Other Program Costs | WR | Various : Various | 11.000 | - | | - | | - | | - | | - | - | 11.000 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>4018 / *Littoral Combat Ship Construction* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 11.460 | - | | - | | - | | - | | - | - | 11.460 | - |

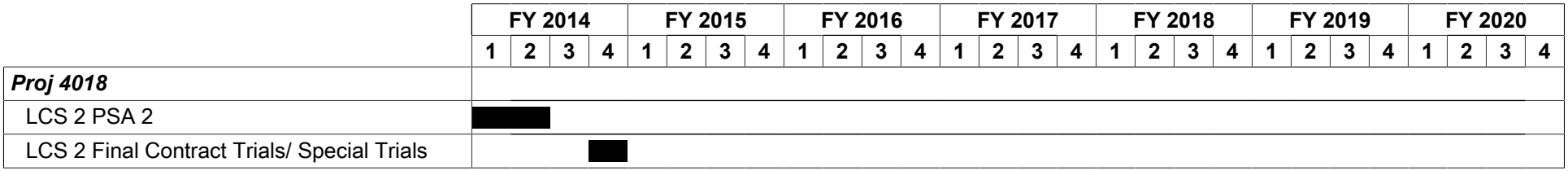
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Workforce | Various | Various : Various | 0.221 | - | | - | | - | | - | | - | - | 0.221 | - |
| | | **Subtotal** | 0.221 | - | | - | | - | | - | | - | - | 0.221 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,537.252 | 4.868 | | - | | - | | - | | - | - | 1,542.120 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>4018 / *Littoral Combat Ship Construction* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>4018 / *Littoral Combat Ship Construction* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4018*** | | | | |
| LCS 2 PSA 2 | 1 | 2014 | 2 | 2014 |
| LCS 2 Final Contract Trials/ Special Trials | 4 | 2014 | 4 | 2014 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>4506 / *LCS Training* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4506: *LCS Training* | - | - | - | 8.207 | - | 8.207 | 16.630 | 3.300 | 2.300 | 1.000 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

LCS is a minimally-manned ship, and the small crew size, combined with LCS's complex mission, does not allow adequate time for shipboard on-the-job training to achieve LCS operational availability. Consequently, LCS uses a Train-to-Qualify (T2Q)/Train-to-Certify (T2C) training process in an off-ship/shore-based virtual ship trainer environment, using simulators, and blended training solutions focused on both tactical and equipment operations and maintenance training. When completed, the LCS shore-based training capability will satisfy individual, team, unit, and force training, with an objective of meeting Capability Development Document (CDD) T2Q Key Performance Parameter (KPP) requirements.

RDT&E funds will be used to develop advanced Immersive Virtual Shipboard Environment (IVSE), or Virtual Reality (VR) courseware and associated simulators, enabling the satisfactory achievement of the aforementioned training objectives. Additionally, after fielding of systems and courseware, RDTE funds will be utilized to upgrade training to maintain conformance with LCS hull configurations and approved operational technical manuals and procedures. RDTE funds are also used to test and evaluate training devices to ensure compliance with requirements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** LCS Total System Training Architecture | - | - | 8.207 | - | 8.207 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** LCS is a minimally-manned ship, and the small crew size, combined with LCS's complex mission, does not allow adequate time for shipboard "on-the-job" training to achieve LCS operational availability. Consequently, LCS uses a Train-to-Qualify (T2Q)/Train-to-Certify (T2C) training process in an off-ship/shore-based virtual ship trainer environment, using simulators, and blended training solutions focused on both tactical and equipment operations and maintenance training. When completed, the LCS shore-based training capability will satisfy individual, team, unit, and force training, with an objective of meeting Capability Development Document (CDD) T2Q Key Performance Parameter (KPP) requirements. | | | | | |
| ***FY 2014 Accomplishments:***<br>FY2014 Accomplishments entered in Project Unit 3096. | | | | | |
| ***FY 2015 Plans:***<br>FY2015 Plans entered in Project Unit 3096. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>4506 / *LCS Training* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| RDTE funding for NAWCTSD goes to Program Management, Contracting, Research and Engineering, Test and Evaluation, Logistics and Industrial Ops, and Finance management support and travel requirements<br>as the LCS Training System Executive Agent. Funding is provided to develop and oversee Deck and other courseware (depending on budget) for LCS in support of PMS 505.<br>CSCS is funded as the Training Support Agent (TSA) for fielding of LCS 1 and LCS 2 Integrated Tactical Trainers (ITTs) and delivery of instruction. Delivery of instruction tasks include: oversight/management, curriculum maintenance, oversight of simulator maintenance, facility operating costs (phones, building maintenance, etc.), and repair parts support for Littoral Combat Ship Training Facility (LTF) Level One trouble tickets. Also goes to continued LCS training Facility (LTF) San Diego Department of Defense (DoD) Information Assurance (IA) Certification and Accreditation (C&A) Package (DIACAP). Contracts are also tied to an OPN funding line to procure associated spares for shore based trainers.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | - | 8.207 | - | 8.207 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 1320: *LCS Training* | - | - | 59.031 | - | 59.031 | 3.117 | 4.060 | 18.076 | 18.466 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Per the combined LCS Navy Training System Plan (NTSP), the LCS core crew training concept will meet T2Q and T2C requirements incrementally, with expected completion in FY19. In the interim, individual qualifications can be met for LCS crew members through a combination of vendor training, existing Navy training, new LCS courses and trainers that are presently online, and Under Instruction (U/I) time aboard LCS ships, prior to reporting for duty. Shore based T2Q cannot be fully met with the interim LCS training strategy. Full realization will be achieved with the completed standup of the San Diego LCS Training Facility (LTF), which includes the Integrated Tactical Trainers, Bridge, Readiness Control Officer (RCO), Combat Systems and Mission Package Training System (MPTS) part-task trainers, the Common Mission Package Trainer (CMPT), Mission Bay trainer and Virtual Computer Labs to support the T2Q operations and maintenance pipeline courses.

Initial crew training includes using existing Navy training where appropriate; Original Equipment Manufacturer (OEM) and vendor training where Naval Education and Training Command (NETC) training does not exist; tactical team training using current tactical Shore Based Trainers (SBTs); and the LCS Academy for platform

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>4506 / *LCS Training* |

familiarization training to prepare a ready to sail crew. Replacement crew training continues this training regime, with initial training to be replaced by fielded NETC training as it comes online.

**E. Performance Metrics**

T2Q will succeed and support mission accomplishment in the long run only if commanders have confidence that the output is valid, reliable, and standardized. To justify that confidence, training outcomes must mirror, and therefore predict, critical mission outcomes. To achieve that result a set of objective, performance-based measures, metrics, and standards is being developed for each watch station and billet requirement. For qualifications to be truly predictive, they must be guaranteed by the application of objective measures that vary little between evaluators. New courses such as the Surface Warfare Officers School (SWOS) LCS Officer of the Deck (OOD), Junior Officer of the Deck (JOOD) and the LCS Shore-Based Trainer Capstone courses have been designed to meet T2Q standards.
Ultimately, success of the training acquisition strategy will be objectively validated by accomplishment of PQS by the sailors as determined through the Learning Management System (LMS) and achievement of all requirements in the LCS Training Manual (TRAMAN) as assessed by LCS Squadrons and appropriate Afloat Training Groups (ATG).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | Project (Number/Name)<br>4506 / *LCS Training* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Deck IVSE | C/FFP | TBD : TBD | 0.000 | - | | - | | 6.000 | Feb 2016 | - | | 6.000 | - | 6.000 | - |
| | | **Subtotal** | 0.000 | - | | - | | 6.000 | | - | | 6.000 | - | 6.000 | - |

**Remarks**

Years prior to FY2016 are reflected in 3096 Project Unit.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Training Operations | WR | NSWC, DD/CSCS : Dahlgren Virginia | 0.000 | - | | - | | 1.397 | Feb 2016 | - | | 1.397 | - | 1.397 | - |
| | | **Subtotal** | 0.000 | - | | - | | 1.397 | | - | | 1.397 | - | 1.397 | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Office Support | C/CPAF | Various : Various | 0.000 | - | | - | | 0.810 | Nov 2015 | - | | 0.810 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | - | | 0.810 | | - | | 0.810 | - | - | - |

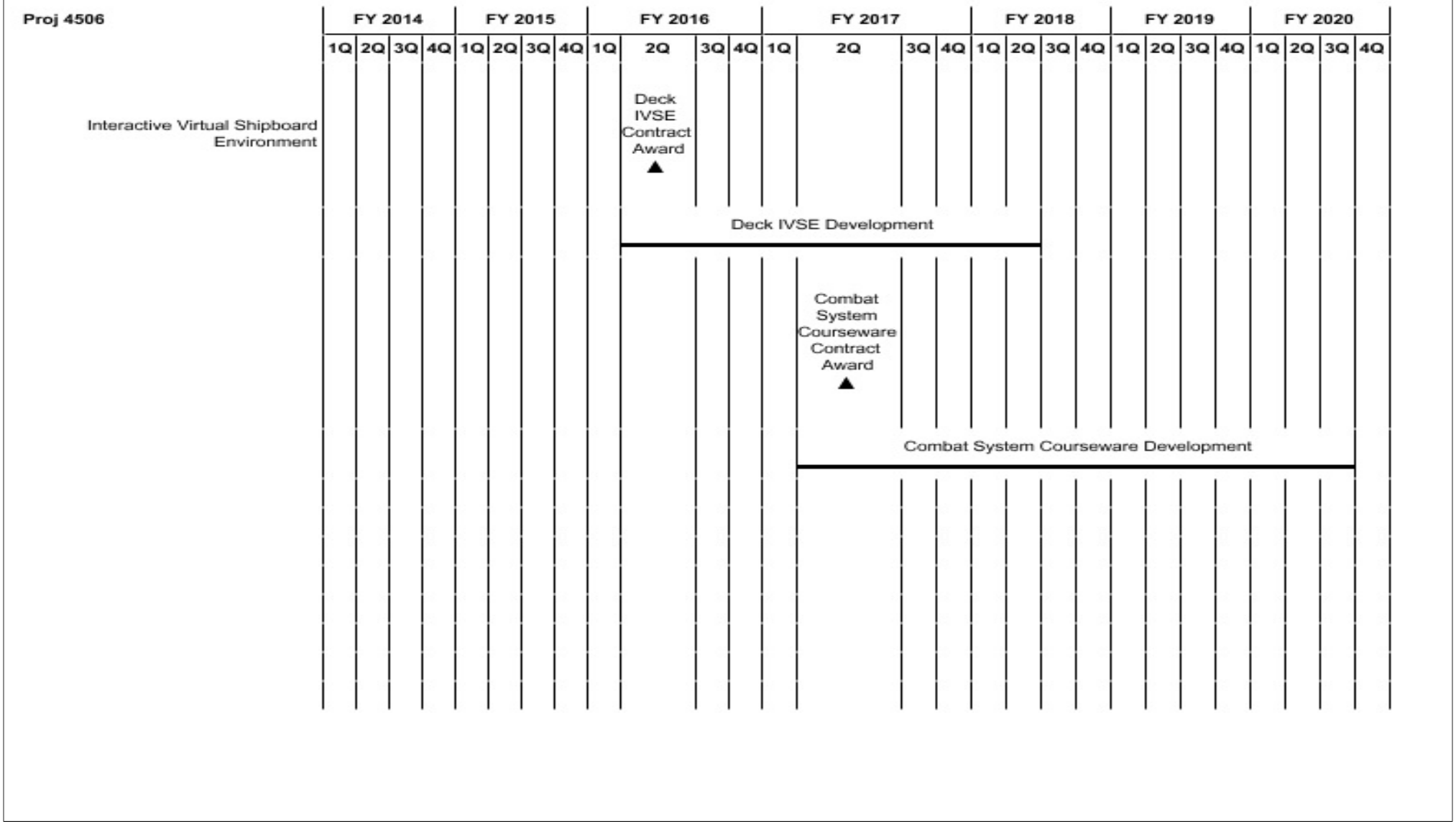
**Remarks**

Years prior to FY2016 are reflected in 3096 Project Unit.

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | - | | 8.207 | | - | | 8.207 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>4506 / *LCS Training* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603581N / *(U)LITTORAL COMBAT SHIP* | **Project (Number/Name)**<br>4506 / *LCS Training* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4506*** | | | | |
| Interactive Virtual Shipboard Environment: DECK IVSE- Contract Award | 2 | 2016 | 2 | 2016 |
| Interactive Virtual Shipboard Environment: DECK IVSE- Development | 2 | 2016 | 2 | 2018 |
| Interactive Virtual Shipboard Environment: Combat System Courseware Contract Award | 2 | 2017 | 2 | 2017 |
| Interactive Virtual Shipboard Environment: Combat System Courseware Development | 2 | 2017 | 3 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603582N *I Combat System Integration* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 357.238 | 4.270 | 20.881 | 35.901 | - | 35.901 | 35.213 | 31.985 | 29.556 | 30.259 | Continuing | Continuing |
| 0164: *Combat System Integration* | 350.151 | - | 11.528 | 27.028 | - | 27.028 | 25.888 | 24.193 | 21.639 | 22.077 | Continuing | Continuing |
| 3312: *MTMD-Maritime Theater Missile Defense Forum* | 7.087 | 4.270 | 9.353 | 8.873 | - | 8.873 | 9.325 | 7.792 | 7.917 | 8.182 | Continuing | Continuing |

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

Chief of Naval Operations (CNO) created the Navy's Strike Force Interoperability (SFI) Program in 1998 in response to critical shortfalls in the introduction of integrated and interoperable system of systems to deploying Strike Forces. Naval Sea Systems Command (NAVSEA) acts as management lead for Joint System Command (SYSCOM) system certification policy and guidance and certifies platforms for interoperability within the platform and throughout the enterprise, in accordance with Commander, US Fleet Forces Command/Commander, Pacific Fleet (COMUSFLTFORCOM/COMPACFLT) Inst. 4720.3B (OCT 2008), C5ISR Modernization Policy. COMUSFLTFORCOM/COMPACFLT Inst. 4720.3B also requires that NAVSEA act as administrative agent for COMNAVNETWARCOM Command and Control, Communications, Computers, and Combat Systems Integration
Modernization Process (C5IMP) and execution agent for Navy Command and Control, Communications, Computers, and Combat Systems Integration (C5I) Modernization Conferences (NCMC). This program conducts Interoperability Assessments that are required to certify Aircraft Carriers, Amphibious Assault Ships, and Surface Combatants in accordance with the Naval Warfare System Certification Policy (NWSCP), NAVSEAINST 9410.2A, NAVAIR 5230.20, SPAWAR 5234.1.

The SFI Program ensures overall strike force interoperability is characterized and assessed. NAVSEA is assigned central United States Navy (USN) responsibility for interoperability, directing the development of policy and architecture for Strike Force warfare systems engineering and implementation of common warfare systems engineering processes. There are three priorities within the Strike Force Interoperability Program: 1) Support Fleet "as-is" state which includes Navigation System Certification (NAVCERT), Interoperability Capabilities & Limitations, and Interoperability Tactical Information Coordinator Technical Aids (TIC TECHAIDs); 2) Ship's system modernization (non-HME) including warfighting capability & other C5I upgrades including C5IMP Baseline Management; and 3) Ship Warfare System Certification & Force Level Assessments. This includes Warfare Systems Certification, Interoperability Certification, Force Level Interoperability Analysis, & Assessments, Cybersecurity Assessments and recommendations for improvements to the program offices for implementation at the systems level.

In addition to these core efforts, this program also engages in efforts designed to ensure the U.S. Navy is interoperable with Joint and Coalition forces through the Maritime Theater Missile Defense (MTMD) and other bilateral/multilateral maritime integrated air and missile defense related efforts.

Project 0164 Combat System Integration:

This project consists of five key pillars executed within the SFI program: 1) Command & Control, Communications, Computer, Combat Systems, and Intelligence Modernization Process (C5IMP) and Fleet Readiness. The C5IMP validates the introduction of new systems into the Fleet and ensures system maturity prior to

installation, thereby reducing risk and enhancing readiness and effectiveness of deploying ship and strike groups; 2) Warfare Systems Certification, which is essential to validating the maturity and operational performance of warfare systems prior to fleet delivery and deployment; 3) Navigation Certification (NAVCERT) and Electronic Charting and Display System - Navy (ECDIS-N) certification, which certifies ship electronic charting and certifies ship electronic charting capability and certifies the accurate transmission of navigation data to combat and weapons systems; and 4) Interoperability Certification and Assessment, the independent assessment of Strike Group Warfare Systems operational performance. Interoperability Assessment examine force level engagement threads, aircraft control, air battle management, and operational displays. Assessments of deploying ships in Strike Force configurations are accomplished through the utilization of the Navy's Distributed Integration & Interoperability Assessment Capability (DIIAC) Concept which will support the Deputy Assistant Secretary of the Navy (DASN) shift to the left policy by providing early interoperability testing in the acquisition lifecycle. It is a U.S. Fleet Forces Command and Commander in Chief, U.S. Pacific Fleet (COMPACFLT) requirement that all Strike Forces undergo Interoperability Assessment testing in the DEP prior to deployment. Interoperability Certification results are used to develop fleet tactical tools (Capabilities & Limitations (C&L) and Tactical Information Coordinator Technical Aids (TIC TECHAIDs)), which ensure that operators understand the interoperability capabilities and limitations of their combat systems and have the watch station tools necessary for the performance of their tactical responsibilities; 5) Cybersecurity assessment, the assessment of cybersecurity at the Warfare Systems System of Systems (SoS) level.

Project 3312 Maritime Theater Missile Defense Forum (MTMD):
This project funds participation in Maritime Integrated Air and Missile Defense projects with other nations. Included is participation in the Maritime Missile Defense Projects Framework Memorandum of Understanding of 2004 (as amended 2009). Known as the Maritime Theater Missile Defense (MTMD) forum, it promotes interoperability with the Navies of nine participating nations (Australia, Canada, France, Germany, Italy, Netherlands, Spain, United Kingdom and the United States). This project funds participation in several Project Arrangements and includes maritime contribution to the NATO Active Layered Theater Ballistic Missile Defense (ALTBMD) project, now known as NATO Ballistic Missile Defense (BMD). Engineering analysis and recommendations from MTMD activities are provided to European, Pacific and Central Combatant Commands to influence present day operations. Specifically, the MTMD Forum is addressing challenges with "Maritime Allied Air Defense in Support of Ballistic Missile Defense Operations" that face the Combatant Commanders during present day operations.

The MTMD forum provides protection against the proliferation of short, medium and long-range Ballistic Missile (BM) and Advanced Anti-Ship Cruise Missile (ASCM) threats through the creation of an interoperable sea-based Integrated Air and Missile Defense (IAMD) capability among coalition nations. This includes protection across the full spectrum of these threats through the enhanced utilization of existing sea-based systems to protect against current threats while progressively improving and developing systems and system-of- systems to effectively counter evolving threats.
This project supports USN participation in several Maritime IAMD related Project Arrangements and Working Groups including:
(1) Battle Management Command, Control, Communications, Computers, and Intelligence (BMC4I) to define and develop architectures as well as to perform engineering to addresscoalition capability gaps.
(2) Modeling & Simulation (M&S) to establish and maintain a maritime coalition M&S testbed and to perform legacy and future systems simulation testing.
(3) Coalition Distributed Engineering Plant (CDEP) to establish and maintain a maritime coalition Hardware-in-the-Loop Testbed and to conduct CDEP testing.
(4) Open Architecture (OA) to develop Interface Standards and Data Models.
(5) Test Planning and Execution (TPEX) to develop Test Plans, oversee exercise participation and conduct post event data analysis and reporting.
(6) Operational Requirements (OR) to develop a Coalition Maritime Missile Defense Operational Concept Document and to identify operational constraints and tactical constructssurrounding coalition maritime missile defense activities.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603582N *I Combat System Integration* |

(7) Reciprocal Use of Test Facilities agreements with other nations to support Maritime IAMD and MTMD related demonstrations.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 4.396 | 20.881 | 33.195 | - | 33.195 |
| Current President's Budget | 4.270 | 20.881 | 35.901 | - | 35.901 |
| Total Adjustments | -0.126 | - | 2.706 | - | 2.706 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.126 | - | | | |
| • Program Adjustments | - | - | 2.881 | - | 2.881 |
| • Rate/Misc Adjustments | - | - | -0.175 | - | -0.175 |

**Change Summary Explanation**

FY 2016, Proj 0164, increase to support research and development of Cybersecurity metrics and support Warfare Systems Certifications.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603582N / *Combat System Integration* | Project (Number/Name)<br>0164 / *Combat System Integration* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0164: *Combat System Integration* | 350.151 | - | 11.528 | 27.028 | - | 27.028 | 25.888 | 24.193 | 21.639 | 22.077 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Project 0164: Combat System Integration:

This project funds the Strike Force Interoperability Program through the following pillars: 1) Command & Control, Communications, Computer, Combat Systems, and Intelligence Modernization Process (C5IMP) and Fleet Readiness. The C5IMP validates the introduction of new systems into the Fleet and ensures system maturity prior to installation, thereby reducing risk and enhancing readiness and effectiveness of deploying ships and strike groups; 2) Warfare Systems Certification, which is essential to validating the maturity and operational performance of warfare systems prior to fleet delivery and deployment; 3) Navigation Certification (NAVCERT) and Electronic Charting and Display System - Navy (ECDIS-N) certification, which certifies ship electronic charting capability and certifies the accurate transmission of navigation data to combat and weapons systems; and 4) Interoperability Certification and Assessment, the independent assessment of Strike Group Warfare Systems operational performance. Interoperability Assessment examine force level engagement threads, aircraft control, air battle management, and operational displays. Assessments of deploying ships in Strike Force configurations are accomplished through the utilization of the Joint Mission Environment Test Capability (JMETC) network, which is the cornerstone for the Distributed Integration & Interoperability Assessment Capability (DIIAC) Concept which will support the DASN (RDA) shift to the left policy by providing early interoperability tesing in the acquisition lifecycle. It is a U.S. Fleet Forces Command and Commander in Chief, U.S. Pacific Fleet (COMPACFLT) requirement that all Strike Forces undergo Interoperability Assessment testing prior to deployment. Interoperability Certification results are used to develop fleet tactical tools (Capabilities & Limitations (C&L) and Tactical Information Coordinator Technical Aids (TIC TECHAIDs)), which ensure that operators understand the interoperability capabilities and limitations of their combat systems and have the tactical guidance necessary to perform their task of operating the data links and 5) Cybersecurity assessment, the assessment of cybersecurity at the Warfare Systems System of Systems (SoS) level.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Navigation System Certification (NAVCERT) | - | 1.143 | 1.824 | - | 1.824 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This project funds assessments in support of new capability upgrades and modernization funded by the cognizant program office. The Navigation Certification (NAVCERT) program provides assurance to the ship, Immediate Superior in Command (ISIC) and Type Commander that the ships integrated navigation suite operates as intended and meets performance requirements for safe and reliable navigation and system operation. In addition, this program verified the accuracy of the data originating from sensors and validates its receipt by all users including Aircraft Inertial Alignment System, and Integrated Warfare Systems. Certification is required after five years, Chief of Naval Operations Availabilities Greater than six months, or in support of | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Precision Approach and Landing System (PALS). The scope of the certification includes all inertial navigation system equipment as well as the Electronic Charting and Display System Navy (ECDIS- N). This program meets OPNAV ECDIS-N and Operational Safety and Assurance certification requirements in SECNAVINST 5400.15C, and OPNAVINST 9420.2 and in the current draft of OPNAVINST 9420.1.<br><br>***FY 2014 Accomplishments:***<br>FY 2014 accomplishments were funded with FY 2013 RDTEN funding issued in FY 2014. Performed 18 NAVCERTs on cruisers, destroyers, carriers, and amphibs. Initiated update of NAVSEA Instruction 9420.4A to incorporate new program requirements, fleet input and lessons learned.<br>***FY 2015 Plans:***<br>Continuing critical NAVCERT efforts to include performing 17 NAVCERTs on cruisers, destroyers, carriers, and amphibs.<br>***FY 2016 Base Plans:***<br>Plans are to perform 29 NAVCERTs on cruisers, destroyers, carriers, and amphibs. Issue update of NAVSEA Instruction 9420.4A.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Command, Control, Communications, Computer, Combat Systems, and Intelligence Modernization Process (C5IMP) and Fleet Readiness (C5ISR) | -<br>- | 1.660<br>- | 1.780<br>- | -<br>- | 1.780<br>- |
| ***Articles:***<br><br>***Description:*** This project funds engineering assessments of proposed C5I capability modernizations to determine maturity for installation and risk associated with installs of equipment outside of normal modernization windows. This project is required to support the fleet C5I Modernization Policy (per COMUSFLTFORCOM/ COMPACFLT Inst. 4720.3B), to manage operational risks associated with C5ISR modernization in both afloat and ashore units ensuring deploying units receive improved, interoperable, and certified warfighting capabilities in order to meet theater operational requirements. This is done by determining the maturity, through engineering analysis, of the critical linchpins needed to achieve interoperability for each proposed C5IMP capability improvement item to be installed in a ships baseline (Baseline Change), developing installation recommendations of C5I system upgrades for the Fleet Commanders, and researching and analyzing installation or operating problems. Failure to achieve required maturity can break the warfare system package installed on a ship and impact strike group capabilities. There is close coordination with the FLTCDRs and TYCOMs as well as other members of the C5IMP community to address, coordinate, | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| and resolve C5IMP modernization issues thereby reducing risk and enhancing readiness and effectiveness of deploying ships and strike groups. Strike Group Engineers (SGEs) analyze planned C5I configurations of ships and Strike Groups; identify and analyze capability, interoperability, and modernization issues in a Strike Group context; assess impacts against requirements; and provide recommendations for resolution.<br><br>***FY 2014 Accomplishments:***<br>FY 2014 accomplishments were funded with FY 2013 RDTEN funding issued in FY 2014. Facilitated critical C5IMP efforts to include facilitating review, assessment, and execution of C5I installations during CNO Availabilities in FY14.<br><br>***FY 2015 Plans:***<br>Facilitate review, assessment, and execution of C5I installations during approximately 100 CNO Availabilities in FY15.<br>Support two NCMCs and 12 monthly baseline events.<br><br>***FY 2016 Base Plans:***<br>Facilitate review, assessment, and execution of C5I installations during approximately 100 CNO Availabilities in FY16. Support two NCMCs and 12 monthly baseline events.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Interoperability Certification and Assessment | - | 5.931 | 12.313 | - | 12.313 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This project funds Interoperability assessments via the Distributed Integration & Interoperability Assessment Capability (DIIAC), the technical assessment of interoperable systems to meet mission requirements, the updating of Strike Group Capabilities and Limitations (C&L) and the updating of the Tactical Information Coordinator Technical Aids (TIC TECHAIDs). Efforts of the project ensure NAVSEA/PEOs are delivering mature and interoperable warfare systems at the platform and strike group level, NAVSEA provides strike force interoperability certification and assessments. This program focuses on new systems and platforms under development. Interoperability Assessments of deploying ships in Strike Force configurations is accomplished through the utilization of the Navy's DIIAC, which provides operational configurations for all naval combat systems located at multiple Navy land-based sites located across the country and connected via networking technology. It is a U.S. Fleet Forces Command requirement that all Strike Forces undergo Interoperability Assessment testing in the DIIAC prior to deployment. The DIIAC provides the only opportunity for comprehensive interoperability testing of combat system and C5I configuration items prior to shipboard | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|

delivery for operational use in surface combatant platforms and strike group units. Further, the DIIAC provides the mechanism to support the surface Navy's participation in the Joint testing environments as well as the Maritime Theater Missile Defense (MTMD) Coalition forces interoperability testing. The result of DIIAC testing is fed into the development of fleet tactical tools: Capabilities & Limitations (C&L) and Tactical Information Coordinator Technical Aids (TIC TECHAIDs), which ensure that operators understand the interoperability capabilities and limitations of their combat systems. C&Ls are delivered for Strike Groups and their Coalition and Joint partners. TIC TECHAIDS are delivered to deploying Strike Group ships prior to workups and then a final copy prior to deployment. C&L and TIC TECHAIDS are the final report-out to the Fleet operators of the acquisition community's efforts. They are used on a daily basis in every operational theater as well as in every Navy and Joint schoolhouse.

***FY 2014 Accomplishments:***

FY 2014 accomplishments were funded with FY 2013 RDTEN funding issued in FY 2014. DIIAC testing, supports the Naval Warfare Systems Certification Policy (NWSCP) and produces Objective Quality Evidence (OQE) used in Warfare Systems Certification Installation Assessment (WSIA) and Warfare System Certification Decision (WSCD). Conducted three limited interoperability assessments of LCS-1 and AEGIS/SSDS AMIIP Baselines. Provided C&L documents for 30 deploying Strike Groups (from a database containing 204 US surface ships) and 10 Naval Air Squadrons (covering F/A-18s, E-2Cs, MH-60s, EA-6Bs and P-3s). TIC TECHAIDs delivered for SG ships, ARG ships, and independent deploying ships.

***FY 2015 Plans:***

Continuing critical Interoperability Certification and Assessment efforts to include a limited interoperability assessment test for AEGIS Baseline 9. Conduct evaluation and provide required updates to Interoperability C&L for 30 deploying Strike Groups (from a database containing 204 US surface ships), 110 Naval Air Squadrons (covering F/A-18s, E-2Cs, MH-60s, EA-6Bs and P-3s). Provide annual deliveries of TIC TECHAIDS for SG, ships ARG ships, and independent deploying.

***FY 2016 Base Plans:***

Conduct four DIIAC test event to support the Interoperability Assessment for certification of SSDS for CVN78, including planning, execution, and reconstruction with data analysis. Conduct Interoperability Certification assessments for two AEGIS baselines and a representative Carrier Strike Group (CSG) Assessment to provide OQE for Warfare Systems Certification. Conduct evaluation and provide required updates to Interoperability C&L documents on the C&L website for 30 deploying Strike Groups (from a database containing 204 US surface ships), 110 Naval Air Squadrons (covering F/A-18s, E-2Cs, MH-60s, EA-6Bs and P-3s). Provide annual

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| deliveries of TIC TECHAIDS for SG, ships ARG ships, and independent deploying ships and Land Based Sites at Maritime Operations Centers (MOC) and Fleet Area Control and Surveillance Facilities (FACSFAC).<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Warfare Systems Certification | - | 2.794 | 8.111 | - | 8.111 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This project funds the conduct of Warfare Systems Certification against set criteria. This includes providing operational risk assessments, using Objective Quality Evidence (OQE), to ensure installation readiness and deployment readiness of warfare systems and Navy surface ships. As directed by COMUSFLTFORCOM/COMPACFLT Inst. 4720.3B, C5ISR Modernization Policy, and in accordance with NAVSEAINST 9410.2, Naval Warfare System Certification Policy (NWSCP), NAVSEA will perform these assessments based on OQE obtained through testimony of subordinate activities and independent modeling/ simulation and testing both for initial assessments and certifications. NAVSEA engineering analyses are developed and staffed for criteria not met. NAVSEA accomplishes these efforts through Warfare Systems Certification Readiness Reviews (WSCRR), Warfare Systems Installation Assessment (WSIA), and Warfare Systems Certification Decisions (WSCD) to support the installation and deployment of warfare systems in Navy surface platforms. The purpose of the WSCRR is to review and approve the Warfare System Certification Plan (WSCP), monitor warfare systems against the WSCP and monitor satisfaction of established criteria to facilitate a WSIA and WSCD. The purpose of the WSIA is to provide the Fleet with an early assessment of risk and characterization of the warfare systems maturity and readiness to support sail-away and any shipboard test and training events for New Construction (NC) phase, Refueling Complex Overhaul (RCOH) or lead ships that are test platforms for major modernization effort and/or an assessment to support an authorization for installation of the warfare system(s) for in-service platforms. This allows the Fleet to make informed installation, testing/exercise, and training decisions. The purpose of the WSCD is to provide warfare systems certification including an assessment of risk and characterization of the warfare systems maturity and readiness to support deployment. A NAVSEA certification decision message is released following the WSCD. An operational risk assessment characterizing warfare systems maturity and readiness to support the subject ship's deployment is developed from OQE gathered from 20 different criteria for each decision point meeting/panel. This pillar also ensures that aggregate deficiencies and workarounds do not render the operator ineffective by conducting modeling/simulation/testing and analysis of all work-arounds documented in Tactics, Techniques and Procedures (TTPs), Capabilities & Limitations (C&L), and Trouble Reports (TR).<br><br>***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| FY 2014 accomplishments were funded with FY 2013 RDTEN funding issued in FY 2014. Conducted Warfare Systems<br>Certification Events for a subset of the 20 criteria that do not require modeling/simulation and testing for 80 ships (WSCRRs, WSIAs, and WSCDs), involving CG 47, DDG 51/1000, CVN 68/78, LHA 1/6, LHD 1, LPD 17, LSD 41/49 LCS Ship Classes and amphibious assault ships.<br>***FY 2015 Plans:***<br>Continuing Warfare System Certification for subset of the 20 criteria that do not require modeling/simulation and testing for 50 ships (e.g. aggregate deficiencies and workload analysis) efforts to for 50 Warfare Systems Certification Events for above ship classes.<br>***FY 2016 Base Plans:***<br>Support approximately 100 Warfare Systems Certification Events for above ship classes for all 20 criteria including those criteria that require modeling/simulation and testing. Update the NWSCP and implement revised Naval Warfare Systems Certification Policy.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Warfare Systems Cybersecurity | - | - | 3.000 | - | 3.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The required assessment and characterization of aggregate levels of risk for Ships is required at the Warfare Systems System of Systems (SoS) level and will be required for the Naval Warfare Systems Certification of Navy Carriers and Combatants. Cybersecurity assessment activities begins in FY16. Cybersecurity Assessment at the SoS level will entail: 1.) establishing and collecting metrics to characterize Warfare Systems ability to protect, detect, react, and restore capabilities, as well as analyze the mission effects induced by the cyber threat activity; 2.) start the development of the methodologies, tools, and techniques used to conduct such risk assessments appropriate to ship warfare systems baselines and representative strike group interoperability requirements; 3.) conduct an assessment of developmental and operational warfare systems.<br>***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Develop Cybersecurity metrics, methodologies and support Warfare Systems Certifications by providing cybersecurity assessments in support of WSIAs and WSCDs.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 11.528 | 27.028 | - | 27.028 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN 2960: *ICSTF: Integrated Combat System Test Facility* | 8.143 | 4.016 | 14.419 | - | 14.419 | 8.777 | 8.972 | 9.186 | 8.379 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

RDTEN funding under this line supports independent certification of the integration of major capability upgrades acquired by Program Executive Offices (PEOs) into host Navy Platforms and Strike Forces. The RDTEN engineering and certification activities at field sites do not involve direct procurement of equipment or engineering services, and hence no acquisition strategy is required. The major capability upgrades evaluated under this program fall under their associated PEOs' acquisition strategies.

**E. Performance Metrics**

Quarterly Program Reviews and Baseline Assessments

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603582N / *Combat System Integration* | Project (Number/Name)<br>0164 / *Combat System Integration* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF Requirements Engineering & Analysis | WR | NSWCs : DN/PHD/ Corona | 5.157 | - | | - | | - | | - | | - | - | 5.157 | - |
| SF Requirements Engineering & Analysis | WR | Non-NSWCs : Various | 5.295 | - | | - | | - | | - | | - | - | 5.295 | - |
| Platform/Strike Force Certification | WR | NSWCs : DD/ICSTD/ DN/Corona | 39.732 | - | | - | | - | | - | | - | - | 39.732 | - |
| Platform/Strike Force Certification | WR | Non-NSWCs : Various | 27.843 | - | | - | | - | | - | | - | - | 27.843 | - |
| Fleet Response Plan (FRP) | WR | NSWCs : DD/PHD/ DN | 27.030 | - | | - | | - | | - | | - | - | 27.030 | - |
| Fleet Response Plan (FRP) | WR | Non-NSWCs : Various | 3.793 | - | | - | | - | | - | | - | - | 3.793 | - |
| Combat Systems Cert ISO Platform Cert | WR | NSWCs : DN/DD/ PHD/Corona | 24.640 | - | | - | | - | | - | | - | - | 24.640 | - |
| Combat Systems Cert ISO Platform Cert | WR | Non-NSWCs : Various | 1.853 | - | | - | | - | | - | | - | - | 1.853 | - |
| Navigation System Certification | WR | SPAWAR : Charleston | 6.290 | - | | 1.143 | Nov 2014 | 1.824 | Nov 2015 | - | | 1.824 | Continuing | Continuing | Continuing |
| C5IMP & Fleet Readiness | WR | NSWCs : DD/PHD | 4.577 | - | | 1.210 | Jan 2015 | 1.780 | Jan 2016 | - | | 1.780 | Continuing | Continuing | Continuing |
| C5IMP & Fleet Readiness | WR | Non-NSWCs : Various | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Warfare Systems Certification | WR | NSWCs : DD/DN/ Corona | 16.154 | - | | 1.035 | Nov 2014 | 3.850 | Nov 2015 | - | | 3.850 | Continuing | Continuing | Continuing |
| Warfare Systems Certification | WR | Non-NSWCs : Various | 3.500 | - | | 1.759 | Jan 2015 | 4.261 | Jan 2016 | - | | 4.261 | Continuing | Continuing | Continuing |
| CNI/Design Agent | SS/CPAF | General Dynamics : Not Specified | 47.926 | - | | - | | - | | - | | - | - | 47.926 | - |
| CNI/Software Engineering | WR | NSWC : Dahlgren | 8.383 | - | | - | | - | | - | | - | - | 8.383 | - |
| CNI/Test and Evaluation | WR | CDSA : Not Specified | 3.922 | - | | - | | - | | - | | - | - | 3.922 | - |
| CNI/Systems Engineering | WR | NSWC : PHD | 2.645 | - | | - | | - | | - | | - | - | 2.645 | - |
| CNI/Miscellaneous | WR | Various : Various | 7.529 | - | | - | | - | | - | | - | - | 7.529 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603582N / *Combat System Integration* | Project (Number/Name)<br>0164 / *Combat System Integration* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OA Automated Test and Retest | WR | NSWCs : Various | 17.500 | - | | - | | - | | - | | - | - | 17.500 | - |
| Contract Engineering Support | C/CPFF | Gryphon Technology : VA | 22.159 | - | | 1.050 | Jan 2015 | 1.170 | Jan 2016 | - | | 1.170 | Continuing | Continuing | Continuing |
| Contract Program Management Support | C/CPFF | Delta Resources Inc. : VA | 8.141 | - | | - | | - | | - | | - | - | 8.141 | - |
| Travel | Allot | NAVSEA HQ : Washington, DC | 2.290 | - | | - | | - | | - | | - | - | 2.290 | - |
| Interoperability Fixes | WR | NSWCs : Various | 1.500 | - | | - | | - | | - | | - | - | 1.500 | - |
| TIC TECHAIDS | WR | CSC : VA | 0.000 | - | | 1.175 | Jan 2015 | 1.460 | Jan 2016 | - | | 1.460 | Continuing | Continuing | Continuing |
| Interoperability Cert Assessment | WR | NSWCs : DD/SSC/ Corona | 0.000 | - | | 1.146 | Nov 2014 | 1.352 | Nov 2015 | - | | 1.352 | Continuing | Continuing | Continuing |
| DIIAC Engineering and Operations | WR | NSWCs : DD/DN/ PHD | 0.000 | - | | 1.326 | Jan 2015 | 2.981 | Jan 2016 | - | | 2.981 | Continuing | Continuing | Continuing |
| Warfare Systems Cybersecurity | WR | NSWCs : Various | 0.000 | - | | - | | 3.000 | Jan 2016 | - | | 3.000 | - | 3.000 | - |
| | | **Subtotal** | 287.859 | - | | 9.844 | | 21.678 | | - | | 21.678 | - | - | - |

**Remarks**

The programs principle support contracts (N00178-04D-4062 EH04 and N00178-04D-4030 EH02) are incrementally funded via Technical Instructions throughout the course of the fiscal year and the last increment to be awarded is 15% of the budget to cover efforts executed during the 4th qtr of the FY.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Combat System Integration Testing (CSIT) | WR | NSWCs : DD/ICSTF | 5.736 | - | | - | | - | | - | | - | - | 5.736 | - |
| Interoperability Certification Assessment | WR | NSWCs : DD/ SPAWAR/San Diego | 26.804 | - | | 1.052 | Jan 2015 | 2.791 | Jan 2016 | - | | 2.791 | Continuing | Continuing | Continuing |
| DEP Engineering and Operations | WR | NSWCs : DD/ SPAWAR/San | 17.129 | - | | 0.632 | Jan 2015 | 2.559 | Jan 2016 | - | | 2.559 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603582N / *Combat System Integration* | Project (Number/Name)<br>0164 / *Combat System Integration* | |

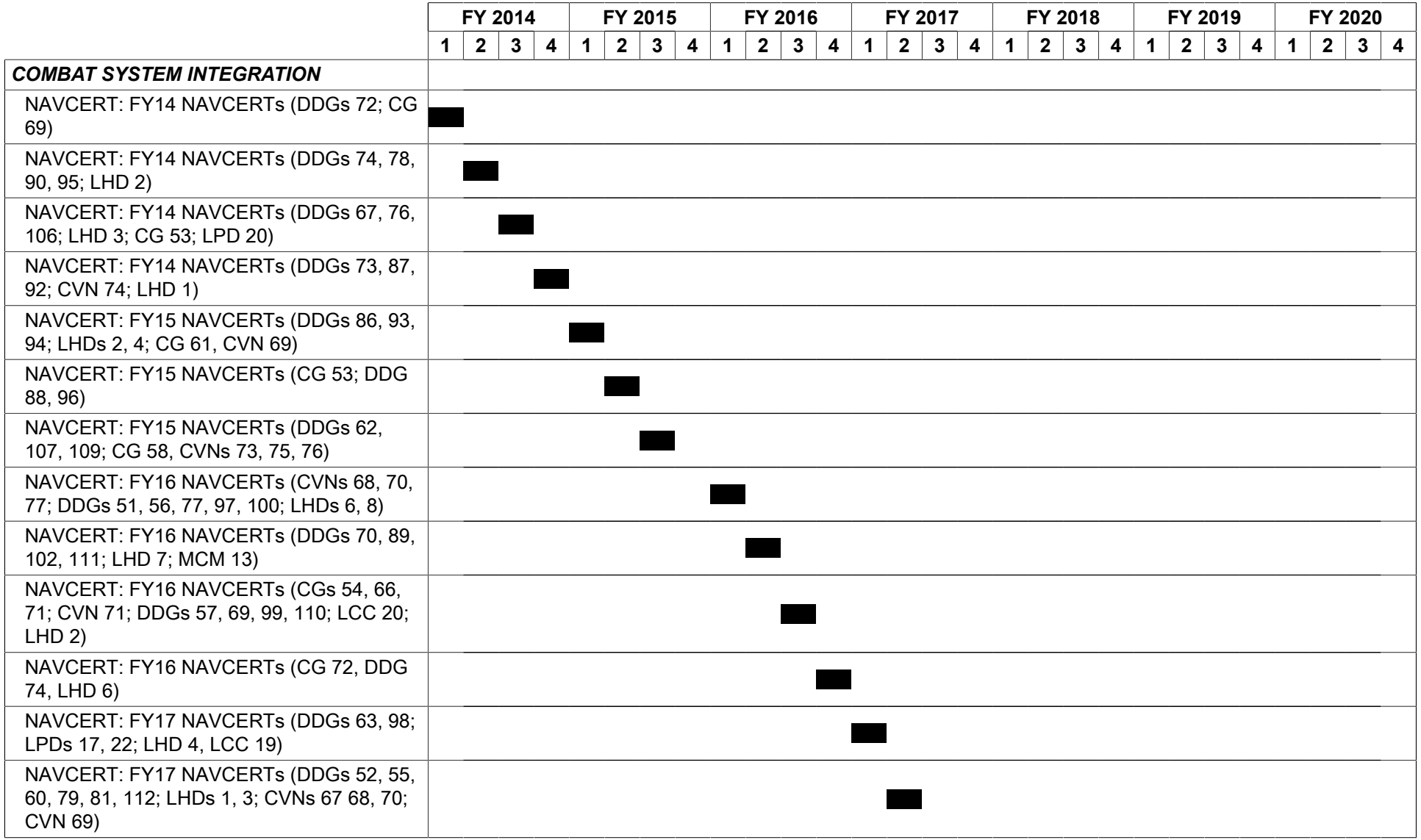
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEP Engineering and Operations | WR | NSWCs : Various | 12.623 | - | | - | | - | | - | | - | - | 12.623 | - |
| | | **Subtotal** | 62.292 | - | | 1.684 | | 5.350 | | - | | 5.350 | - | - | - |

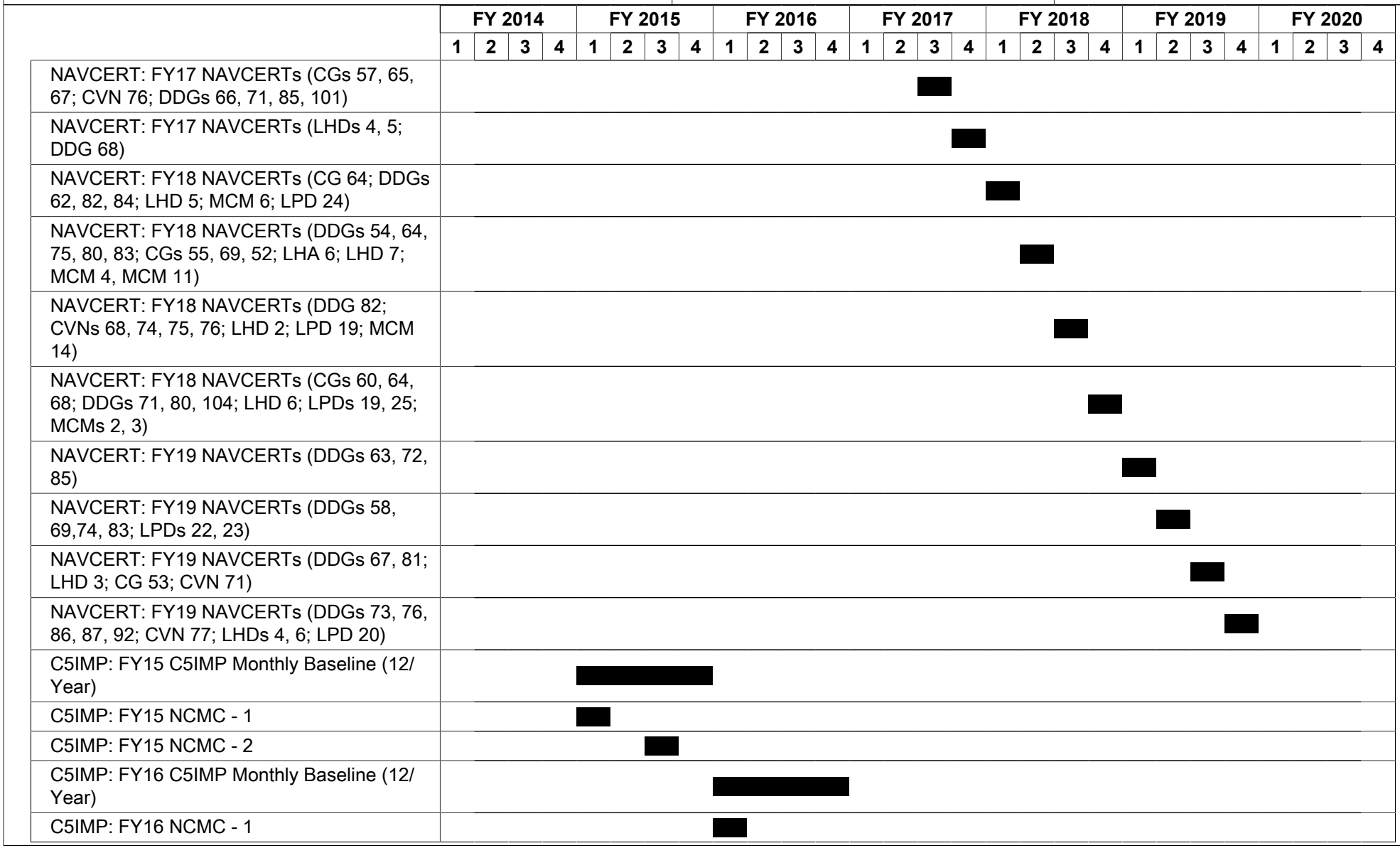
| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 350.151 | - | | 11.528 | | 27.028 | | - | | 27.028 | - | - | - |

**Remarks**

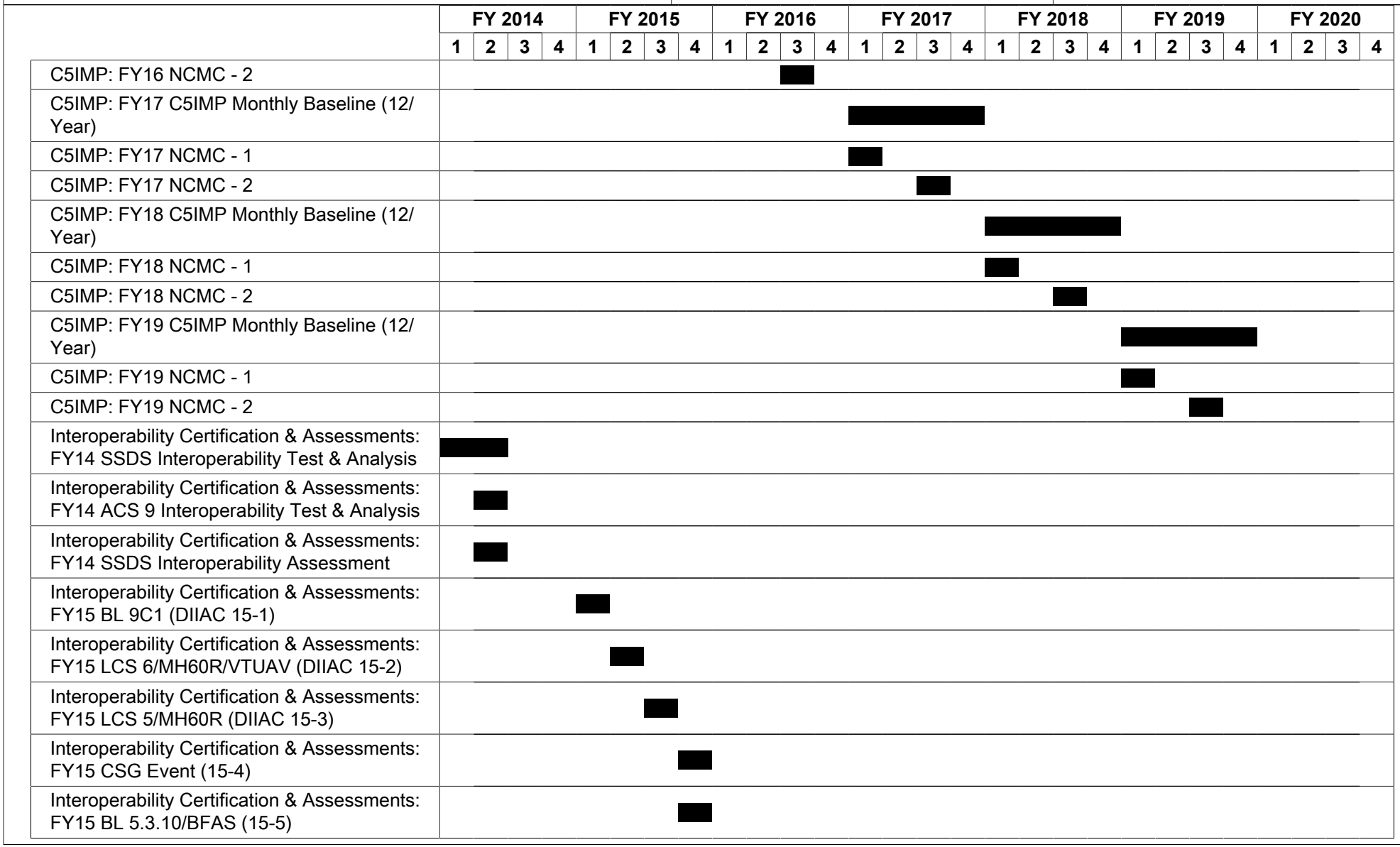
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |



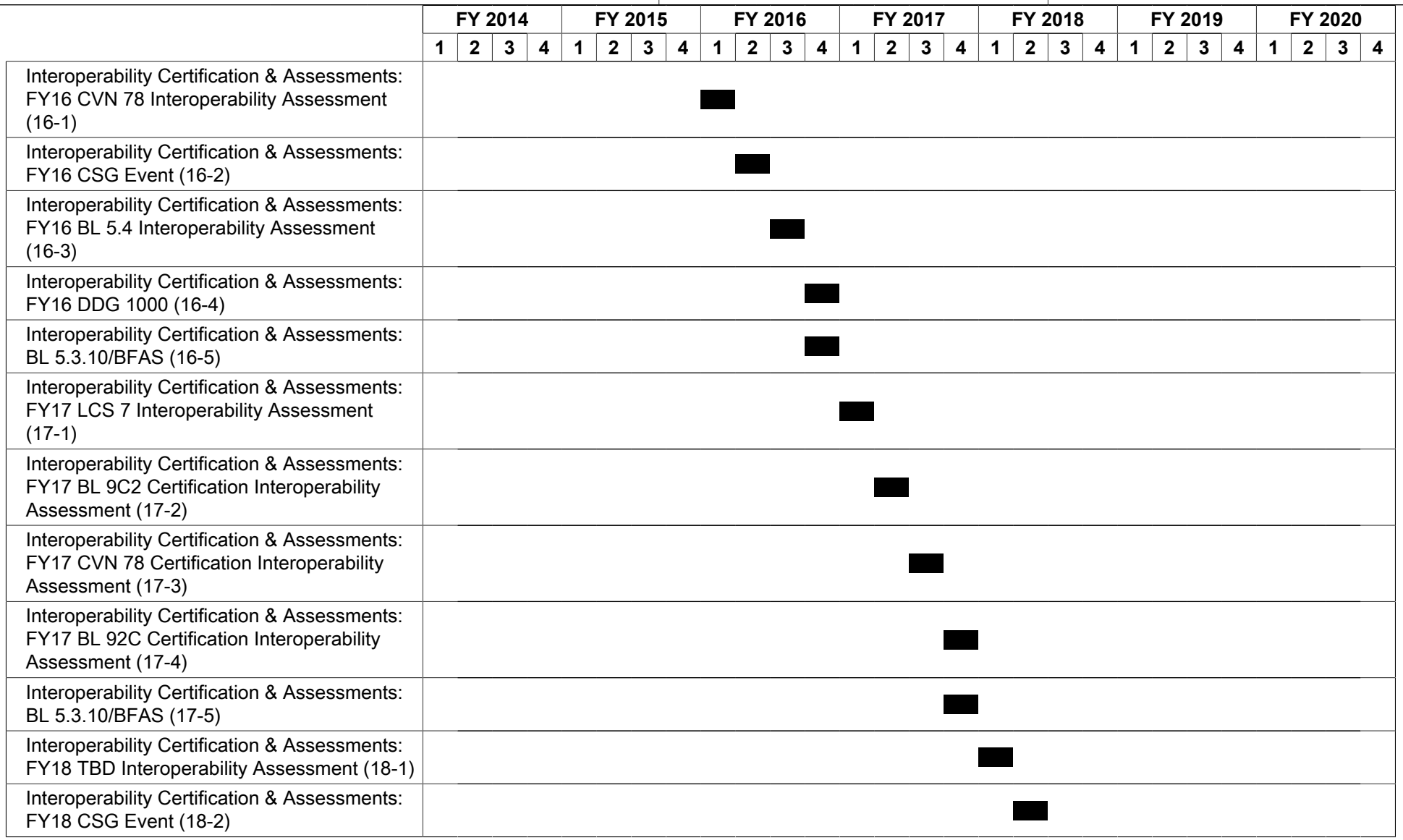
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |



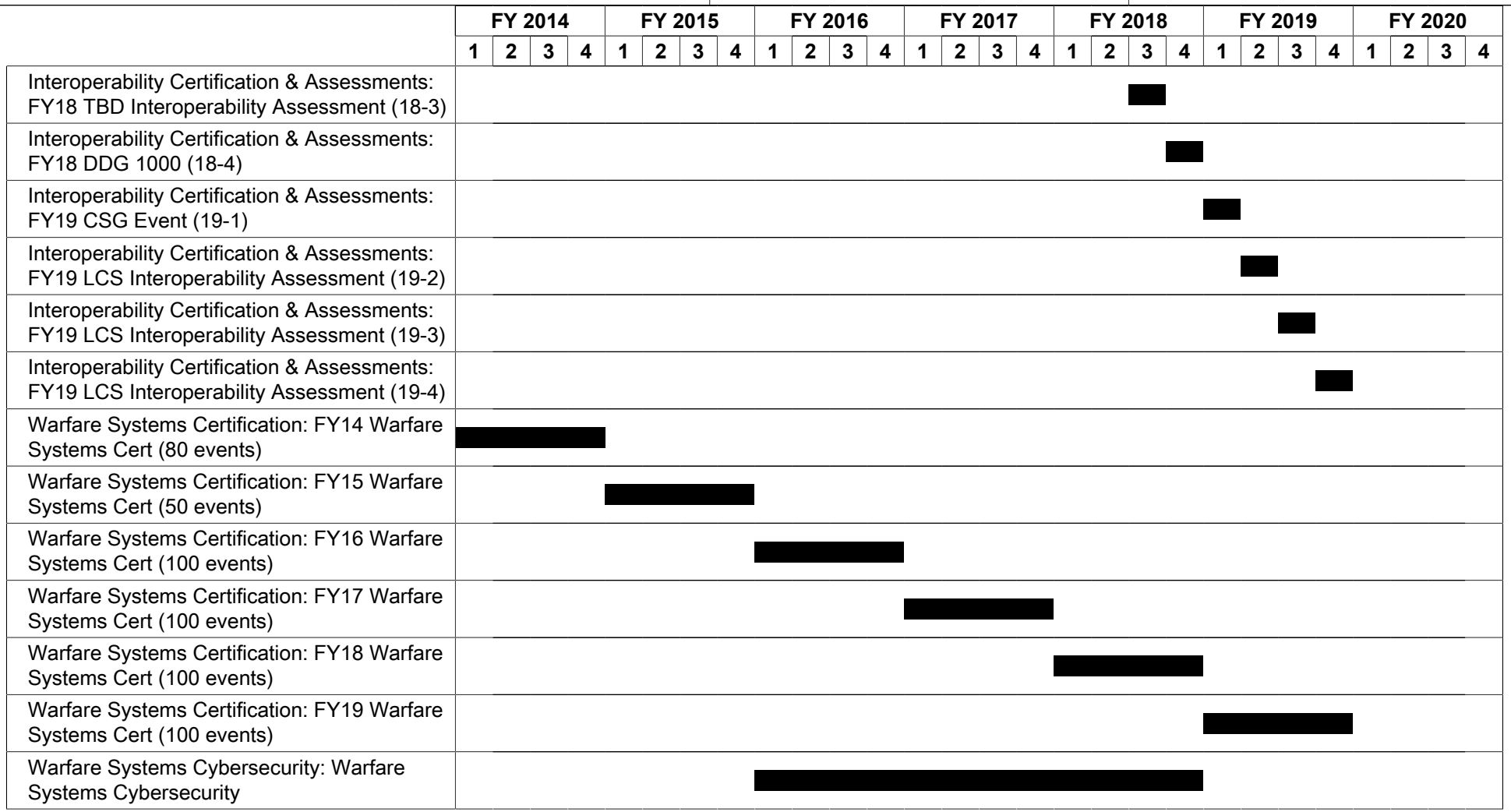
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***COMBAT SYSTEM INTEGRATION*** | | | | |
| NAVCERT: FY14 NAVCERTs (DDGs 72; CG 69) | 1 | 2014 | 1 | 2014 |
| NAVCERT: FY14 NAVCERTs (DDGs 74, 78, 90, 95; LHD 2) | 2 | 2014 | 2 | 2014 |
| NAVCERT: FY14 NAVCERTs (DDGs 67, 76, 106; LHD 3; CG 53; LPD 20) | 3 | 2014 | 3 | 2014 |
| NAVCERT: FY14 NAVCERTs (DDGs 73, 87, 92; CVN 74; LHD 1) | 4 | 2014 | 4 | 2014 |
| NAVCERT: FY15 NAVCERTs (DDGs 86, 93, 94; LHDs 2, 4; CG 61, CVN 69) | 1 | 2015 | 1 | 2015 |
| NAVCERT: FY15 NAVCERTs (CG 53; DDG 88, 96) | 2 | 2015 | 2 | 2015 |
| NAVCERT: FY15 NAVCERTs (DDGs 62, 107, 109; CG 58, CVNs 73, 75, 76) | 3 | 2015 | 3 | 2015 |
| NAVCERT: FY16 NAVCERTs (CVNs 68, 70, 77; DDGs 51, 56, 77, 97, 100; LHDs 6, 8) | 1 | 2016 | 1 | 2016 |
| NAVCERT: FY16 NAVCERTs (DDGs 70, 89, 102, 111; LHD 7; MCM 13) | 2 | 2016 | 2 | 2016 |
| NAVCERT: FY16 NAVCERTs (CGs 54, 66, 71; CVN 71; DDGs 57, 69, 99, 110; LCC 20; LHD 2) | 3 | 2016 | 3 | 2016 |
| NAVCERT: FY16 NAVCERTs (CG 72, DDG 74, LHD 6) | 4 | 2016 | 4 | 2016 |
| NAVCERT: FY17 NAVCERTs (DDGs 63, 98; LPDs 17, 22; LHD 4, LCC 19) | 1 | 2017 | 1 | 2017 |
| NAVCERT: FY17 NAVCERTs (DDGs 52, 55, 60, 79, 81, 112; LHDs 1, 3; CVNs 67 68, 70; CVN 69) | 2 | 2017 | 2 | 2017 |
| NAVCERT: FY17 NAVCERTs (CGs 57, 65, 67; CVN 76; DDGs 66, 71, 85, 101) | 3 | 2017 | 3 | 2017 |
| NAVCERT: FY17 NAVCERTs (LHDs 4, 5; DDG 68) | 4 | 2017 | 4 | 2017 |
| NAVCERT: FY18 NAVCERTs (CG 64; DDGs 62, 82, 84; LHD 5; MCM 6; LPD 24) | 1 | 2018 | 1 | 2018 |
| NAVCERT: FY18 NAVCERTs (DDGs 54, 64, 75, 80, 83; CGs 55, 69, 52; LHA 6; LHD 7; MCM 4, MCM 11) | 2 | 2018 | 2 | 2018 |
| NAVCERT: FY18 NAVCERTs (DDG 82; CVNs 68, 74, 75, 76; LHD 2; LPD 19; MCM 14) | 3 | 2018 | 3 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| NAVCERT: FY18 NAVCERTs (CGs 60, 64, 68; DDGs 71, 80, 104; LHD 6; LPDs 19, 25; MCMs 2, 3) | 4 | 2018 | 4 | 2018 |
| NAVCERT: FY19 NAVCERTs (DDGs 63, 72, 85) | 1 | 2019 | 1 | 2019 |
| NAVCERT: FY19 NAVCERTs (DDGs 58, 69,74, 83; LPDs 22, 23) | 2 | 2019 | 2 | 2019 |
| NAVCERT: FY19 NAVCERTs (DDGs 67, 81; LHD 3; CG 53; CVN 71) | 3 | 2019 | 3 | 2019 |
| NAVCERT: FY19 NAVCERTs (DDGs 73, 76, 86, 87, 92; CVN 77; LHDs 4, 6; LPD 20) | 4 | 2019 | 4 | 2019 |
| C5IMP: FY15 C5IMP Monthly Baseline (12/Year) | 1 | 2015 | 4 | 2015 |
| C5IMP: FY15 NCMC - 1 | 1 | 2015 | 1 | 2015 |
| C5IMP: FY15 NCMC - 2 | 3 | 2015 | 3 | 2015 |
| C5IMP: FY16 C5IMP Monthly Baseline (12/Year) | 1 | 2016 | 4 | 2016 |
| C5IMP: FY16 NCMC - 1 | 1 | 2016 | 1 | 2016 |
| C5IMP: FY16 NCMC - 2 | 3 | 2016 | 3 | 2016 |
| C5IMP: FY17 C5IMP Monthly Baseline (12/Year) | 1 | 2017 | 4 | 2017 |
| C5IMP: FY17 NCMC - 1 | 1 | 2017 | 1 | 2017 |
| C5IMP: FY17 NCMC - 2 | 3 | 2017 | 3 | 2017 |
| C5IMP: FY18 C5IMP Monthly Baseline (12/Year) | 1 | 2018 | 4 | 2018 |
| C5IMP: FY18 NCMC - 1 | 1 | 2018 | 1 | 2018 |
| C5IMP: FY18 NCMC - 2 | 3 | 2018 | 3 | 2018 |
| C5IMP: FY19 C5IMP Monthly Baseline (12/Year) | 1 | 2019 | 4 | 2019 |
| C5IMP: FY19 NCMC - 1 | 1 | 2019 | 1 | 2019 |
| C5IMP: FY19 NCMC - 2 | 3 | 2019 | 3 | 2019 |
| Interoperability Certification & Assessments: FY14 SSDS Interoperability Test & Analysis | 1 | 2014 | 2 | 2014 |
| Interoperability Certification & Assessments: FY14 ACS 9 Interoperability Test & Analysis | 2 | 2014 | 2 | 2014 |
| Interoperability Certification & Assessments: FY14 SSDS Interoperability Assessment | 2 | 2014 | 2 | 2014 |
| Interoperability Certification & Assessments: FY15 BL 9C1 (DIIAC 15-1) | 1 | 2015 | 1 | 2015 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Interoperability Certification & Assessments: FY15 LCS 6/MH60R/VTUAV (DIIAC 15-2) | 2 | 2015 | 2 | 2015 |
| Interoperability Certification & Assessments: FY15 LCS 5/MH60R (DIIAC 15-3) | 3 | 2015 | 3 | 2015 |
| Interoperability Certification & Assessments: FY15 CSG Event (15-4) | 4 | 2015 | 4 | 2015 |
| Interoperability Certification & Assessments: FY15 BL 5.3.10/BFAS (15-5) | 4 | 2015 | 4 | 2015 |
| Interoperability Certification & Assessments: FY16 CVN 78 Interoperability Assessment (16-1) | 1 | 2016 | 1 | 2016 |
| Interoperability Certification & Assessments: FY16 CSG Event (16-2) | 2 | 2016 | 2 | 2016 |
| Interoperability Certification & Assessments: FY16 BL 5.4 Interoperability Assessment (16-3) | 3 | 2016 | 3 | 2016 |
| Interoperability Certification & Assessments: FY16 DDG 1000 (16-4) | 4 | 2016 | 4 | 2016 |
| Interoperability Certification & Assessments: BL 5.3.10/BFAS (16-5) | 4 | 2016 | 4 | 2016 |
| Interoperability Certification & Assessments: FY17 LCS 7 Interoperability Assessment (17-1) | 1 | 2017 | 1 | 2017 |
| Interoperability Certification & Assessments: FY17 BL 9C2 Certification Interoperability Assessment (17-2) | 2 | 2017 | 2 | 2017 |
| Interoperability Certification & Assessments: FY17 CVN 78 Certification Interoperability Assessment (17-3) | 3 | 2017 | 3 | 2017 |
| Interoperability Certification & Assessments: FY17 BL 92C Certification Interoperability Assessment (17-4) | 4 | 2017 | 4 | 2017 |
| Interoperability Certification & Assessments: BL 5.3.10/BFAS (17-5) | 4 | 2017 | 4 | 2017 |
| Interoperability Certification & Assessments: FY18 TBD Interoperability Assessment (18-1) | 1 | 2018 | 1 | 2018 |
| Interoperability Certification & Assessments: FY18 CSG Event (18-2) | 2 | 2018 | 2 | 2018 |
| Interoperability Certification & Assessments: FY18 TBD Interoperability Assessment (18-3) | 3 | 2018 | 3 | 2018 |
| Interoperability Certification & Assessments: FY18 DDG 1000 (18-4) | 4 | 2018 | 4 | 2018 |
| Interoperability Certification & Assessments: FY19 CSG Event (19-1) | 1 | 2019 | 1 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>0164 / *Combat System Integration* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Interoperability Certification & Assessments: FY19 LCS Interoperability Assessment (19-2) | 2 | 2019 | 2 | 2019 |
| Interoperability Certification & Assessments: FY19 LCS Interoperability Assessment (19-3) | 3 | 2019 | 3 | 2019 |
| Interoperability Certification & Assessments: FY19 LCS Interoperability Assessment (19-4) | 4 | 2019 | 4 | 2019 |
| Warfare Systems Certification: FY14 Warfare Systems Cert (80 events) | 1 | 2014 | 4 | 2014 |
| Warfare Systems Certification: FY15 Warfare Systems Cert (50 events) | 1 | 2015 | 4 | 2015 |
| Warfare Systems Certification: FY16 Warfare Systems Cert (100 events) | 1 | 2016 | 4 | 2016 |
| Warfare Systems Certification: FY17 Warfare Systems Cert (100 events) | 1 | 2017 | 4 | 2017 |
| Warfare Systems Certification: FY18 Warfare Systems Cert (100 events) | 1 | 2018 | 4 | 2018 |
| Warfare Systems Certification: FY19 Warfare Systems Cert (100 events) | 1 | 2019 | 4 | 2019 |
| Warfare Systems Cybersecurity: Warfare Systems Cybersecurity | 1 | 2016 | 4 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603582N / *Combat System Integration* | Project (Number/Name)<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3312: *MTMD-Maritime Theater Missile Defense Forum* | 7.087 | 4.270 | 9.353 | 8.873 | - | 8.873 | 9.325 | 7.792 | 7.917 | 8.182 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project funds participation in Maritime Integrated Air and Missile Defense projects with other nations. Included is participation in the Maritime Missile Defense Projects Framework Memorandum of Understanding of 2004 (as amended 2009). Known as the Maritime Theater Missile Defense (MTMD) forum, it promotes interoperability with the Navies of nine participating nations (Australia, Canada, France, Germany, Italy, Netherlands, Spain, United Kingdom and the United States). This project funds participation in several Project Arrangements and includes maritime contribution to the NATO Active Layered Theater Ballistic Missile Defense (ALTBMD) project, now known as NATO Ballistic Missile Defense (BMD). Engineering analysis and recommendations from MTMD activities are provided to European, Pacific and Central Combatant Commands to influence present day operations. Specifically, the MTMD Forum is addressing challenges with "Maritime Allied Air Defense in Support of Ballistic Missile Defense Operations" that face the Combatant Commanders during present day operations.

The MTMD forum provides protection against the proliferation of short, medium and long-range Ballistic Missile (BM) and Advanced Anti-Ship Cruise Missile (ASCM) threats through the creation of an interoperable sea-based Integrated Air and Missile Defense (IAMD) capability among coalition nations. This includes protection across the full spectrum of these threats through the enhanced utilization of existing sea-based systems to protect against current threats while progressively improving and developing systems and system-of- systems to effectively counter evolving threats.

This project supports USN participation in several Maritime IAMD related Project Arrangements and Working Groups including:

(1) Battle Management Command, Control, Communications, Computers, and Intelligence (BMC4I) to define and develop architectures as well as to perform engineering to address coalition capability gaps.
(2) Modeling & Simulation (M&S) to establish and maintain a maritime coalition M&S testbed and to perform legacy and future systems simulation testing.
(3) Coalition Distributed Engineering Plant (CDEP) to establish and maintain a maritime coalition Hardware-in-the-Loop Testbed and to conduct CDEP testing.
(4) Open Architecture (OA) to develop Interface Standards and Data Models.
(5) Test Planning and Execution (TPEX) to develop Test Plans, oversee exercise participation and conduct post event data analysis and reporting.
(6) Operational Requirements (OR) to develop a Coalition Maritime Missile Defense Operational Concept Document and to identify operational constraints and tactical constructs surrounding coalition maritime missile defense activities.
(7) Reciprocal Use of Test Facilities agreements with other nations to support Maritime IAMD and MTMD related demonstrations.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Maritime Theater Missile Defense Forum (MTMD) | 4.270 | 9.353 | 8.873 | - | 8.873 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |

***Description:*** This project funds participation in Maritime IAMD to promote interoperability with other nations. This project funds participation in Modeling and Simulation (M&S), Battle Management, Command, Control, Communications, Computers and Intelligence (BMC4I), Coalition Distributed Engineering Plant (CDEP), Test Planning and Execution (TPEX), Open Architecture (OA), and Operational Requirements (OR) activities.

***FY 2014 Accomplishments:***
(1) BMC4I Target Architecture 1 was fully completed and provided to M&S, CDEP and TPEX to finalize test architectures and to create the initial information exchange requirements between systems and nations to enable mission threads test development. BMC4I delivered the MTMD Coalition Capabilities and Interoperability (CCI) and Systems Tactical Data Links Interoperability (STIR) Reports.
(2) M&S delivered the Level I national M&S Baseline Architecture test data for Level II multi-national analysis and conducted updates to system models and the M&S testbed and federation stability tests to meet Target Architecture No. 1 requirements. M&S also completed and delivered the Joint Project Optic Windmill 2013 (JPOW13) data analysis and final report. The JPOW13 and Baseline Architecture M&S Level II analysis and recommendations will support at sea demonstration risk reduction activities.
(3) CDEP completed supplemental Baseline Architecture Hardware-in the-Loop testing and delivered the CDEP Baseline Integrated Capabilities and Limitations Report and CDEP Target Architecture 2 test plan
(4) Open Architecture completed the Open Architecture Radar Interface Standard and delivered the standard for international certification through the industry consortium Object Management Group. Once the industry consortium certifies the radar interface standard, it becomes an international standard. The development of Force Level Open Architecture Technical Standards (FLOATS) continues.
(5) TPEX delivered the updated MTMD Master Test Plan and initial Data Collection and Analysis Plan and will continue planning and range preparations for the major at-sea demonstrations during Joint Warrior 152 in 2015 and Rim of the Pacific (RIMPAC) 2016. Targets and range services procurements for 2015 test events have commenced. Test architectures are in development with NATO BMD and the Missile Defense Agency. Risk reduction analysis and tests are underway.
(6) Operational Requirements working group provided the initial Maritime Integrated Air and Missile Defense tactics, techniques and procedures and Operational Framework and Objectives for 2015 at sea testing to Fleet staff and operators for review. The MTMD nations received the documents for evaluation and the Operational framework guidance was provided for MTMD Forum multi-national and Force-Level mission planning.

***FY 2015 Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| (1) BMC4I will continue engineering analysis and multi-national interoperability gap assessment from Target Architecture 1 Test results and will develop Target Architecture No. 2. BMC4I will evaluate Recommended Point Solutions and provide final recommendations for the implementation in correcting coalition interoperability gaps. BMC4I will finalize information exchange requirements in preparation for at-sea demonstrations. M&S will support 2015 at-sea test training.<br>(2) M&S will complete analysis of Target Architecture No. 1 tests and test Architecture No. 1-1 and provide assessments and recommendations to improve information exchange requirements identified by BMC4I. M&S will also provide training in support of the 2015 At-Sea demonstration.<br>(3) CDEP will complete analysis of Target Architecture No. 1 hardware-in-the-loop tests and provide assessments and recommendations to improve information exchanges required to conduct the at-sea demonstrations. CDEP will provide<br>the final architecture risk assessment and Capabilities & Limitations document to support the at-sea demonstrations.<br>(4) Open Architecture will continue development of the Force Level Open Architecture Technical Standard. Inputs from<br>M&S and CDEP test results will be used to improve the details of the standard.<br>(5) TPEX will finalize preparations and conduct MTMD participation as part of Joint Warrior 152. This 2015 At-Sea Demonstration will include live tracking events and a combination of live and simulated engagements. Integrated<br>Air Defense and Ballistic Missile Defense test scenarios among the nations will be conducted. This will be the first multi-national maritime test of its kind ever conducted. Planning for RIMPAC 2016 will continue and will include target configuration/procurement.<br>(6) Operational Requirements group will continue to provide fleet inputs and operator oversight to test and evaluation events. The Operational Concept Document will be updated as will final tactics, techniques and procedures in support of the at-sea demonstrations in 2015 and 2016. | | | | | |
| ***FY 2016 Base Plans:***<br>(1) BMC4I will continue engineering analysis and multi-national interoperability gap assessment from Target Architecture 1 test results and complete development of Target Architecture No. 2. BMC4I will evaluate Recommended Point Solutions and provide final recommendations for the implementation in correcting coalition interoperability gaps. BMC4I will finalize information exchange requirements in preparation for at-sea demonstrations. BMC4I develop updates to MTMD Coalition Capabilities and Interoperability (CCI) and Systems Tactical Data Links Interoperability (STIR) Reports. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| (2) M&S complete analysis of Target Architecture No 1-1 M&S test and provide final assessment of Target Architecture 1-1. M&S will also provide and recommendations to improve the information exchange requirements identified by BMC4I. M&S will model and further Target Architectures and provide training in support of the 2016 at sea demonstration.<br>(3) CDEP will conduct Target Architecture No. 1 hardware-in-the-loop tests and provide assessments and recommendations to improve information exchanges required to conduct the at-sea demonstrations. CDEP will evaluate the architecture risk, and update the Capabilities & Limitations document to support the at-sea demonstrations.<br>(4) Open Architecture will continue development of the Force Level Open Architecture Technical Standards. Inputs from M&S, CDEP and TPEX tests will be used to improve standards.<br>(5) TPEX will finalize preparations for and conduct MTMD participation as part of RIMPAC 16. This 2016 At-Sea Demonstration will include live tracking events and a combination of live and simulated engagements. Integrated<br>Air Defense and Ballistic Missile Defense test scenarios among the nations will be conducted. This will be the first multi-national maritime test of its kind ever conducted. Planning for RIMPAC 2016 and follow-on 2017/2018 at-sea testing will continue and will include target configuration/procurement.<br>(6) Operational Requirements group will continue to provide fleet inputs and operator oversight to test and evaluation events. The Operational Concept Document will be updated as will final tactics, techniques and procedures in support of the at-sea demonstrations in 2016.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.270 | 9.353 | 8.873 | - | 8.873 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0605853N: *PU 0149 INTERNATIONAL COOP MANAGEMENT, TECHNICAL AND INTL SUPT* | 2.500 | 2.244 | 2.300 | - | 2.300 | 2.358 | 2.417 | 2.477 | 2.539 | Continuing | Continuing |
| • 0603790N: *PU 2293 NATO RESEARCH & DEVELOPMENT* | 0.500 | - | - | - | - | - | - | - | - | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Quarterly Program Reviews and Baseline Assessments

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603582N / *Combat System Integration* | Project (Number/Name)<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCM4I Architectures Definition & | WR | NSWC/DD : DAHLGREN, VA | 0.703 | 0.161 | Jan 2014 | 0.188 | Dec 2014 | 0.154 | Jan 2016 | - | | 0.154 | - | 1.206 | - |
| BMC4I Architectures Definition & | C/CPFF | NSWC/DD : DAHLGREN, VA | 0.393 | 0.030 | Jul 2014 | 0.249 | Dec 2014 | 0.239 | Jan 2016 | - | | 0.239 | - | 0.911 | - |
| BMC41 Interoperability Program Design & Direction | C/CPFF | SPAWAR : SAN DIEGO, CA | 0.350 | 0.500 | Jan 2014 | 0.756 | Dec 2014 | 0.679 | Jan 2016 | - | | 0.679 | Continuing | Continuing | Continuing |
| BMC4I Programmatic Support | C/CPFF | GRYPHON : WASHINGTON, DC | 0.000 | 0.023 | Jun 2014 | 0.156 | Dec 2014 | 0.140 | Jan 2016 | - | | 0.140 | - | 0.319 | - |
| M&S Test Plan and Execution | WR | CDSA/DN : DAM NECK, VA | 0.629 | 0.154 | Dec 2013 | 0.353 | Dec 2014 | 0.244 | Jan 2016 | - | | 0.244 | Continuing | Continuing | Continuing |
| M&S Test Development & Engineering | C/CPFF | CDSA/DN : DAM NECK, VA | 0.481 | 0.073 | Feb 2014 | 0.356 | Dec 2014 | 0.244 | Jan 2016 | - | | 0.244 | Continuing | Continuing | Continuing |
| M&S Technical Support & Special Studies | C/CPFF | NAVSEA (JHU/ APL) : LAUREL, MD | 0.505 | 0.259 | Mar 2014 | 0.384 | Dec 2014 | 0.494 | Jan 2016 | - | | 0.494 | Continuing | Continuing | Continuing |
| CDEP Project Officer (PO) | WR | CDSA/DN : DAM NECK, VA | 0.011 | 0.186 | Apr 2014 | 0.404 | Dec 2014 | 0.364 | Jan 2016 | - | | 0.364 | Continuing | Continuing | Continuing |
| CDEP Interoperability Cert Assess | WR | NSWC/DD : DAHLGREN, VA | 0.714 | 0.100 | Dec 2013 | 0.236 | Dec 2014 | 0.212 | Jan 2016 | - | | 0.212 | - | 1.262 | - |
| CDEP Test Event Plan & Coor for Data Mgt & Analysis | WR | NSWC/COR : RIVERSIDE, CA | 0.359 | 0.150 | Dec 2013 | 0.165 | Dec 2014 | 0.149 | Jan 2016 | - | | 0.149 | Continuing | Continuing | Continuing |
| CDEP Caps & Lims Development | WR | NSWC/PHD : VENTURA, CA | 0.144 | 0.050 | Dec 2013 | 0.325 | Dec 2014 | 0.292 | Jan 2016 | - | | 0.292 | Continuing | Continuing | Continuing |
| CDEP Cross Domain Network Engineering | WR | SSCPAC : SAN DIEGO, CA | 0.287 | 0.185 | Dec 2013 | 0.236 | Dec 2014 | 0.212 | Jan 2016 | - | | 0.212 | Continuing | Continuing | Continuing |
| CDEP Engineering & Operations | C/CPFF | SSCPAC (TEA) : SAN DIEGO, CA | 0.210 | - | Dec 2013 | 0.240 | Dec 2014 | 0.215 | Jan 2016 | - | | 0.215 | Continuing | Continuing | Continuing |
| CDEP Data Guard Engineering | C/CPFF | NSWC/DD (LM) : DAHLGREN, VA | 0.412 | 0.100 | Apr 2014 | 0.207 | Dec 2014 | 0.186 | Jan 2016 | - | | 0.186 | Continuing | Continuing | Continuing |
| CDEP Contract Engineering Support | C/CPFF | CDSA/DN (URS) : DAM NECK, VA | 0.188 | 0.161 | Jan 2014 | 0.166 | Dec 2014 | 0.148 | Jan 2016 | - | | 0.148 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OA Development of Interface Standards | WR | NSWC/DD : DAHLGREN, VA | 0.100 | 0.120 | Apr 2014 | 0.473 | Dec 2014 | 0.446 | Jan 2016 | - | | 0.446 | Continuing | Continuing | Continuing |
| TPEX Technical Support | WR | PEO IWS : WASHINGTON, DC | 0.000 | 0.050 | Feb 2014 | 0.069 | May 2015 | 0.051 | Jan 2016 | - | | 0.051 | Continuing | Continuing | Continuing |
| TPEX Link Management Support, BTS LAB | WR | SPAWAR : SAN DIEGO, CA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| TPEX Data Analysis & Reporting, PA 1 PO | WR | NSWC/COR : RIVERSIDE, CA | 0.225 | 0.050 | Dec 2013 | 0.597 | Jun 2015 | 0.521 | Jan 2016 | - | | 0.521 | Continuing | Continuing | Continuing |
| TPEX Afloat Training & Readiness | WR | TTGLANT : NORFOLK, VA | 0.000 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| TPEX Data Collection, Analysis & Reporting | WR | NSWC/DD : DAHLGREN, VA | 0.000 | 0.100 | Jan 2014 | 0.473 | Dec 2014 | 0.106 | Jan 2016 | - | | 0.106 | - | 0.679 | - |
| TPEX Mini Groom Team, PO, PE, TDL | WR | NSWC/PHD : PORT HUENEME, CA | 0.040 | 1.368 | May 2014 | 0.620 | May 2015 | 0.318 | Jan 2016 | - | | 0.318 | - | 2.346 | - |
| TPEX Test Plans, Trials Lead, Test Eng, Prog & Fin Management | C/CPFF | PEO IWS (TASC) : WASHINGTON, DC | 0.411 | 0.400 | Feb 2014 | 1.513 | Dec 2014 | 1.189 | Jan 2016 | - | | 1.189 | Continuing | Continuing | Continuing |
| TPEX Test Planning, Orbital Safety | C/CPFF | NAVSEA (JHU/ APL) : LAUREL, MD | 0.000 | 0.050 | Mar 2014 | 0.567 | Dec 2014 | 0.413 | Jan 2016 | - | | 0.413 | Continuing | Continuing | Continuing |
| TPEX Range Planning & execution, Safety Planning/Documentation, Clearances & Approval, Infrastructure Modifications | C/CPFF | UK MINISTRY OF DEFENSE : HEBRIDES, SCOTLAND | 0.925 | - | | - | | - | | - | | - | - | 0.925 | - |
| TPEX Targets & Weapons | WR | NSWC PHD/WSMR DET : CHINA LAKE, CA | 0.000 | - | | 0.295 | Dec 2014 | 0.531 | Dec 2015 | - | | 0.531 | - | 0.826 | - |
| TPEX Afloat Training & Readiness | WR | TTGPAC : SAN DIEGO, CA | 0.000 | - | | - | | 0.053 | Jan 2016 | - | | 0.053 | - | 0.053 | - |
| TPEX Air Target Support | WR | TTGPAC : NORFOLK, VA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| TPEX Range Planning & execution, Safety | WR | PMRF : KAUAI, HI | 0.000 | - | | 0.118 | Dec 2014 | - | | - | | - | - | 0.118 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |

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

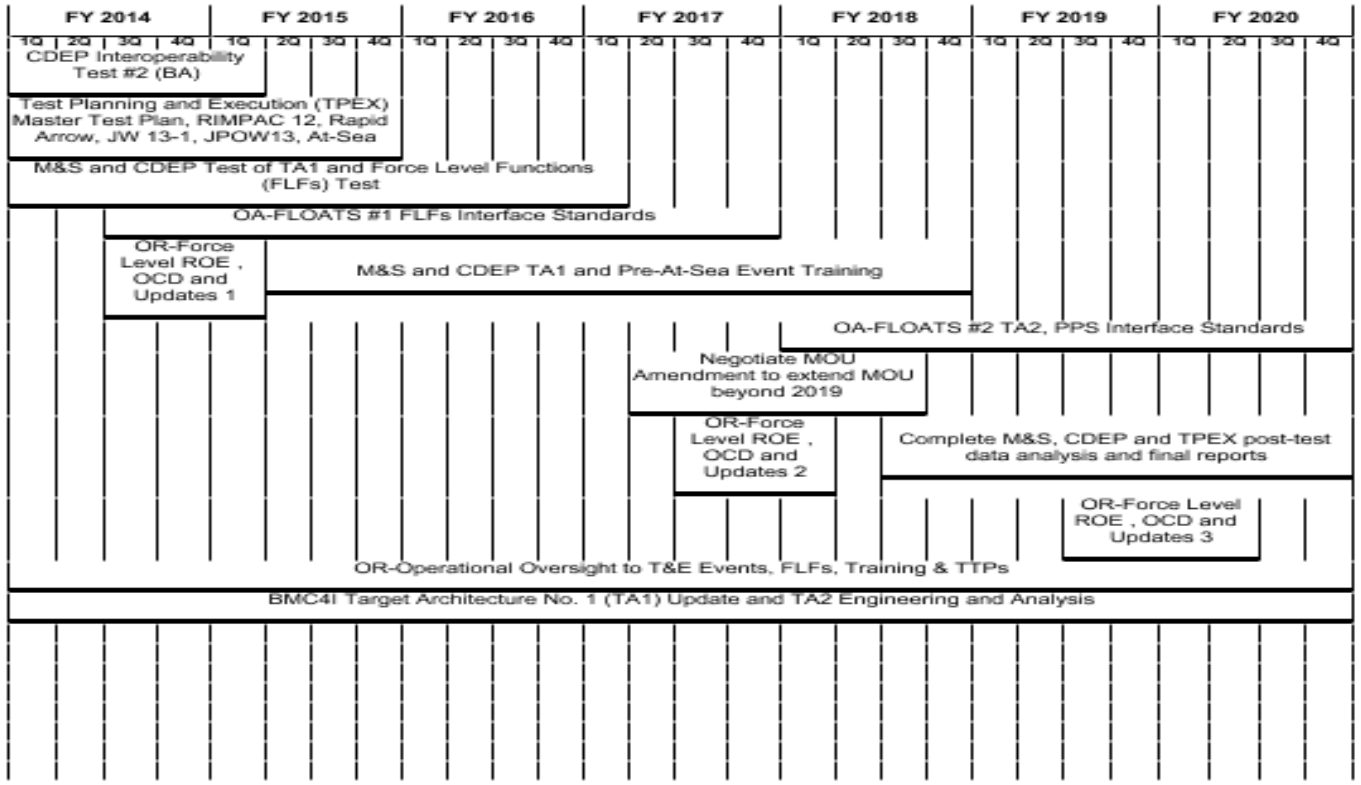
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Planning/Documentation, Clearances & Approvals | | | | | | | | | | | | | | | |
| TPEX SAAM Flight Travel | WR | NATIONAL GUARD BUREAU : ARLINGTON, VA | 0.000 | - | | 0.089 | Dec 2014 | 1.008 | Jan 2016 | - | | 1.008 | - | 1.097 | - |
| TPEX Range & Target Support Services | WR | NAWC PM : POINT MUGU, CA | 0.000 | - | | 0.118 | Dec 2014 | 0.265 | Jan 2016 | - | | 0.265 | - | 0.383 | - |
| | | **Subtotal** | 7.087 | 4.270 | | 9.353 | | 8.873 | | - | | 8.873 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 7.087 | 4.270 | | 9.353 | | 8.873 | | - | | 8.873 | - | - | - |

**Remarks**

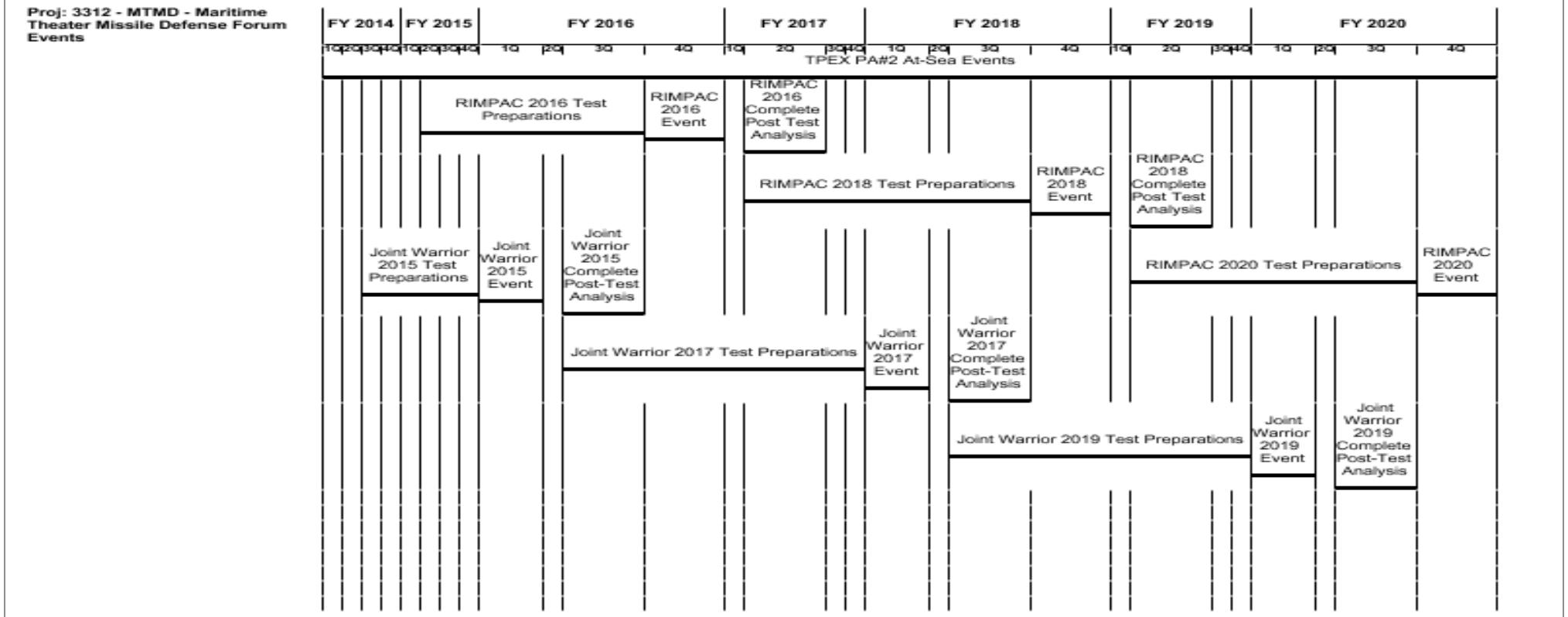
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |

**Proj: 3312 - MTMD - Maritime Theater Missile Defense Forum**




*2016PB - 0603582N - 3312*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |




2016PB - 0603582N - 3312

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj: 3312 - MTMD - Maritime Theater Missile Defense Forum*** | | | | |
| CDEP Interoperability Test #2 (BA) | 1 | 2014 | 1 | 2015 |
| Test Planning and Execution (TPEX) Master Test Plan, RIMPAC 12, Rapid Arrow, JW 13-1, JPOW13, At-Sea Event #1 | 1 | 2014 | 4 | 2015 |
| M&S and CDEP Test of TA1 and Force Level Functions (FLFs) Test | 1 | 2014 | 1 | 2017 |
| OA-FLOATS #1 FLFs Interface Standards | 3 | 2014 | 4 | 2017 |
| OR-Force Level ROE , OCD and Updates 1 | 3 | 2014 | 1 | 2015 |
| M&S and CDEP TA1 and Pre-At-Sea Event Training | 2 | 2015 | 4 | 2018 |
| OA-FLOATS #2 TA2, PPS Interface Standards | 1 | 2018 | 4 | 2020 |
| Negotiate MOU Amendment to extend MOU beyond 2019 | 2 | 2017 | 3 | 2018 |
| OR-Force Level ROE , OCD and Updates 2 | 3 | 2017 | 1 | 2018 |
| Complete M&S, CDEP and TPEX post-test data analysis and final reports | 3 | 2018 | 4 | 2020 |
| OR-Force Level ROE , OCD and Updates 3 | 3 | 2019 | 2 | 2020 |
| OR-Operational Oversight to T&E Events, FLFs, Training & TTPs | 1 | 2014 | 4 | 2020 |
| BMC4I Target Architecture No. 1 (TA1) Update and TA2 Engineering and Analysis | 1 | 2014 | 4 | 2020 |
| ***Proj: 3312 - MTMD - Maritime Theater Missile Defense Forum Events*** | | | | |
| TPEX PA#2 At-Sea Events | 1 | 2014 | 4 | 2020 |
| RIMPAC 2016 Test Preparations | 2 | 2015 | 3 | 2016 |
| RIMPAC 2016 Event | 4 | 2016 | 4 | 2016 |
| RIMPAC 2016 Complete Post Test Analysis | 2 | 2017 | 2 | 2017 |
| RIMPAC 2018 Test Preparations | 2 | 2017 | 3 | 2018 |
| RIMPAC 2018 Event | 4 | 2018 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603582N / *Combat System Integration* | **Project (Number/Name)**<br>3312 / *MTMD-Maritime Theater Missile Defense Forum* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| RIMPAC 2018 Complete Post Test Analysis | 2 | 2019 | 2 | 2019 |
| RIMPAC 2020 Test Preparations | 2 | 2019 | 3 | 2020 |
| RIMPAC 2020 Event | 4 | 2020 | 4 | 2020 |
| Joint Warrior 2015 Test Preparations | 3 | 2014 | 4 | 2015 |
| Joint Warrior 2015 Event | 1 | 2016 | 1 | 2016 |
| Joint Warrior 2015 Complete Post-Test Analysis | 3 | 2016 | 3 | 2016 |
| Joint Warrior 2017 Test Preparations | 3 | 2016 | 4 | 2017 |
| Joint Warrior 2017 Event | 1 | 2018 | 1 | 2018 |
| Joint Warrior 2017 Complete Post-Test Analysis | 3 | 2018 | 3 | 2018 |
| Joint Warrior 2019 Test Preparations | 3 | 2018 | 4 | 2019 |
| Joint Warrior 2019 Event | 1 | 2020 | 1 | 2020 |
| Joint Warrior 2019 Complete Post-Test Analysis | 3 | 2020 | 3 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603595N *I (U)Ohio Replacement* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | - | 853.277 | 971.393 | - | 971.393 | 712.354 | 766.528 | 484.920 | 205.999 | Continuing | Continuing |
| 3220: *SBSD Advanced Submarine System Development* | 0.000 | - | 816.807 | 971.393 | - | 971.393 | 712.354 | 766.528 | 484.920 | 205.999 | Continuing | Continuing |
| 3237: *Launch Test Facility* | 0.000 | - | 36.470 | - | - | - | - | - | - | - | - | 36.470 |
| **MDAP/MAIS Code:** P444 | | | | | | | | | | | | |

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

This program element supports innovative research and development in submarine Hull, Mechanical and Electrical (HM&E) and combat systems technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible. The program element also supports programs transitioning from Science and Technology (S&T), Defense Advanced Research Projects Agency (DARPA), Independent Research and Development, and Small Business Innovation Research (SBIR) projects.

Project Unit 3220:

The objective of the Sea Based Strategic Deterrent (SBSD) Advanced Submarine System Development project is to design and prepare for construction of the replacement of the OHIO Class SSBN.

Project Unit 3237:

The Launch Test Facility project constructs the Launch Test Facility at Naval Air Warfare Center, China Lake, CA to enable Full Scale Surface Launch Testing and evaluation / qualification of the TRIDENT II D5LE SWS missile launcher subsystem for the OHIO Replacement Submarine. The project construction will be authorized by 10 U.S.C. Section 2353, funded from Research, Development, Test, and Evaluation (RDT&E) appropriations, and will have no general utility and will be utilized solely to meet RDT&E contractual requirements.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | R-1 Program Element (Number/Name)<br>PE 0603595N *I (U)Ohio Replacement* | | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | - | 849.277 | 994.926 | - | 994.926 |
| Current President's Budget | - | 853.277 | 971.393 | - | 971.393 |
| Total Adjustments | - | 4.000 | -23.533 | - | -23.533 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 4.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | - | - | -16.826 | - | -16.826 |
| • Rate/Misc Adjustments | - | - | -6.707 | - | -6.707 |

**Change Summary Explanation**

Note: Beginning in 2015, there is an administrative change that shifts efforts funded from PE 0603561N (Advanced Submarine System Development) / Project 3220 to PE 0603595N (Ohio Replacement) / Project 3220. This shift is consistent with Congressional intent identified in the FY13 Appropriation Act.

Reduced FY 16 funding due to the Department's decision to reduce contracted services.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603595N / *(U)Ohio Replacement* | Project (Number/Name)<br>3220 / *SBSD Advanced Submarine System Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3220: *SBSD Advanced Submarine System Development* | - | - | 816.807 | 971.393 | - | 971.393 | 712.354 | 766.528 | 484.920 | 205.999 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Note: Beginning in 2015, there is an administrative change that will shift efforts funded from PE 0603561N (Advanced Submarine System Development) / Project 3220 to PE 0603595N (OHIO Replacement) / Project 3220. This shift is consistent with Congressional intent identified in the FY13 Appropriation Act.

Reduced FY16 funding due to the Department's decision to reduce contracted services.

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

The Sea Based Strategic Deterrent (SBSD) Advanced Submarine System Development project supports the OHIO Replacement (OR) program. The funding applies to the design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for Common Missile Compartment (CMC) design, whole ship design, and component technologies development for the next generation U.S. ballistic missile submarine. This RDT&E program supports cooperation with the United Kingdom (UK) to maintain strategic deterrence, based on a single effort to develop a CMC as agreed by the UK Secretary of State for Defence and the U.S. Secretary of Defense in 2009.

The OHIO Replacement program strategy is to maximize the re-use of existing OHIO systems and new designs from the SEAWOLF and VIRGINIA Classes (as applicable), focus on Life Cycle Total Ownership Cost (TOC) affordability, and meet the military requirements established for this SSBN to achieve mission success in a challenging environment. The requested funding levels provide for the Technology Development, Design, and Engineering Integration efforts necessary to support the OHIO Replacement SSBN lead ship construction start in FY 2021.

The following key activities support a ship acquisition program to replace the OHIO Class SSBNs:

1. Design and development of a missile compartment, launch system, and strategic support systems to meet U.S. strategic requirements while cooperating with the UK on modernizing its strategic deterrent in accordance with Presidential direction (December 2006).
2. Concept and System Definition for remaining portions of the ship will be accomplished through a Design/Build/Sustain approach modeled after the approach used by the VIRGINIA Class program.
3. Engineering and integration of existing technologies and development of new technologies required to provide the capabilities needed to ensure platform operational effectiveness and minimize life cycle cost.

OR Concept and System Definition Prototyping, and Technology Development Efforts

The OR program supports design, systems engineering, prototyping and vendor qualification activities needed to develop CMC design, the OHIO Replacement whole ship design, and component development. The OR design timelines are based on the design approach proven on the VIRGINIA Class Program, adjusted for the additional complexity of a missile compartment and Strategic Weapons Systems (SWS). Planned technical studies and prototyping are necessary to reduce risks associated with updating SSBN system designs for current technical standards and demonstrating design feasibility of developmental technology to meet the ship design and construction schedule.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

The Navy continues investing in program funded affordability initiatives similar to those employed successfully for VIRGINIA Class, but tailored to the unique SSBN mission and operational tempo of OHIO Replacement to drive down overall program costs. Efforts will focus on reducing ship construction costs through implementing more effective design features to produce a more affordable/producible class. As part of this effort, alternative contracting strategies will be examined to include multi-class multiyear procurement (MYP) and economic order quantity (EOQ).
Activities planned for FY 2015 are being executed to ensure the first article quad pack prototype of the CMC is on schedule to support the UK SUCCESSOR Programme. The CMC program will mature required technologies and re-host the TRIDENT II D5 SWS (Launcher, Fire Control and Navigation) while ensuring no degradation to D5 security, safety and performance. In addition, whole ship design efforts are focused on technologies requiring significant engineering, integration and development time and those technologies that are required to support ship design and construction schedules such as the propulsor, maneuvering/ship control and signatures. These technologies are critical for stealth capability for a ship class that will be in service until the 2080s. Ship concept design efforts include important pre-construction activities such as finalizing ship requirements, risk characterization and mitigation, improvement and validation of performance prediction tools and improvement of design tools. Technology development will address engineering and integration of existing technologies as well as maturation of developmental technologies.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Lead Design Yard (CMC / Ship Study and Design) | - | 425.044 | 517.316 | - | 517.316 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>The combination of Common Missile Compartment (CMC) Design and Prototyping and Ship Study and Design represents the required Lead Design Yard (LDY) Shipbuilder effort for the OHIO Replacement (OR) Program.<br><br>CMC: This funding applies to the design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for Common Missile Compartment (CMC) design and component / technology development for the OHIO Replacement submarine. Included in this effort is prototyping of the Missile Tubes (MTs), Quad Packs (QPs) and ultimately the Missile Tube Module (MTM). Specific planned efforts in FY 2015 include commencing development of first article missile tubes. Also included are continuing efforts for the design and development of the MTs, MTM and entire CMC to include: completion of approximately 90 percent of Diagrams, 30 percent of Design Disclosures, and 70 percent of CMC arrangements in support of the MTs, First Article QP (FAQP), and MTM build. Additionally this effort will continue validation of missile tube to missile tube quad pack production techniques development, testing, and integration of missile tube to keel robotic welding techniques that support process certification; generate digital manufacturing data for the prototype FAQP; begin manufacturing of First Article MTs and place contract actions for long lead material to support development | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| of FAQP pressure hull; conduct final CMC pressure hull model testing at Government laboratory; and receive approvals for CMC Subsystem Hazard Analysis (SHAs).<br><br>Ship Study and Design: This funding applies to the design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for whole ship design, shipbuilder component / technology development for the OHIO Replacement submarine. Specific efforts in FY2015 include design of the forward and aft ends of OHIO Replacement including Rest of Ship (RoS) system integration, completion of approximately 80 percent of engineered component procurement specifications, 90 percent of System Diagrams, 15 percent of RoS Arrangements, as well as commencing RoS Design Disclosures to support program schedule. This funding also continues maintaining configuration control for all CMC interfaces with Rest of Ship, begins ship integration of the Generation 1 Propulsor design and completes development of a Non-Shipboard Prototype to validate the next generation design tool at the shipbuilder. | | | | | |
| ***FY 2016 Base Plans:***<br>The combination of Common Missile Compartment (CMC) Design and Prototyping and Ship Study and Design represents the required Lead Design Yard (LDY) Shipbuilder effort for the OHIO Replacement (OR) Program.<br><br>CMC: This funding applies to the design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for Common Missile Compartment (CMC) design and component / technology development for the OHIO Replacement submarine. Included in this effort is prototyping of the Missile Tubes (MTs), Quad Packs (QPs) and ultimately the Missile Tube Module (MTM). Specific planned efforts in FY 2016 include continued fabrication of First Article prototype MTs; completion of approximately 85 percent of CMC arrangements and over 60 percent of required Design Disclosures. This effort also includes receiving approvals for CMC System Hazard Analyses (SHAs); performing assembly, installation and test of manufacturing fixtures required to prove Integrated Tube and Hull (ITH) manufacturing; commencing manufacturing of the FAQP pressure hull; support of development of Strategic Weapons Support Systems (SWSS) for the land based test facility; and placement of contract actions for material to support the Prototype MTM.<br><br>Ship Study and Design: Lead Design Yard (LDY) efforts increase by approximately 20 percent in FY 2016, driven by a 50 percent increase in labor hours and time related material associated with design disclosure and arrangement development as well as the accompanying engineering analysis. The increase in funding requirements from FY 2015 to FY 2016 supports the 83 percent design completion required for an FY 2021 Lead Ship construction start and the aggressive 84 month build necessary to support the first strategic deterrent | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| patrol in FY 2031. This funding applies to the shipbuilder design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for whole ship design, component / technology development for the OHIO Replacement submarine. Specific efforts in FY 2016 include the completion of all RoS Systems Diagrams, issuing an additional four percent of Rest of Ship Design Disclosures, and completion of approximately 90 percent of engineered component procurement specifications. Additionally, the completion of arrangements in FY2016 will approach 50 percent. Efforts will also continue towards maintaining configuration control for all CMC interfaces with Rest of Ship and progressing ship integration of the Propulsor design.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** NAVSEA R&D and Prototyping | - | 152.606 | 184.978 | - | 184.978 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>This funding applies to the Government combat systems, component and technology development for the OHIO Replacement (OR) submarine essential to achieving required signatures, maneuverability, combat and communications capabilities. Specific efforts in FY 2015 include testing of the Generation 1 Propulsor models on the large scale vehicle and commencement of the Generation 2 Propulsor design based on lessons learned from Generation 1 testing; Analysis of composite components in support of propulsor development efforts; commencing manufacturing of the full scale prototype propulsor rotor quick disconnect hardware; and initializing the full scale bearing test rig evaluation of candidate prototype OR bearing materials. Additional efforts include beginning Phase II of the Concept of Operations Experiment (COOPEX) to support Hovering and Missile Compensation Control System (HMCCS) and Ship Control System (SCS) designs; conducting a full scale at-sea test of signature control technologies on a surrogate platform to inform stern design; continuing Government Furnished Equipment (GFE) development studies to enable delivery of preliminary Government Furnished Information (GFI) for Non-Propulsion Electronics Systems (NPES); continued OR specific systems engineering efforts and arrangements trade studies to support AN/BRR-6 reliability updates; and conducting water tunnel and model testing to support control surface design. This effort also continues Government support and oversight of development of approximately 50 engineered components.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| This funding applies to the Government combat systems, component and technology development for the OHIO Replacement (OR) submarine essential to achieving required signatures, maneuverability, combat and communications capabilities. Efforts in FY 2016 represent a significant increase in the pace of Government design, prototyping, testing and analysis required. The combined Government design, manufacture and testing in FY 2016 for the Generation 1 and Generation 2 Propulsors will increase as the processes and feedback become more mature. This effort also includes the performance of various propulsor development related events including: completion of Generation 1 Propulsor testing on the Large Scale Vehicle and continued Generation 2 Propulsor design (including small and intermediate scale testing). Other efforts include performing a propulsor rotor quick disconnect demonstration and preparations for handling and assembly demonstrations for proof of concept testing; completion of candidate bearing material testing at the full scale bearing test rig; and completing Concept of Operations Experiment (COOPEX) Phase II & III to support Hovering and Missile Compensation and Missile Compensation Control System (HMCCS) and Ship Control System (SCS) designs. Specific efforts also include continued development, refinement, and delivery of GFI for NPES; continued assessment of AN/BRR-6 reliability based updates (including delivery of updated GFI); continued initial systems architecture assessment and development in conjunction with existing submarine classes to deliver increased GFI fidelity; commencement of development for the forward compartment structural configuration model; and completion of testing and analysis to support the finalization of control surface design. This effort also continues Government support and oversight of development of approximately 50 engineered components.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Systems Engineering/Program Management | - | 86.569 | 71.896 | - | 71.896 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>This funding applies to the Government technical and programmatic oversight including Program Office management and technical support from government laboratories for review, analysis and approval of lead design yard and various government performer's design deliverables. Specific efforts in FY 2015 include continued review and approval of Arrangements, System Descriptions/Diagrams, and Design Disclosures in accordance with the Integrated Master Schedule (IMS) via technical oversight, review and Government approval of all Lead Design Yard (LDY) developed design products. Continue maintenance planning and design for | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| sustainment activities to ensure SBSD availability requirements can be met. Complete the OHIO Replacement Capabilities Development Document (CDD) and submit the updated CDD to the Joint Requirements Oversight Counsel (JROC) for validation and approval. Conduct additional assessments, as required, to support the JROC CDD validation and approval process. Continue functional allocation of CDD requirements to platform design and system attributes and performance standards. Continue to identify and assess platform, shore facilities, and infrastructure characteristics to identify opportunities to positively impact program costs. Continue program affordability initiatives in order reduce overall out-year program costs. Specific initiatives include Integrated Product Development Environment (IPDE) process development and identification of candidates for material reuse. Continue program affordability efforts targeted to achieving potential savings associated with multi-year and/or Economic Order Quantity (EOQ) procurements across submarine classes, investigating the government vs. contractor furnished equipment mix for potential efficiencies, and potential savings associated with continuous missile tube and/or launch tube production runs. Continue efforts for Milestone B document preparation to fulfill OSD oversight requirements.<br>***FY 2016 Base Plans:***<br>This funding applies to the Government technical and programmatic oversight including Program Office management and technical support from government laboratories for review, analysis and approval of lead design yard and various government performer's design deliverables. Specific efforts in FY 2016 include continued review and approval of Arrangements, System Descriptions/Diagrams, and Design Disclosures in accordance with the Integrated Master Schedule (IMS) via technical oversight, review and Government approval of all Lead Design Yard (LDY) developed design products. After approval of the JROC CDD, complete development and gain approval of TEMP and LFT&E Master Plan. Obtain waiver for Full-Up-System Level (FUSL) testing. Continued program affordability efforts targeted to quantifying potential savings associated with multi-year and/or Economic Order Quantity (EOQ) procurements across submarine classes, investigating the government vs. contractor furnished equipment mix for potential efficiencies, and potential savings associated with continuous MT and/or launch tube production runs.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Strategic Weapons Systems Integration | - | 152.588 | 197.203 | - | 197.203 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2015 Plans:***<br>Continue system engineering efforts required for the re-hosting and integration of the TRIDENT II (D5) SWS on the OHIO Replacement submarine including review and modification of SWS Coordination, Interface and Arrangement Drawings for SWS equipment within the CMC and Missile Control Center Module (MCCM), SWS system and subsystem detailed preliminary design, and Hardware and Software requirements development. Continue SWS Test Systems material procurement and builds, test berth /facility modifications and development of special test vehicles. Continue SWS Ashore test capability development. Continue SWS training capability/ requirements development. Complete build and deliver Fire Control Engineering Test Systems. Continue design efforts for the development of a missile launch tube test capability and test stand including refurbishment of a test vehicle to support launch system prototype efforts and evaluation / qualification program. Continue design and development efforts for shipboard SWS Navigation. Continue systems engineering design efforts related to the OHIO Replacement guidance handling carts and procurement of a prototype guidance handling cart.<br><br>***FY 2016 Base Plans:***<br>Continue system engineering efforts required for the re-hosting and integration of the TRIDENT II (D5) SWS on the OHIO Replacement submarine including review and modification of SWS Coordination, Interface and Arrangement Drawings for SWS equipment within the CMC and Missile Control Center Module (MCCM), SWS system and subsystem preliminary design, and Hardware and Software requirements development. Continue SWS Test Systems material procurement and builds, test berth / facility modifications and development of special test vehicles. SWS Ashore test capability development. SWS training capability/requirements development. Continue design efforts for the development of a missile launch tube test capability to support launch system prototype efforts and evaluation / qualification program at the China Lake Launch Test Facility (LTF). Conduct a launcher evaluation test readiness review. Conduct integration and test of multiple components at the LTF. Continue design and development efforts for shipboard SWS Navigation. Complete build and test of the Inertial Navigation Simulator. Continue systems engineering design efforts related to the OHIO Replacement guidance handling carts. Conduct mechanical and electrical surface support equipment critical design reviews. Commence Reentry Body Simulator development.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 816.807 | 971.393 | - | 971.393 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/3219: *SBSD Nuclear Technology Development* | 296.050 | 369.964 | 422.661 | - | 422.661 | 411.598 | 401.698 | 291.302 | 278.600 | Continuing | Continuing |
| • RDTEN/3220: *Advanced Submarine System Development* | 760.134 | - | - | - | - | - | - | - | - | - | 2,747.327 |
| • SCN/1045: *OHIO Replacement Submarine* | - | - | - | - | - | 777.793 | 791.793 | 2,771.344 | 1,316.280 | Continuing | Continuing |
| • RDTEN/3237: *ORP Launch Test Facility* | - | 36.470 | - | - | - | - | - | - | - | - | 36.470 |
| • MILCON/0805376N: *Ohio Replacement Power and Propulsion Facility* | - | 23.985 | - | - | - | - | - | - | - | - | 23.985 |
| • MILCON/0901211N: *MCON Design Funds* | - | 0.364 | - | - | - | - | - | - | - | - | 0.364 |
| • RDTEN/0951: *Joint Warhead Fuse Sustainment Program* | 83.751 | 84.692 | 95.400 | - | 95.400 | 113.938 | 110.608 | 64.964 | 66.351 | Continuing | Continuing |
| • OPN/5358: *SWS Modernization Fund* | 224.484 | 201.832 | 240.694 | - | 240.694 | 200.789 | 222.157 | 227.140 | 231.945 | Continuing | Continuing |
| • WPN/1250: *TRIDENT II Mods* | 1,130.079 | 1,175.455 | 1,099.064 | - | 1,099.064 | 1,142.004 | 1,151.852 | 1,194.240 | 1,249.313 | Continuing | Continuing |
| • OMN/12D2: *Fleet Ballistic Missile* | 968.966 | 1,001.297 | 1,034.760 | - | 1,034.760 | 1,051.946 | 1,067.652 | 1,092.294 | 1,117.407 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The common missile compartment will be designed and developed to support the U.S. and UK in development of the OHIO Replacement and SUCCESSOR SSBN programs enabling a common U.S.-UK CMC and maximizing the benefit of the ongoing U.S.-UK partnership in strategic deterrence. The OHIO Replacement R&D efforts will incentivize cost reduction initiatives in the design, construction and operations & support portions of the program. R&D efforts will be performed by Navy laboratories, shipyards, private industry, and University Affiliated Research Centers.

**E. Performance Metrics**

Updated Integrated Master Schedule and CMC build strategy down-select. Development of signature management efforts to address knowledge gap, concepts for propulsor and shafting, and design guidance and interface control requirements.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603595N / *(U)Ohio Replacement* | Project (Number/Name)<br>3220 / *SBSD Advanced Submarine System Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | SS/CPFF | Ship Design Contractor-EB : Groton, CT | 0.000 | - | | 425.044 | Oct 2014 | 517.316 | Dec 2015 | - | | 517.316 | Continuing | Continuing | Continuing |
| Product Development | WR | NSWC : Carderock, MD | 0.000 | - | | 161.615 | Oct 2014 | 171.125 | Oct 2015 | - | | 171.125 | Continuing | Continuing | Continuing |
| Product Development | WR | NUWC : Newport, RI | 0.000 | - | | 14.808 | Oct 2014 | 21.045 | Oct 2015 | - | | 21.045 | Continuing | Continuing | Continuing |
| Product Development | Various | NAVSEA : Various | 0.000 | - | | 23.921 | Oct 2014 | 23.297 | Oct 2015 | - | | 23.297 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | ARL Penn State University : State College, PA | 0.000 | - | | 0.377 | Oct 2014 | 0.377 | Oct 2015 | - | | 0.377 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | NGMS : Sunnyvale, CA | 0.000 | - | | 32.859 | Oct 2014 | 54.531 | Oct 2015 | - | | 54.531 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | JHU/APL : Laurel, MD | 0.000 | - | | 5.807 | Oct 2014 | 7.073 | Oct 2015 | - | | 7.073 | Continuing | Continuing | Continuing |
| Product Development | WR | NUWC : Keyport, WA | 0.000 | - | | - | | 0.800 | Oct 2015 | - | | 0.800 | - | 0.800 | - |
| Product Development | SS/CPFF | CSDL : Cambridge, MA | 0.000 | - | | 4.368 | Oct 2014 | 4.788 | Oct 2015 | - | | 4.788 | Continuing | Continuing | Continuing |
| Product Development | WR | NSWC : Corona, CA | 0.000 | - | | 0.300 | Dec 2014 | 0.675 | Oct 2015 | - | | 0.675 | - | 0.975 | - |
| Product Development | SS/CPFF | LMFS : Mitchel Field, NY | 0.000 | - | | 8.777 | Oct 2014 | 8.835 | Oct 2015 | - | | 8.835 | Continuing | Continuing | Continuing |
| Product Development | C/CPFF | EMCUBE : Alexandria, VA | 0.000 | - | | 0.669 | Oct 2014 | 0.675 | Oct 2015 | - | | 0.675 | - | 1.344 | - |
| Product Development | SS/CPFF | LMMSC : Sunnyvale, CA | 0.000 | - | | 29.744 | Dec 2014 | 35.345 | Dec 2015 | - | | 35.345 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | JRC : Washington, DC | 0.000 | - | | 0.955 | Oct 2014 | 0.993 | Dec 2015 | - | | 0.993 | - | 1.948 | - |
| Product Development | C/CPFF | GDAIS : Pittsfield, MA | 0.000 | - | | 20.443 | Nov 2014 | 17.582 | Nov 2015 | - | | 17.582 | Continuing | Continuing | Continuing |
| Product Development | WR | CNSW : China Lake, CA | 0.000 | - | | 9.114 | Nov 2014 | 15.377 | Nov 2015 | - | | 15.377 | - | 24.491 | - |
| Product Development | SS/CPFF | IEC : Anaheim, CA | 0.000 | - | | 1.762 | Oct 2014 | 6.761 | Oct 2015 | - | | 6.761 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603595N / *(U)Ohio Replacement* | Project (Number/Name)<br>3220 / *SBSD Advanced Submarine System Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | WR | NSWC : Dahlgren, VA | 0.000 | - | | 4.524 | Oct 2014 | 4.265 | Oct 2015 | - | | 4.265 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | BAE : Rockville, MD | 0.000 | - | | 7.768 | Oct 2014 | 8.351 | Oct 2015 | - | | 8.351 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | BNA : Huntington Beach, CA | 0.000 | - | | 1.454 | Dec 2014 | 1.218 | Dec 2015 | - | | 1.218 | Continuing | Continuing | Continuing |
| Product Development | WR | NSWC Crane : Crane, IN | 0.000 | - | | 11.788 | Nov 2014 | 16.880 | Nov 2015 | - | | 16.880 | Continuing | Continuing | Continuing |
| Product Development | SS/CPFF | SPA : Alexandria, VA | 0.000 | - | | 3.921 | Oct 2014 | 3.235 | Oct 2015 | - | | 3.235 | Continuing | Continuing | Continuing |
| Product Development | Various | SSP : Various | 0.000 | - | | 7.958 | Oct 2014 | 9.442 | Oct 2015 | - | | 9.442 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 777.976 | | 929.986 | | - | | 929.986 | - | - | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Management Support | C/CPFF | Various : Multiple Awards | 0.000 | - | | 19.938 | Jan 2015 | 21.925 | Oct 2015 | - | | 21.925 | Continuing | Continuing | Continuing |
| Government Management Support | WR | Various: NSWC : Carderock, MD | 0.000 | - | | 18.477 | Oct 2014 | 19.032 | Oct 2015 | - | | 19.032 | Continuing | Continuing | Continuing |
| Travel | WR | NAVSEA HQ : Washington, D.C. | 0.000 | - | | 0.416 | Oct 2014 | 0.450 | Oct 2015 | - | | 0.450 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 38.831 | | 41.407 | | - | | 41.407 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 816.807 | | 971.393 | | - | | 971.393 | - | - | - |

**Remarks**

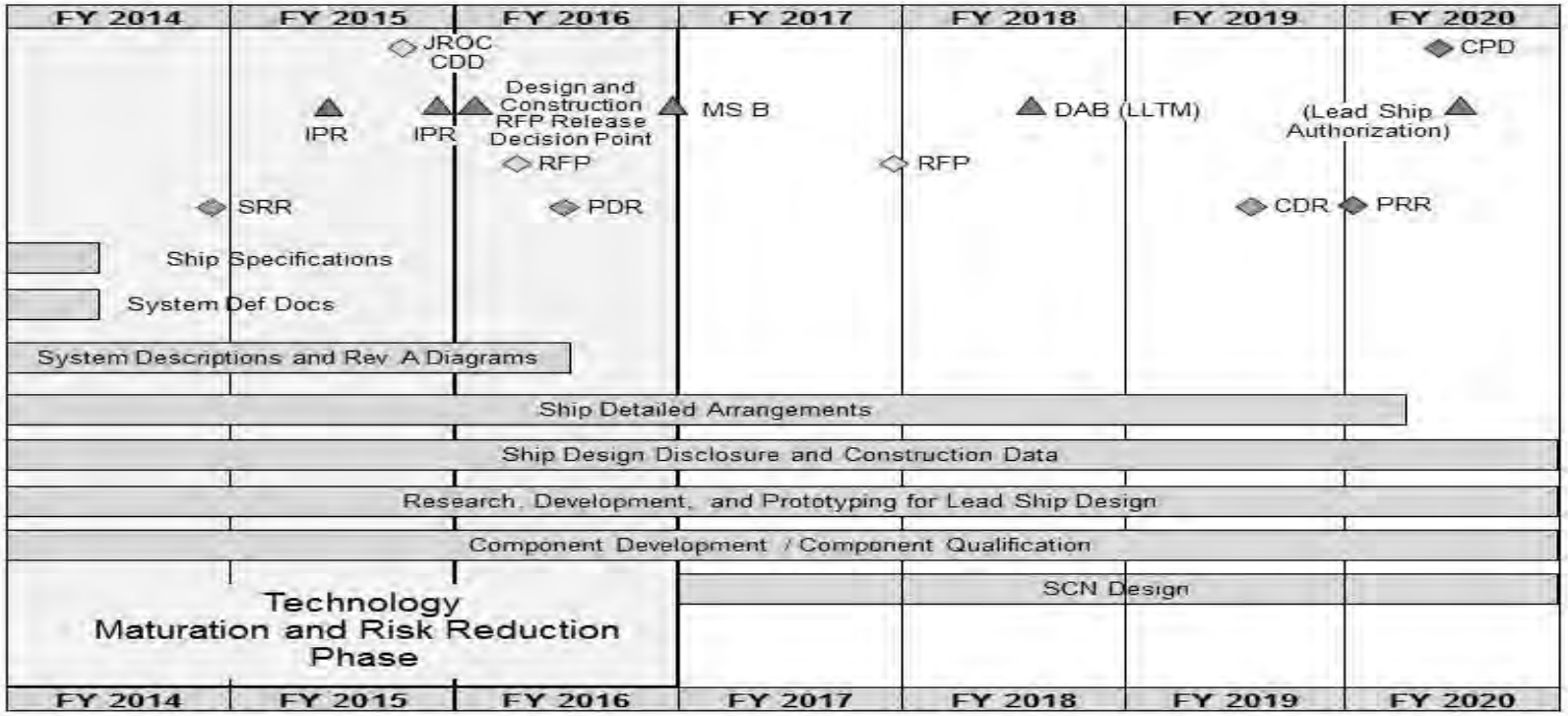
The listed Award Dates represent the date on which initial obligations occur for the effort.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603595N / *(U)Ohio Replacement* | Project (Number/Name)<br>3220 / *SBSD Advanced Submarine System Development* | |

| | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

Note: Beginning in 2015, there is an administrative change that shifts efforts funded from PE 0603561N (Advanced Submarine System Development) / Project 3220 to PE 0603595N (Ohio Replacement) / Project 3220. This shift is consistent with Congressional intent identified in the FY13 Appropriation Act.

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |




CDD - Capabilities Development Document
CDR - Critical Design Review
CPD - Capability Production Document
DAB - Defense Acquisition Board
IPR - In Progress Review
JROC - Joint Requirements Oversight Council
LLTM - Long Lead Time Material
MS - Milestone
PDR - Preliminary Design Review
PRR – Production Readiness Review
RDT&E - Research, Development, Test, & Evaluation
RFP - Request for Proposal
SCN – Shipbuilding and Conversion, Navy
SRR - System Requirements Review

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3220 / *SBSD Advanced Submarine System Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Notes: * Effort began prior to 1st Quarter FY 2014. ** Effort continues past 4th Quarter FY 2020*** | | | | |
| Ship Specifications* | 1 | 2014 | 2 | 2014 |
| System Definition Documents* | 1 | 2014 | 2 | 2014 |
| System Descriptions and Rev A Diagrams* | 1 | 2014 | 2 | 2016 |
| Ship Detailed Arrangements* | 1 | 2014 | 1 | 2020 |
| Ship Design Disclosure and Construction Data* | 1 | 2014 | 4 | 2020 |
| Research, Development, and Prototyping for Lead Ship*, ** | 1 | 2014 | 4 | 2020 |
| Component Development/Component Qualification* , ** | 1 | 2014 | 4 | 2020 |
| SCN Design** | 1 | 2017 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603595N / *(U)Ohio Replacement* | Project (Number/Name)<br>3237 / *Launch Test Facility* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3237: *Launch Test Facility* | - | - | 36.470 | - | - | - | - | - | - | - | - | 36.470 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Project Unit 3237: Project constructs a new Launch Test Facility to support surface launch testing and evaluation of full-scale launch technologies. The project construction is authorized by 10 U.S.C. Section 2353, funded from Research, Development, Test, and Evaluation (RDT&E) appropriations, and will have no general utility and utilized solely to meet RDT&E contractual requirements. This project enables full-scale testing of a Trident II D5LE SWS missile launcher subsystem to collect launch event information for verification and validation of modeling and simulation software, to evaluate and demonstrate launcher subsystem performance, and to qualify the launcher subsystem hardware. This project provides a test facility to conduct qualification testing of full-scale launcher hardware. The project will provide performance and safety data to mitigate the risk of a tactical failure in the fleet.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** OR Launch Test Facility | - | 36.470 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>Construct the Launch Test Facility at Naval Air Warfare Center, China Lake, CA to enable Full Scale Launch Testing and evaluation / qualification of the TRIDENT II D5LE missile launcher subsystem for the OHIO Replacement Submarine. Additional details are contained in the form DD1391 provided as a supplement to the budget materials. | | | | | |
| ***FY 2016 Base Plans:***<br>N/A | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 36.470 | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3237 / *Launch Test Facility* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTE/PE0603561N/3220: *Advanced Submarine System Development* | 784.823 | - | - | - | - | - | - | - | - | Continuing | Continuing |
| • RDTEN/3219: *SBSD Nuclear Technology Development* | 296.050 | 369.964 | 422.661 | - | 422.661 | 411.598 | 401.698 | 291.302 | - | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

FFP Contract executed through NAVFAC Multiple Award Construction Contract.

NAVFAC has the contractual warrant to buy design services. NAVFAC/Southwest executes the technical administration, planning, and scheduling for the overall design of the Launch Test Facility (LTF) based on the Facility Design Criteria executed by NAVFAC/SW. NAVFAC/SW Construction effort is led by NAVFAC/SW and executed by NAVFAC/SW Facilities Engineering and Acquisition Division (FEAD) for construction, certification and validation of the facility.

The facility will provide the necessary foundations, buildings, cranes, infrastructure, ordnance storage, test vehicle arrestment and other services & amenities needed to conduct full-scale surface launch test, integration testing, arrestment, and recovery/reuse of D5LE SWS test vehicles. Operation of the LTF requires interactions with NAWS & NAWCWD at China Lake, CA and its existing infrastructure, the environment, and operators & maintenance personnel. The facility is being developed to support the Surface Launch Test system capabilities which will provide a full scale, reusable launch test capability to support Launcher Subsystem development, evaluation and qualification, and Trident II D5LE SWS Missile Subsystem risk reduction.

**E. Performance Metrics**

Authority to Construct (ATC)
Authority to Operate (ATO)

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603595N / *(U)Ohio Replacement* | Project (Number/Name)<br>3237 / *Launch Test Facility* | |

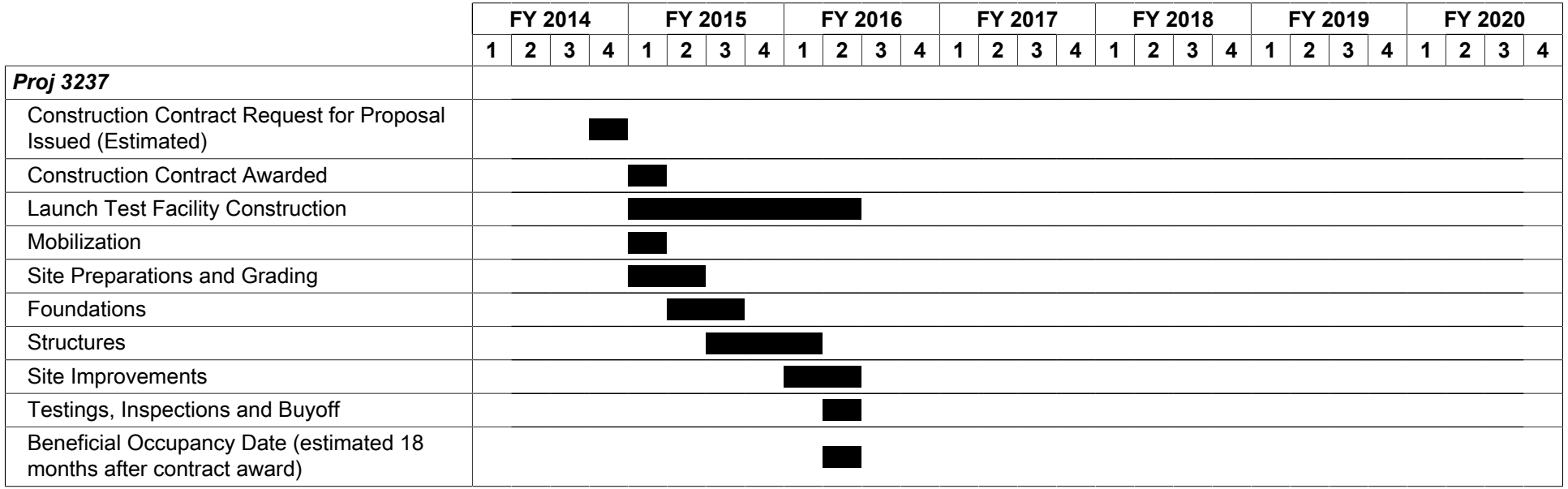
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | WR | NAWC CL : China Lake, CA | 0.000 | - | | 36.470 | Oct 2014 | - | | - | | - | - | 36.470 | - |
| | | **Subtotal** | 0.000 | - | | 36.470 | | - | | - | | - | - | 36.470 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 36.470 | | - | | - | | - | - | 36.470 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3237 / *Launch Test Facility* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603595N / *(U)Ohio Replacement* | **Project (Number/Name)**<br>3237 / *Launch Test Facility* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3237*** | | | | |
| Construction Contract Request for Proposal Issued (Estimated) | 4 | 2014 | 4 | 2014 |
| Construction Contract Awarded | 1 | 2015 | 1 | 2015 |
| Launch Test Facility Construction | 1 | 2015 | 2 | 2016 |
| Mobilization | 1 | 2015 | 1 | 2015 |
| Site Preparations and Grading | 1 | 2015 | 2 | 2015 |
| Foundations | 2 | 2015 | 3 | 2015 |
| Structures | 3 | 2015 | 1 | 2016 |
| Site Improvements | 1 | 2016 | 2 | 2016 |
| Testings, Inspections and Buyoff | 2 | 2016 | 2 | 2016 |
| Beneficial Occupancy Date (estimated 18 months after contract award) | 2 | 2016 | 2 | 2016 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603596N *I (U)LCS Mission Modules* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | 105.682 | 176.948 | 206.149 | - | 206.149 | 125.761 | 57.067 | 46.582 | 39.463 | Continuing | Continuing |
| 3129: *LCS Mission Package Development* | 0.000 | 105.682 | 176.948 | 206.149 | - | 206.149 | 125.761 | 57.067 | 46.582 | 39.463 | Continuing | Continuing |

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

This Program Element (PE) provides funds for detailed design, development, issue resolution, certification, integration, and testing of the Littoral Combat Ship (LCS) Mission Modules (MM). LCS is a fast, agile, and networked surface combatant with capabilities optimized to defeat asymmetric threats, and ensure naval and joint force access into contested littoral regions. It uses open-systems architecture design, modular weapons, sensor systems, and a variety of manned and unmanned vehicles to expand the battle space and project offensive power into the littoral.

The LCS MMs provide tailored warfighting capability for one at a time of the three focused mission areas:

MCM - provides capability to conduct minehunting (detection, localization, classification, identification, and neutralization) and mine sweeping operations for mine threats.
SUW - provides capability to conduct enhanced-range coordinated detection, tracking, classification, identification, and neutralization of groups of attacking, multiple, small boat threats, and to conduct maritime security missions.
ASW - provides capability to detect, classify, localize, and prosecute enemy submarines; counter diesel submarine threats in the littoral shallow waters and their associated deep water approaches; and to provide an escort capability for forces transiting through submarine threat areas.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 161.771 | 196.948 | 139.227 | - | 139.227 |
| Current President's Budget | 105.682 | 176.948 | 206.149 | - | 206.149 |
| Total Adjustments | -56.089 | -20.000 | 66.922 | - | 66.922 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -20.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -49.000 | - | | | |
| • SBIR/STTR Transfer | -7.089 | - | | | |
| • Program Adjustments | - | - | 68.076 | - | 68.076 |
| • Rate/Misc Adjustments | - | - | -1.154 | - | -1.154 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603596N *I (U)LCS Mission Modules* |

**Change Summary Explanation**

FY16 increase, $36.4M, is a result of a realignment from OPN to RDTE,N to support completion of the ASW MM Advanced Development Model (ADM). Prior reductions impact the program's ability to achieve IOC for the ASW Mission Module in Q4FY16. In order to restore the ASW MM profile, the program had FY16 OPN (BLI 1602) realigned to RDTE,N to support an FY16 operational assessment of the ADM system and possible deployment on LCS-1 in FY16. The funding supports weight reduction efforts, and design and development of the Engineering Development Model (EDM) hardware: Variable Depth Sonar (VDS), Launch, Handling, Recovery Equipment (LHRE), and Multi-Function Towed Array (MFTA), Torpedo Defense Modules, and test spares.

FY16 increase of $10M supports Surface to Surface Mission Modules efforts for inclusion into the SUW MP.

FY16 increase of $4.2M supports Knifefish MCM UUV integration and procurement efforts previously delayed due to budgetary constraints.

FY16 increase of $17.3M for mission package integration.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603596N / *(U)LCS Mission Modules* | | | | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 3129: *LCS Mission Package Development* | - | 105.682 | 176.948 | 206.149 | - | 206.149 | 125.761 | 57.067 | 46.582 | 39.463 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Program provides focused war fighting capabilities in littoral mine countermeasures, countering small boat threats, and littoral anti-submarine warfare to provide ensured access to enable the US Joint Force operations in the littorals. A mission package is a combination of warfare mission modules with specialized crew, support equipment, and vehicles including manned helicopters and unmanned maritime systems. They are packaged in a modular fashion so that they can be quickly swapped out pier side. Mission module development includes architectures, interfaces, and integration of mission systems. Mission systems integration also includes the procurement of the first mission packages to be used on the Flight 0 Littoral Combat Ships (LCS). The program has an inventory objective of 24 MCM mission packages, 24 SUW mission packages, and 16 ASW mission packages. Mission package procurement and delivery are aligned with the ship delivery schedule, mission area demand signal from the combatant commanders, and the retirement of legacy platforms. This means that 64 interchangeable mission packages will be available for use among the seaframe variants of the LCS class to support global warfighting and peacetime presence requirements.

An incremental development approach to delivering capability allows the continued insertion of mature capabilities throughout the life of the program without the need for modifications to the sea frames. Future mission package increments will be considered when joint warfighting objectives or changing threats create new operational capability requirements that cannot be met by current mission package designs, or when new technological opportunities allow significant progress toward delivering cost effective, enhanced capabilities. Future mission module increments can be tested, constructed, and incorporated into existing mission packages, one of the most important benefits of LCS modular design.

The LCS MCM mission package will counter deep, shallow, and tethered mines in the littoral without putting Sailors in the minefield. When the MCM mission package is embarked, LCS is capable of conducting detect-to-engage operations (hunting, sweeping, and neutralization) against very shallow and deep-water sea mine threats. The MCM mission package provides these capabilities through the use of sensors and weapons deployed from an MH-60S multi-mission helicopter and unmanned off-board vehicles. The MCM package consists of the following systems: Coastal Battlefield Reconnaissance & Analysis (COBRA), Airborne Laser Mine Detection System (ALMDS), Remote Multi-Mission Vehicle (RMMV), AQS-20A Mine hunting Sonar, Airborne Mine Neutralization System (AMNS), Unmanned Integrated Sweep System (UISS) (which is comprised of the Unmanned Surface Vehicle (USV) and the Unmanned Surface Sweep System (US3)), Surface Mine Countermeasures (SMCM), Unmanned Undersea Vehicle (UUV) with Low Frequency Broad Band (LFBB), support equipment, and support containers. The individual systems are combined into five modules: Organic Airborne Mine Countermeasures (OAMCM) Module, Remote Mine Hunting Module, Unmanned Influence Sweep Module, Coastal Mine Reconnaissance Module and the Buried Mine Module. The Organic Airborne Mine Countermeasures Module provides rapid mine hunting and clearing using the embarked MH-60 helicopter and Mine Countermeasure systems. The Remote Mine Hunting Module uses a Remote Multi-Mission Vehicle (RMMV) and AQS-20A to provide sustained mine hunting and clearing from the surface. The Influence Sweep Module provides endurance bottom sweep capability, the Coastal Mine Reconnaissance Module (CMRM) will allow detection of minefield patterns and obstacles from an embarked Fire Scout VTUAV, and the Buried Mine Module will allow detection of buried mines. When complete, the MCM mission package will provide full capability against floating, tethered, bottom, and buried mines.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

The ASW mission package enables LCS to conduct detect-to-engage operations against modern submarines that pose a threat. Specific ASW capabilities include protecting forces in transit, protecting joint operating areas, and establishing ASW barriers.

ASW modules developed to provide the warfighter capabilities that can be employed for ASW area search as well as high value unit escort missions. Module components include a torpedo countermeasures system, a Variable Depth Sonar, and a Multi-Function Towed Array. The Aviation Module offers airborne threat localization and engagement capability through a Fire Scout VTUAV and an MH-60R with MK54 torpedoes. The individual systems are combined into three modules: Torpedo Defense Countermeasure; ASW Escort/Large area Clearance; and Aviation Module.

The SUW mission package increases firepower and offensive/defensive capabilities against large numbers of highly maneuverable, fast, small craft threats, giving LCS the ability to protect the sea lanes and move a force quickly through a choke point or other strategic waterway. With the SUW mission package embarked, LCS has enhanced detection and engagement capability against enemy small craft and similar littoral surface threats.

The SUW mission package is comprised of several modules including the Gun Mission Module (GMM). The GMM is comprised of two high velocity 30mm cannons and is augmented with the ship's 57mm gun to counter close in to mid-range threats. The Aviation Module uses the embarked MH-60R helicopter with Hellfire missile and the MQ-8B Fire Scout Vertical Take-off and Landing Tactical Unmanned Aerial Vehicle (VTUAV) for the detection, identification, and classification of surface contacts and to engage long range threats. The Maritime Security Module supports the embarkation of a Visit, Board, Search, and Seizure (VBSS) team. The Surface to Surface Missile Module (SSMM) will provide missile coverage for mid-range threats and small boats.

The LCS Mission Modules Common Equipment consists of enabling products required by all mission packages to provide common hardware interfaces, computer operating environment, communications systems, aviation interface systems, and portable development & integration test-sets. Common hardware interfaces include definition, installation, and control of mechanical, electrical, and cooling requirements common to all mission packages. The Mission Package Computing Environment (MPCE) provides common services and Operating Environment to support all Mission Package Application Software and Open Architecture Products. The Multi-Vehicle Communications System (MVCS) enables the control and data exchange of simultaneous unmanned mission vehicles and the Seaframes. Aviation interface systems include integration and management of data communications, data processing, and physical hardware interfaces such as common equipment and containers used by all mission packages. Development and integration test-sets provide a mobile operating environment installed in the Mission Package Portable Control Stations (MP-PCS) to serve as a surrogate Seaframe during mission package development and integration test events at test ranges.

Per the FY14 Appriopriations Act, the LCS Mission Modules Program has been assigned its own PE of 0603596N. Prior year funding is located in PE 0603581N. FY14 funding was transferred to the greatest extent practicable.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** System Engineering | 5.213 | 17.447 | 9.633 | - | 9.633 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Supported Capability Production Document (CPD) for SUW Increment III, MCM Increment II/III development. Provided SE guidance to the TSRs, CCBs, RMB, PPP and RAM-C Working group and others as identified in the LCS MM SEP. Coordinated and provide guidance for all LCS MP SETR events including but not limited to the following: PDR, CDR, SRR, TRR. Provided management oversight for the Configuration Control Board including reviewing and approving ECPs. Negotiated connection agreements with Littoral Combat Ship (LCS) Squadron One (LCSRON) Class IA Manager (IAM) allowing mission packages to operate on LCS. Supported all Certification Test and Evaluation (CT&E) events conducted which include MPAS, results will be used to develop revised PRA package/risk deficiency database. Updated the LCS Mission Modules Program Protection Plan and the Information Assurance Strategy to support MPCE 2.0 development. Supported the SSSTRP and WSESRB Review of mission packages and prepare the closure of findings. Developed MAR package for risk acceptance. Updated the PMS 420 System Safety Management Plan (SSMP) Plan. Completed mission package Integration System Hazard Analysis (SHA). Updated the PMS 420 Hazardous Material Management Program (HMMP) Plan. Identified and manage ESOH mishap risk maintained within the Program Hazard Tracking Database. Coordinated HSI activities across MPs and integrate MPs with seaframe HSI activities. Monitored the implementation of the PMS 420 MM HSI Plan. Updated the following SE documents including: LCS MM SEP; Corrosion Prevention Control Plan (CPCP), PESHE, Life Cycle Signature Support Plan. Continued supporting opportunities for technology transition identified in the S&T Notebook to include at-sea refueling, data mission payload, and lightweight container. Supported and track weight against the Weight Management Plan. Leveraged modeling and simulation to support CPD development for mission packages. Continued tracking SE Metrics including requirements and engineering change volatility and LCS MM Systems Readiness Level (SRL) assessment. Continued implementation of M&S Plan to certify the following: NMWS M&S in support of MCM IOT&E; ATRT to support SUW MPAS regression testing; SUW MM Increment I/II modeling; ASW modeling for developmental testing. | | | | | |
| ***FY 2015 Plans:***<br>Conduct six (6) System Engineering Technical Reviews (SETR) as follows: MCM Increment III System Requirements Review (SRR), Preliminary Design Review (PDR) and Critical Design Review (CDR), MCM Increment IV SRR, Surface-to-Surface Missile Module (SSMM) CDR, and Antisubmarine Warfare (ASW) Mission Package CDR to ensure that each system under review can proceed into development, module integration, and test. Assess each Configuration Item within each system under review to ensure each product has been captured in an appropriate detailed design documents. Establish the initial Production Baseline for each system/module under review. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Develop and accredit all modeling and simulation tools required to support ASW Escort, and Torpedo Defense mission modules and Surface-to-Surface Missile Module. The modeling and simulation tools for ASW and SSMM will support integration, certification, and training of the Mission Package Application Software (MPAS) for both ASW MP and SUW MP Increment IV.<br><br>Develop and/or update SE documentation in support of Milestone C: Systems Engineering Plan; Information Assurance Strategy; Program Protection Plan; Programmatic Environmental, Safety, and Health Evaluation (PESHE); Clinger Cohen Act.<br><br>Continue to align LCS MM requirements and development plans toward the Incremental KPP approach and in support of Net-Centric operations: Support CPD Development for the MPs; MP Department of Defense Architecture Framework (DoDAF)Architectures.<br><br>Continue the implementation of LCS MM M&S strategic plan to support performance prediction; validation of T&E plans; and/or training and stim/sim efforts.<br><br>Continue Safety/ESOH risk/hazard analysis and mitigation tracking: Align hazards and MARs to product baseline; ESOH risk/hazard analysis and mitigation; Implement DoD/DoN ESOH related directives and initiatives affecting the program to SE Team.<br><br>Continue to provide HSI subject matter expert into development and implementation of MP common systems, i.e. CSA, MPCC, feedback process; assess and address HSI issues associated with Mission Packages; evaluate manpower and workload policies affected by new technology implementation; align MP HSI tasks and activities to MP SETR events; track and mitigate MP HSI risks and issues; update and implement the PMS 420HSIP.<br><br>Continue Implementation of the Corrosion Prevention and Control Plan (CPCP).<br><br>Continue to provide Configuration Management for the PMS 420 LCS MM Program: identify and control Mission Package configurations via the PMS420 CCB; manage Test Observation Report (TOR); capture and track problems found during integration testing, Navy Core Testing (NCT), and ship visits.<br><br>Continue to update the MP Reliability, Availability, Maintainability-Cost (RAM-C) Report (which comprises the RAM-C Analysis Report and the RAM-C Rationale Report) to assess LCS MP RAM metrics, influence design | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| of MP hardware and support-system design, and help determine the optimal mix of hardware design, support-system design, and lifecycle cost.<br><br>Coordinate with and assist the PMS 420 APMs and LSEs with the scheduling, planning, and execution of SETRs.<br><br>Verify that the LCS MPCE, the MMs, and MVCS are compliant with DoD and DON IA policies, and that such compliance is stated in their respective program Information Assurance Strategies, PRA artifacts, and other program documentation.<br><br>Conduct analysis to determine the methodology and engineering design efforts required to create a federated architecture of Mission Package Application Software (MPAS) with the focus on integration into future LCS seaframes.<br>***FY 2016 Base Plans:***<br>Develop and/or update SE documentation in support of Milestone C: Systems Engineering Plan; Information Assurance Strategy; Program Protection Plan; PESHE; Clinger Cohen Act, Life Cycle Mission Data Plan<br><br>Continue to align LCS MM requirements and development plans toward the Incremental KPP approach and in support of Net-Centric operations: Support CPD Development for the MPs:; MP DODAF Architectures.<br><br>Continue the implementation a LCS MM M&S strategic plan to support performance prediction; validation of T&E plans; and/or training and stim/sim efforts.<br><br>Continue Safety/ESOH risk/hazard analysis and mitigation tracking: Align hazards and MARs to product baseline; ESOH risk/hazard analysis and mitigation; Implement DoD/DoN ESOH related directives and initiatives affecting the program to SE Team.<br><br>Continue to provide HSI subject matter expert into development and implementation of MP common systems, i.e. CSA, MPCC, feedback process; assess and address HSI issues associated with Mission Packages; evaluate manpower and workload policies affected by new technology implementation; align MP HSI tasks and activities to MP SETR events; track and mitigate MP HSI risks and issues; update and implement the PMS 420HSIP. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue Implementation of the Corrosion Prevention and Control Plan (CPCP).<br><br>Continue to provide Configuration Management for the PMS 420 LCS MM Program: identify and control Mission Package configurations via the PMS420 CCB; manage Test Observation Report (TOR); capture and track problems found during integration testing, Navy Core Testing (NCT), and ship visits.<br><br>Continue to update the MP Reliability, Availability, Maintainability-Cost (RAM-C) Report (which comprises the RAM-C Analysis Report and the RAM-C Rationale Report) to assess LCS MP RAM metrics, influence design of MP hardware and support-system design, and help determine the optimal mix of hardware design, support-system design, and lifecycle cost.<br><br>Coordinate with and assist the PMS 420 APMs and LSEs with the scheduling, planning, and execution of SETRs.<br><br>Verify that the LCS MPCE, the MMs, and MVCS are compliant with DoD and DON IA policies, and that such compliance is stated in their respective program Information Assurance Strategies, PRA artifacts, and other program documentation.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Program Management | 0.483 | 4.545 | 4.252 | - | 4.252 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Supported all efforts associated with Milestone C. Continued PM efforts: business and administrative planning, organizing, directing, coordinating, controlling, and approval actions designated to accomplish overall program objectives that are not associated with specific hardware elements or included in systems engineering. | | | | | |
| ***FY 2015 Plans:***<br>Support all efforts associated with Milestone C. Continue PM efforts: business and administrative planning, organizing, directing, coordinating, controlling, and approval actions designated to accomplish overall program objectives that are not associated with specific hardware elements or included in systems engineering. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Support all efforts associated with Milestone C. Continue PM efforts: business and administrative planning, organizing, directing, coordinating, controlling, and approval actions designated to accomplish overall program objectives that are not associated with specific hardware elements or included in systems engineering.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** System Test and Evaluation | 18.756 | 34.144 | 30.871 | - | 30.871 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Conducted SUW MP TECHEVAL/IOT&E aboard LCS 1 variant. Completed Planning, and conducted Execution, Data Analysis and Reporting for SUW MP TECHEVAL with increasing stress scenarios to characterize performance of SUW MP against requirements and in preparation and readiness for IOT&E. Completed test planning and OTRR preparation and executed both events for SUW MP IOT&E on LCS 1 variant. Conducted data analysis and reporting for SUW MP TECHEVAL. Conducted SUW MP DT on LCS 2 variant. Began SUW MP SSMM planning. Commenced conduct of SSMM live fire test program and completed GMM live fire test program to include data analysis and report. Conducted MCM MP AMCM Phase B Operational Assessment. Conducted MCM MP Unmanned Systems Operational Assessment. Continued test planning and OTRR preparation to support execution of both events for MCM MP TECHEVAL and IOT&E. Conducted data analysis and reporting for MCM MP TECHEVAL and IOT&E. Continued test planning, conducted initial integration test, transition from engineering to DT testing of the ASW MP on the LCS platform; Performed data analysis of initial ASW MP testing. Conducted National Environmental Policy Act (NEPA) and environmental planning and coordination to support DT/TECHEVAL/IOT&E. Conducted and Support Certification Test and Evaluation to include software certification/assessment testing, reporting, and events such as MPRAs, MRAs, Test Readiness Reviews, WSESRB, etc. and in order to support fleet deployment upon completion of the DT/TECHEVAL/IOT&E events.<br>***FY 2015 Plans:***<br>Conduct SUW MP IOT&E aboard LCS 2 variant. Begin planning for integration testing of VTUAV with the SUW MP. Continue SUW MP SSMM planning. Conduct SSMM live fire test program to include data analysis and reporting. Complete test planning and OTRR for MCM MP TECHEVAL and IOT&E. Complete MCM MP DT and conduct TECHEVAL and IOT&E on LCS 2 variant. Continue test planning for DT testing of the ASW MP on the LCS platform. Conduct National Environmental Policy Act (NEPA) and environmental planning and coordination to support DT/TECHEVAL/OT/FOTE. Conduct and Support Certification Test and Evaluation to | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| include software certification/assessment testing, reporting, and events such as MPRAs, MRAs, Test Readiness Reviews, WSESRB, etc in order to support fleet deployment upon completion of the IOT&E and FOTE events.<br>***FY 2016 Base Plans:***<br>Continue planning and executing SSMM live fire test program. This includes additional planning, testing, data analysis, and reporting for the Longbow/Hellfire missile in a module to be installed in LCS weapons zone.<br><br>Complete test planning and begin execution for MCM MP DT, TECHEVAL and IOT&E on LCS 1 variant. This is the first time that the MCM MP would undergo operational testing onboard the LCS 1 variant. This completes the Increment 1 IOT&E for the MCM MP across both seaframe variants.<br><br>Conduct and Support Certification Test and Evaluation to include software certification/assessment testing, reporting, and events such as MPRAs, MRAs, MRRs, Test Readiness Reviews, WSESRB, etc in order to support test events and Fleet deployment upon completion of the IOT&E.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Integration, Assemble, Test and Checkout | 1.031 | 14.638 | 8.375 | - | 8.375 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Performed Mission Package - Seaframe Integration and Aviation Integration.<br>Seaframe Integration provided services that support the successful integration of the MCM, SUW, and ASW Mission Packages into both variants of LCS seaframes. Mission Package (MP) - Seaframe integration engineering includes: Hardware integration engineering, Software integration engineering, Launch handling & recovery integration engineering, Waterfront integration, Mission Systems and Ship Integration Team (MSSIT), Communications integration, Seaframe studies, and ship modification technical data package development. Aviation Integration: Continued to integrate new capabilities of VTUAV onto LCS, such as weapons and radar. Integrated the larger and higher endurance MQ-8C with LCS. Integrated new Mission Package driven payloads onto the VTUAV. Provided HSF or CV-TSC/PLA functionality as MP solution. Integrated MH-60S SUW enhancements into SUW MP (20mm gun, missiles, radar, data link). Conducted systems engineering for VTUAV and MH-60S ASW enhancements into ASW MP. Conducted systems engineering analysis of alternatives for integrating new Unmanned Aerial Systems into MPs. Continued program level Integration, Assembly, Test & Checkout efforts of ECPs required to correct findings from Developmental and Operational test events.<br>***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Perform Mission Package - Seaframe Integration and Aviation Integration.<br>Seaframe Integration provides services that support the successful integration of the MCM, SUW, and ASW Mission Packages into both variants of LCS seaframes. Mission Package (MP) - Seaframe interface validation and validation assessments for LCS 7 through 12 prior to delivery. Integration assessment reports to support MCM MP TECHEVAL and IOT&E on LCS 2. Integration assessment reports to support deployment of LCS 3 with SUW MP. Engineering studies and seaframe modifications to support SUW MP TECHEVAL and IOT&E on LCS 4. Engineering studies and seaframe modifications to support ASW MP TECHEVAL and IOT&E on LCS 5 and 6.<br><br>Aviation Integration provides services that support the successful integration of aviation assets of the MCM, SUW, and ASW Mission Packages into both variants of LCS seaframes. Hardware engineering for Aviation Support Containers, including roll-on/roll-off (RO/RO) Cabinets and Mezzanine. Hardware Engineering for VTUAV Global Command and Control System (GCCS) back-fits. Improve communications for TCDL within Combat to the Mission Packages. Software Engineering for the continued development of the Helo Support Function (HSF) and Mission Package Application Software (MPAS) with Aviation assets. Support and integration of VTUAV modifications including Advanced Precision Kill Weapon System and Radar RDC.<br><br>Continue program level Integration, Assembly, Test & Checkout efforts of ECPs required to correct findings from Developmental and Operational test events. | | | | | |
| ***FY 2016 Base Plans:***<br>Perform Mission Package - Seaframe Integration and Aviation Integration.<br>Seaframe Integration provides services that support the successful integration of the MCM, SUW, and ASW Mission Packages into both variants of LCS seaframes. Aviation Integration provides services that support the successful integration of aviation assets of the MCM, SUW, and ASW Mission Packages into both variants of LCS seaframes.<br><br>FY16 will include efforts to continue: Seaframe Change Management and Execution using AIT; integrating SUW Incr. III with SSMM MP onto both of the variants; integrating MCM Incr. I and II on Freedom variant; ICD 2.0 and IDS 2.0 configuration management; integrating UISS MM into laydown plan and weight/stability analysis for MCM MP; integrating Knifefish MM into laydown plan and weight/stability analysis for MCM MP; supporting TECHEVAL and IOT&E on ASW MP on Freedom variant; begin integrating ASW MP on INDY variant; and continue to expand role of MSSIT for FIT checks and IV&V checks. | | | | | |
| ***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Training Systems Development | 4.550 | 16.839 | 15.915 | - | 15.915 |
| ***Articles:*** | - | - | - | - | - |

***FY 2014 Accomplishments:***

Achieved partial Ready for Training (RFT) at NETC facility for MCM MM training using Common Mission Package Trainer (CMPT) team trainer and Networked Tactical Trainer System (NTTS) part task trainers. Continued Mine Warfare Evaluator (MIWE), Remote Vehicle Operator (RVO) and Remote Sensor Operator (RSO) training precursors to LCS MCM MM Fundamentals and Capstone courses. Updated interim and formal curriculum to incorporate findings from program test events, operations and classroom experience. Updated CMPT MCM and SUW integrated team trainer software for delivery of incremental capability to support MM Fundamentals, MM Operations and MM Planning curriculum. Updated Information Assurance posture as required to support integrated training using Fleet Synthetic Training in the Navy Cooperative Training Environment (NCTE). Continued SUW formal training curriculum instruction development for MM Fundamentals, Capstone and Planning Courses necessary to achieve partial RFT in FY15. Performed vendor and interim training for formal MCM, SUW, and ASW test events. Funded training related detachment travel and provided Vendor and interim formal training to MCM, ASW, and SUW MM replacement Sailors and new MCM and SUW detachments in accordance with CSPPs.

***FY 2015 Plans:***

Continue development of training and training systems for MCM, SUW and ASW Mission Module Detachments in accordance with NTSPs. Perform vendor and interim training for formal MCM, SUW, and ASW test events. Fund training related detachment and replacement Sailor travel for vendor and interim formal training in accordance with CSPPs.

Transition MCM and SUW tactical team training to NETC facilities and achieve initial capability at LCS Training facility for MCM and SUW tactical team training. Update formal curriculum to incorporate findings from program test events, operations and classroom experience. Update formal curriculum to incorporate findings from program test events, operations and classroom experience. Continue analysis of MCM and SUW training to validate effective training delivery and identify changes necessary to deliver training that will achieve Train to Certify KPP. Complete analysis to determine initial ASW training and trainer requirements and begin development of ASW Training and trainers. Continue initial LCS ASW training using SQQ-89 courses. Achieve RFT of LCS SUW MM CAPSTONE course at LTF. Achieve RFT of MK-50 GMM differences course at Dam Neck. Develop curriculum and system changes to support incremental capability fielding plan.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Commence update of Common Mission Package Trainer (CMPT) for ASW and development of LCS ASW MM Fundamentals and CAPSTONE courses with a plan to achieve RFT in FY16.<br>Train to Certify (T2C) capability will be achieved in FY19 after all systems have been delivered, trainers in place and formal training has been developed and accepted.<br>***FY 2016 Base Plans:***<br>Continue development of training and training systems for MCM, SUW and ASW Mission Module Detachments in accordance with NTSPs. Perform vendor and interim training for formal MCM, SUW, and ASW test events. Fund training related detachment and replacement Sailor travel for vendor and interim formal training in accordance with CSPPs.<br>Achieve initial capability at LCS Training facility for MCM and SUW mission bay training. Update formal curriculum to incorporate findings from program test events, operations and classroom experience. Update formal curriculum to incorporate findings from program test events, operations and classroom experience. Continue analysis of MCM and SUW training to validate effective training delivery and identify changes necessary to deliver training that will achieve Train to Certify KPP. Complete analysis to determine initial ASW training and trainer requirements and begin development of ASW Training and trainers. Continue initial LCS ASW training using SQQ-89 courses.<br>Achieve RFT of LCS SUW MM Fundamentals and CAPSTONE courses at LTF. Commence training sailors at LTF Mission Bay Trainer which is expected to RFT late FY15. Achieve RFT of MK-50 GMM differences course at Dam Neck. Develop curriculum and system changes to support incremental capability fielding plan. Complete development of Common Mission Package Trainer (CMPT) for ASW software and Achieve RFT for LCS ASW MM Fundamentals and CAPSTONE courses.<br>Train to Certify (T2C) capability will be achieved in FY19 after all systems have been delivered, trainers in place and formal training has been developed and accepted.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Program Technical Data | 0.244 | 1.845 | 2.071 | - | 2.071 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Updated Program Technical Data packages to incorporate findings from SUW MP and MCM MP OT events. Finalized the initial Integrated Logistics Support products in support of SUW MP FY14 IOC. Prepared for the MCM MP IOC late FY14 / early FY15. Continued Technical Manual Management Activity to review, produce and distribute technical documentation for the program. Continued development of MPSF automated inventory | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| management system (IMS) based on pRFID solution. Started integrated logistics overarching support for the ASW MP and the new increments. Provided overarching provision for Program.<br>***FY 2015 Plans:***<br>Update Program Technical Data packages to incorporate findings from SUW TECHEVAL and IOT&E test events. Finalize initial Integrated Logistics Support products in support of MCM MP TECHEVAL and IOT&E. Continue Technical Manual Management Activity to review, produce, and distribute technical documentation for the program. Complete development and begin implementation of MPSF automated inventory management system (IMS) based on pRFID solution. Prepare for inclusion of ASW into IMS. Start integrated logistics overarching support for the follow-on mission package increments. Provide overarching provisioning for Program. Develop the ASW MP and Surface-to-Surface Missile Module (SSMM) provisioning documentation to include: Allowance Parts Lists (APL) maintenance and development of Preliminary Allowance List (PALs) or Allowance Equipage Lists (AELs) as required for the ASW and SUW MPs. Updates existing provisioning packages as a result of Engineering Change Proposals (ECP) assessment or approvals.<br>***FY 2016 Base Plans:***<br>Finalize the technical data packages for the ASW MP. Coordinate and manage Acquisition Logistics engineering tasks. Update the reliability models including reliability growth, uopdate the performance Based Logistics (PBL) strategy to reflect development and intial implementation of the ASW MP, Surface-to-Surface Missle Module (SSMM) and follow on MCM mission modules.<br><br>Update program technical data packages to incorporate findings frrom MCM TECHEVAL and IOT&E events conducted in FY15.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Common Equipment | 4.876 | 7.447 | 12.366 | - | 12.366 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Mission Package Computing: Continued MPCE v1.9 hardware production and tech refresh activities. INCO of CMPT #3 on LCS 6. Prepared tech refresh for the shore sites (MPPCS #1 and #2) and for LCS 1and LCS 2. Provided maintenance deliveries for MPS/MPOE. PMS 420 CM delivery of MUS v1.0.1p occurred. Conducted quarterly IPRs. Continued development activities to evolve MPCE software architecture to a Service Oriented Architecture (SOA), MPCE v2.0, in support of the CSA Baseline. Mission Package Communications: Supported | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| MCM MPT TECHEVAL workups with MVCS v1.0.0. Prepared for the delivery of MVCS HW and SW builds v2.6. Supported testing of MVCS v1.0.0 on SMCM UUV and UISS.<br>***FY 2015 Plans:***<br>Conduct technology insertion for MPCE on LCS 1-4, Common Mission Packaget Trainer (CMPT) and Mission Package Portable Control Station (MPPCS). Continue development activities to evolve MPCE software architecture to a Service Oriented Architecture (SOA), MPCE v2.0, in support of the Common Software Architecture (CSA) Baseline. Update MUS Design Documentation to align with MPCE 2.0 System Subsystem Specification (SSS).<br><br>Mission Package Communications: Perform post-RTT modifications to HFGW hardware and software. Develop required logistics documentation for the HFGW radio. Complete MVCS v2.0.0. Integrate MVCS into MPCE, and support CSA requirements. Support MVCS installation on UISS. Conduct and support testing of MVCS on SMCM UUV. Implement anti-jamming Requirements for MVCS.<br>***FY 2016 Base Plans:***<br>MPCE v1.9 - Continue hardware tech refresh activities at MP development sites and ship set deliveries for ships in accordance with Ship Project Directives (SPDs); - MPS/MPOE, Develop new software release of MPS/MPOE for MPAS integration on as required basis. Continue integration of Common Software Architecture (CSA) into the ASW MP. Continue evolving the MPCE software architecture to a Service Oriented Architecture (SOA), MPCE 2.0. Complete MPCE 2.0 System Subsystem Spec (SSS) documenting the merge of CSA SSS requirements with the MPCE SSS. Conduct tech refresh/insertion studies needed to sustain incremental MPCE capability upgrades. Identify technology refresh cycles and the hardware required to meet current requirements while addressing obsolescence and future MPCE SSS requirements. MVCS v1.2.0, develop software changes to support UISS and SMCM UUV integration and complete definition of requirements to integrate High Frequency Ground Wave (HFGW) radio.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Mine Countermeasures (MCM) Mission Package | 16.769 | 19.443 | 18.211 | - | 18.211 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Procured USV EDMs. Finalized design for Surface Mine Countermeasures (SMCM) UUV container and procured EDM support container. Designed and integrated the SMCM UUV into MCM MPs. Conducted MCM mission package TECHEVAL and OPEVAL. Conducted KPP modeling analysis. Resolved hardware PTRs | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| identified during testing through development of ACSNs. Complete the integration of RMMV v4.2.1 with MCM MP Increment I. Prepared for and conducted Systems Engineering Technical Reviews (SETR) (SRR/PDR) for MCM MP Increment III. In support of MCM mission package, incorporated the following items into MPAS: RMMV RGP V4.3 improvements, correction of software PTRs identified during MCM MP testing, and MEDAL EA integration. Performed systems engineering (risk management, information assurance, human systems integration, safety), configuration management, and Integrated Logistics Support efforts. | | | | | |
| ***FY 2015 Plans:***<br>Design, develop, and deliver UISS EDMs. Initiate integration of UISS into MCM MPs. Conduct grooming and preparations for MCM mission package TECHEVAL and OPEVAL for increment I. Resolve hardware PTRs identified during testing through development of ACSNs. Prepare for and conduct Systems Engineering Technical Reviews (SETR) (SRR/PDR/CDR) for MCM MP Increment III. Initiate LCS Freedom Class MCM MP increment II integration and test. In support of MCM mission package, incorporate the following items into MPAS: Correction of software PTRs identified during MCM MP testing, and initiate UISS software integration. Perform systems engineering (risk management, information assurance, human systems integration, safety), configuration management, and Integrated Logistics Support. | | | | | |
| ***FY 2016 Base Plans:***<br>For MCM MP Increment 1, resolve hardware PTRs and TORs identified during OPEVAL through development of ACSNs and ECPs. Conduct Increment I developmental testing on LCS Freedom Class and resolve discrepancies.<br>For MCM MP Increment II, integrate COBRA/VTUAV, AQS-20 P3I and Net-Centric Sensor Analysis for MIW (NSAM) into MCM MP. Conduct Developmental testing on an LCS platform.<br><br>For MCM MP Increment III, conduct contractor testing of UISS EDMs and Surface Mine Countermeasures (SMCM) UUVs. Prepare for and conduct Systems Engineering Technical Reviews (SETR) System Functional Review and System Requirements Review (SFR/SRR). Develop Influence Mine Sweep and Buried Minehunting Mission Module Specifications.<br>In support of MCM mission package, incorporate the following items into MCM MPAS: Correction of software PTRs identified during MCM MP OPEVAL, integration of MEDAL EA and NSAM software, and upgrade MPAS Operating Systems to maintain IA compliance. Perform systems engineering (risk management, information assurance, human systems integration, safety), configuration management, and Integrated Logistics Support. | | | | | |
| ***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Anti-Submarine Warfare (ASW) Mission Package | 23.985 | 20.835 | 50.357 | - | 50.357 |
| ***Articles:*** | 1 | - | - | - | - |

***FY 2014 Accomplishments:***

Conducted a System Functional Review (SFR) which defined system requirements and functional performance requirements. Conducted required systems engineering technical reviews to ensure system design meets the total CDD requirement. Conducted component and system level testing and related predictive performance modeling and simulation to establish system and module performance and reliability baselines. Provided developmental engineering support for logistical engineering data and technical documentation. Continued Mission Module development and LCS integration to include Mission Module level at-sea testing.

Completed the preliminary ASW System Subsystem Specification (SSS) and draft Mission Module SSS. SSS conditionally approved by Technical Scope Review board on 15 July. Completed DoDAF products and Interface Requirements Specification.

Collected data and performed analyses associated with the ASW MP Reliability, Maintainability, and Availability (RMA) program. Successfully completed the Combat Management System (CMS) testing at Lockheed Martin (LM) Moorestown Mission System Integration Center (MSIC). Provided Find/Fix/Repair for technical issues associated with Mission Package Application Software (MPAS) identified during integration and developmental testing and conducted necessary regression testing on proposed fixes. Provided developmental engineering support, equipment, and documentation for logistical engineering data and technical publications to include training (ship's crew and Mission Package Support Facility (MPSF) personnel), maintenance and provisioning. Conducted mission package certification, obtained Information Assurance (IA) approvals (i.e. IATT for LBIT), and conducted land based test events. Supported the planning and preparations for the pre Developmental Test (DT) of ASW MP ADM. Conducted studies and analyses on emerging technologies for incorporation into future ASW MP Increments.

Completed and executed Ship Control Document #14658 to support modifications required to install the ASW MP Advanced Development Model (ADM) on LCS 1 to conduct testing in 4QFY14.

Released solicitation requesting white papers on project concepts to support release of a Request for Proposal (RFP) for the Rapid Technology Insertion (RTI) process, which will solicit technology solutions to enhance the

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| successful completion of the primary Littoral Combat Ships (LCS) missions. Reviewed 12 whitepapers submitted in responses to the solicitation.<br><br>Kicked off and completed NAVAIR study.<br><br>***FY 2015 Plans:***<br>Prepare detailed Technical Data Package (TDPs) for Mission Module Engineering Development Model (EDM) weight reduction Preliminary Design Reviews (PDR) Q3 FY15 and execute the Mission Package PDR event in Q4FY15. Build ASW Mission Package (MP) Mission Modules (MM) in accordance with approved Preliminary Design.<br>Initiate the development of a draft ASW Mission Package Capabilities Production Document (CPD) (Q2 FY15) and provide engineering, modeling and analysis support to refine/clarify Capabilities Development Document (CDD) Key Performance Parameters (KPPs) and Additional Attributes (AAs) is staffed though JROC review and approval process.<br>Initiate the PEO LCS Rapid Technology Insertion (RTI) ASW Mission Package Weight Reduction Initiative (RFP # N66604-14-R-1120) proposal evaluation and make Phase I Base Contract awards Q2 FY15. Execute Base Contract Transition Study and then exercise Phase II Options (Q3/Q4 FY15) to initiate procurement of test asset articles and to address ship integration issues to support ASW Mission Package LCS embarkation.<br>Continue Light Weight Tow (LWT) torpedo countermeasure mission module wet end and system control software development. Support development of LWT over boarding and retrieval system. Support LCS shipboard integration and initiate Technical Data Package (TDP) development.<br>Continue Escort Mission Module acoustic processing, aviation integration support software, and Mission Package Application Software (MPAS) development to support testing and software certification in Q4/FY15 and follow on Advance Development Model shipboard testing Q2 FY16.<br>Initiate mission module and mission package level Land Based Integration Test (LBIT) end-to-end (E2E) integration testing, including events at PAX River SAIL for Aviation integration, LM and GD CMS integration, and performance validation testing in support of ASW MP operational assessment in FY16.<br>Execute ASW MP Detachment training in preparation for shipboard testing in Q2 FY16. Plan, prepare and perform Safety and Hazard analysis, Environmental Analysis, HSI Evaluations, and Reliability Assessment.<br>Update current LCS 1 Temporary Alteration/Non-Permanent Change (TEMPALT/NPC) to support ASW Mission Package embarkation on LCS-1 in FY16. Oversee and support execution (Q3 FY15) of shipboard industrial work in accordance with ASW MP TEMPALT/NPC | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Initiate and complete engineering and design development (Q4 FY15) for FREEDOM variant SHIPALT/PC TDP to enable embarkation of the ASW Mission Package. | | | | | |
| ***FY 2016 Base Plans:***<br>Prepare detailed Technical Data Package (TDP) for Mission Package Critical Design Review (CDR) and execute the CDR event in Q2 FY16.<br><br>Award Option to the RFP solicitation which will provides Integration, Fleet Experimentation, and Test of the systems obtained in FY15 through award of Option 1 contracts under RFP # N66604-14-R-1120.<br>Complete mission module and mission package level Land Based Integration Test (LBIT) end-to-end (E2E) integration testing (Q1 FY16). Perform Find, Fix, and Repair (FFR) of identified hardware and software issues prior to the ADM operational assessment test event.<br>Develop FY16 testing objectives, conduct performance prediction modeling and prepare test plans to support the execution of an ASW Mission Package operational testing of the Advance Development Model (ADM) (Q2 FY16) to be followed by a potential deployment to WESTPAC.<br>Oversee and support execution (Q2/Q3 FY16) of shipboard industrial work in accordance with ASW Mission Package Ship Alteration Permanent Change (SHIPALT/PC) Technical Data Package (TDP) and any additional Mission Module installation ECPs as necessary to support ASW ADM Mission Package installation and deployment for the designated FREEDOM variant.<br>Initiate and complete engineering and design development (Q3 FY16) for INDEPENDENCE variant SHIPALT/PC TDP to enable embarkation of the ASW Mission Package.<br>Closeout ASW Mission Package Engineering Development Model (EDM)/weight reduction PDR by completing engineering efforts to resolve or adjudicate PDR (Q4 FY15) Request for Action (RFA). Prepare detailed Technical Data Package (TDP) for Mission Package Critical Design Review (CDR) and execute the CDR event in Q3 FY16.<br>Complete development of a draft ASW Mission Package Capabilities Production Document (CPD) (Q1 FY16) and provide engineering, modeling, and analysis support to OPNAV as CPD is staffed though JROC review and approval process.<br>Continue management of PEO LCS Rapid Technology Insertion (RTI) initiative Phase II (EDM Assessment) and complete procurement of test asset fabrication and integration to support continuation of Phase II component and system level validation testing and ASW Mission Package / Ship integration. Continue to develop final ship integration approaches to support LCS Ship Alteration Permanent Change (SHIPALT/PC) Technical Data Package (TDP) development. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Complete Light Weight Tow (LWT) torpedo countermeasure mission module wet end and system control software development. Complete procurement of test assets and acquire necessary test spares to support Q3 FY17 ship integration.<br>Continue to compile system and package level Reliability and Maintenance (RAM-C) data to support reliability engineering and a prioritized initial spares list. Complete acquisition of initial component and system spares (Q1 FY16) to support continued system developmental testing and an Operational Assessment.<br>Continue development of initial ASW Mission Package system operator training materials and course curriculum to support Train to Qualify and Train to Certify requirements. Support development and exploitation of component and system level modeling and simulation capabilities to enable high fidelity virtual reality training.<br>Continue Escort Mission Module acoustic processing, aviation integration support software, and Mission Package Application Software (MPAS) development and maturation to support IOT&E software certification Q3 FY17 and follow on shipboard testing FY18.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Surface Warfare (SUW) Mission Package | 27.926 | 36.772 | 51.269 | - | 51.269 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>SSMM Inc 1 formal technical data package will be finalized. Continued SSMM Increment I development. Initiated developmental testing to categorize modifications to the current MPAS baseline. Initiated modifications to MPAS to support continued SSMM Increment I development. Conducted appropriate systems engineering technical reviews to ensure missile system design meets the total CDD requirement. Continued planning the SSMM Increment I environmental confidence level testing. Continued development of the detailed launcher design that supports the SSMM Increment I concept. Completed DT/OT/IOT&E for the Gun Mission Module onboard LCS 1 variant. Completed STF and DT of the Gun Mission Module on USS Independence (LCS 2) variant. Participated in RIMPAC on USS Independence (LCS 2). Find/Fix/Repair technical issues associated with GMM and MPAS identified during STF and DT/OT events. Maintained configuration control of SUW MP data, hardware, and software. Collected data and perform analysis associated with the SUW MP Reliability, Maintainability, and Availability (RMA) program. Conducted combat system certification, MP certification, obtain WSESRB/SSSTRP approval, IA approvals, and conduct shipboard test events with each seaframe manufacturer. Supported formal testing of the SUW MP for LCS 1 variant OT events, STF from LCS 2 variant, DT from LCS 2 variant, and OT from LCS 2 variant.<br>***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Conduct SSMM Inc 1 Critical Design Review (CDR). Continue developmental testing to categorize modifications to the current MPAS baseline. Continue modifications to MPAS to support continued SSMM Increment II development. Continue planning the SSMM Increment II environmental confidence level testing. Continue development of the detailed launcher design that supports the SSMM Increment II concept. Find/Fix/Repair technical issues associated with GMM and MPAS identified during STF and DT/OT events. Maintain configuration control of SUW MP data, hardware, and software. Collect data and perform analysis associated with the SUW MP Reliability, Maintainability, and Availability (RMA) program. Conduct combat system certification, MP certification, obtain WSESRB/SSSTRP approval, IA approvals, and conduct shipboard test events with each seaframe manufacturer. Support DT from LCS 2 variant, and OT from LCS 2 variant.<br>***FY 2016 Base Plans:***<br>Continue developmental testing to categorize modifications to the current MPAS baseline. Continue modifications to MPAS to support continued SSMM development. Complete planning and execute the SSMM environmental confidence level testing. Execute engineering and developmental testing of SSMM Continue development of the detailed launcher design that supports the SSMM concept. Find/Fix/Repair technical issues associated with SSMM and MPAS identified during STF and DT events.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Reliability, Availability and Maintainability | 1.849 | 2.993 | 2.829 | - | 2.829 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued to monitor Reliability Growth and update plans as necessary. Continued to refine RAM model assumptions based on actual data and conduct multiple sensitivity analysis to quantify the effect of alternate sparing philosophies (i.e. more onboard spares, complete spare system, etc.) based on mission module availability. Determined the maintenance throughput capability for the mission systems at the Mission Package Support Facility/Mission Module Readiness Center (MPSF/MMRC) depot. Refined modeling of ASW MP. Continued utilizing FRACAS to feed back product and process improvements to the Systems Engineering and ILS organizations.<br>***FY 2015 Plans:***<br>Continue to monitor Reliability Growth and update plans as necessary. Continue to refine RAM model assumptions based on actual data and conduct multiple sensitivity analysis to quantify the effect of alternate sparing philosophies (i.e., more onboard spares, complete spare system, etc.) based on mission module availability. Refine modeling of MCM, SUW, and ASW MPs. Continue utilizing FRACAS to feed back product | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| and process improvements to the Systems Engineering and ILS organizations. Draft RAM-C Analysis Report as necessary. Update RAM-C Rationale Report as necessary.<br>***FY 2016 Base Plans:***<br>Continue the systematically management and elimination of failures and failure modes through identification, classification, analysis and removal or mitigation. Continue the refinement of the MCM, SUW, and ASW RAM models by integration actual data collected during mission package TECHEVAL and Initial Operational Test and Evaluation (IOT&E) and conduct multiple sensitivity analysis to quantify the effect of alternate sparing philosophies (i.e., more onboard spares, complete spare system, etc.) based on mission module availability. Conduct reliability testing of the ASW MP and Surface-to-Surface Missile Module (SSMM). Conduct root cause analysis and recommend corrective action on all discovered failure modes. Continue utilizing FRACAS to feedback MCM, SUW and MCM product and process improvements to the Systems Engineering and ILS organizations. Update RAM-C Rationale Report as necessary.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 105.682 | 176.948 | 206.149 | - | 206.149 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 2127: *Littoral Combat Ship* | 1,793.014 | 1,427.049 | 1,423.337 | - | 1,423.337 | 1,470.017 | 1,504.143 | 1,067.189 | 1,088.533 | 10,691.300 | 27,722.783 |
| • 1600: *LCS Common Mission Modules Equipment* | 35.966 | 37.413 | 25.472 | - | 25.472 | 24.015 | 13.281 | 16.215 | 17.453 | Continuing | Continuing |
| • 5110: *Outfitting/Post Delivery* | 68.165 | 118.282 | 164.545 | - | 164.545 | 204.046 | 205.954 | 209.777 | 179.500 | 1,647.600 | 2,881.353 |
| • 1320: *LCS Training Equipment* | 26.726 | 9.630 | 20.002 | - | 20.002 | 21.278 | 19.004 | 19.394 | - | Continuing | Continuing |
| • 0944: *LCS Class Support Equipment* | 47.078 | 36.206 | 67.109 | - | 67.109 | 73.526 | 78.854 | 88.111 | - | Continuing | Continuing |
| • 1601: *LCS MCM Mission Modules* | 34.885 | 15.270 | 102.171 | - | 102.171 | 152.230 | 140.682 | 146.087 | 68.727 | Continuing | Continuing |
| • 1602: *LCS ASW Mission Modules.* | - | 2.729 | 36.410 | - | 36.410 | 54.331 | 54.231 | 54.541 | 55.529 | Continuing | Continuing |
| • 1603: *LCS SUW Mission Modules* | 19.481 | 44.208 | 25.468 | - | 25.468 | 35.872 | 38.345 | 39.336 | 40.491 | Continuing | Continuing |
| • 1605: *Remote Minehunting System (RMS)* | - | 42.276 | 88.961 | - | 88.961 | 73.554 | 67.683 | 68.318 | 42.684 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

The LCS Mission Module Acquisition Strategy is employing an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability through the introduction of mature programs of record into the respective Mission Packages until the full baseline capability defined in the Capability Development Document (CDD) is reached.

**E. Performance Metrics**

Program Completed Milestone B January 2014
Conducted the SUW MP TECHEVAL/IOT&E aboard LCS 1 variant.
Conducted SUW MP DT on LCS 2 variant

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603596N / *(U)LCS Mission Modules* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1 System Engineering | WR | NSWC PC : Panama City, FL | 0.000 | 1.081 | Oct 2013 | 3.517 | Oct 2014 | 2.000 | Oct 2015 | - | | 2.000 | Continuing | Continuing | Continuing |
| 1.1 System Engineering | WR | NSWC DD : Dahlgren, VA | 0.000 | 0.405 | Oct 2013 | 2.574 | Oct 2014 | 1.000 | Oct 2015 | - | | 1.000 | Continuing | Continuing | Continuing |
| 1.1 System Engineering | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | 2.097 | Oct 2013 | 4.461 | Dec 2014 | 2.500 | Dec 2015 | - | | 2.500 | Continuing | Continuing | Continuing |
| 1.1 System Engineering | WR | SPAWAR PAC : San Diego, CA | 0.000 | 0.850 | Oct 2013 | 3.581 | Oct 2014 | 1.500 | Jan 2016 | - | | 1.500 | Continuing | Continuing | Continuing |
| 1.1 System Engineering | WR | NUWC NPT : Newport, RI | 0.000 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| 1.1 System Engineering | C/CPFF | CACI : Fairfax, VA | 0.000 | 0.319 | Oct 2013 | 0.828 | Dec 2014 | 1.000 | Jan 2016 | - | | 1.000 | Continuing | Continuing | Continuing |
| 1.1 System Engineering | C/CPFF | AAC : Uniontown, PA | 0.000 | - | | 0.637 | Dec 2014 | - | | - | | - | - | 0.637 | - |
| 1.1 System Engineering | WR | NSWC PHD : Port Hueneme, CA | 0.000 | - | | 0.765 | Nov 2014 | - | | - | | - | - | 0.765 | - |
| 1.1 System Engineering | WR | NSWC Carderock : Bethesda, MD | 0.000 | 0.174 | Oct 2013 | 0.956 | Oct 2014 | 0.400 | Nov 2015 | - | | 0.400 | - | 1.530 | - |
| 1.1 System Engineering | C/CPFF | JHU/APL : Laurel, MD | 0.000 | 0.287 | Oct 2013 | 0.127 | Dec 2014 | - | | - | | - | - | 0.414 | - |
| 1.4 Integration, Assembly, Test and Check | WR | NAWC AD : Patuxent River, MD | 0.000 | 0.108 | Oct 2013 | 1.175 | Oct 2014 | 0.300 | Oct 2015 | - | | 0.300 | Continuing | Continuing | Continuing |
| 1.1 System Engineering | C/CPFF | Lockheed Martin : Riviera Beach, FL | 0.000 | - | | - | | 1.233 | Dec 2015 | - | | 1.233 | - | 1.233 | - |
| 1.4 Integration, Assembly, Test and Checkout | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | 0.086 | Oct 2013 | 0.587 | Dec 2014 | 0.575 | Dec 2015 | - | | 0.575 | - | 1.248 | - |
| 1.4 Integration, Assembly, Test and Check | WR | SPAWAR PAC : San Diego, CA | 0.000 | - | | - | | 0.580 | Dec 2015 | - | | 0.580 | Continuing | Continuing | Continuing |
| 1.4 Integration, Assembly, Test and Check | WR | NUWC NPT : Newport, RI | 0.000 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| 1.4 Integration, Assembly, Test and Check | WR | NSWC PC : Panama City, FL | 0.000 | 0.106 | Oct 2013 | 0.294 | Oct 2014 | 0.300 | Oct 2015 | - | | 0.300 | Continuing | Continuing | Continuing |
| 1.4 Integration, Assembly, Test and Check | WR | SUPSHIP Gulfcoast : Pascagoula, MS | 0.000 | - | | - | | 2.500 | Jan 2016 | - | | 2.500 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603596N / *(U)LCS Mission Modules* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.4 Integration, Assembly, Test and Check | WR | SUPSHIP Bath : Bath, ME | 0.000 | - | | - | | 1.495 | Mar 2016 | - | | 1.495 | Continuing | Continuing | Continuing |
| 1.4 Integration, Assembly, Test and Check | WR | NSWC DD : Dahlgren, VA | 0.000 | 0.112 | Oct 2013 | 2.937 | Oct 2014 | 0.300 | Oct 2015 | - | | 0.300 | Continuing | Continuing | Continuing |
| 1.4 Integration, Assembly, Test and Checkout | WR | NSWC PHD : Port Hueneme, CA | 0.000 | - | | 0.658 | Oct 2014 | 0.320 | Dec 2015 | - | | 0.320 | - | 0.978 | - |
| 1.4 Integration, Assembly, Test and Checkout | WR | NSWC Crane : Crane, Indiana | 0.000 | 0.144 | Oct 2013 | 1.469 | Oct 2014 | 0.280 | Nov 2015 | - | | 0.280 | - | 1.893 | - |
| 1.4 Integration, Assembly, Test and Checkout | WR | NSWC Carderock : Bethesda, MD | 0.000 | 0.285 | Oct 2013 | 6.392 | Oct 2014 | 0.300 | Nov 2015 | - | | 0.300 | - | 6.977 | - |
| 1.4 Integration, Assembly, Test and Checkout | C/CPFF | CACI : Fairfax, VA | 0.000 | 0.118 | Oct 2013 | 0.832 | Dec 2014 | 0.950 | Jan 2016 | - | | 0.950 | - | 1.900 | - |
| 1.4 Integration, Assembly, Test and Checkout | Sub Allot | CECOM Bldg 1207 : Various | 0.000 | 0.073 | Oct 2013 | 0.294 | Oct 2014 | 0.475 | Jan 2016 | - | | 0.475 | - | 0.842 | - |
| 1.12 Common Equipment Development | WR | NSWC PC : Panama City, FL | 0.000 | 2.217 | Oct 2013 | 2.105 | Oct 2014 | 6.582 | Oct 2015 | - | | 6.582 | Continuing | Continuing | Continuing |
| 1.12 Common Equipment Development | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | 0.736 | Oct 2013 | 0.392 | Dec 2014 | 0.745 | Jan 2016 | - | | 0.745 | Continuing | Continuing | Continuing |
| 1.12 Common Equipment Development | WR | NUWC NPT : Newport, RI | 0.000 | 0.279 | Oct 2013 | 0.343 | Oct 2014 | 0.550 | Oct 2015 | - | | 0.550 | Continuing | Continuing | Continuing |
| 1.12 Common Equipment Development | WR | NSWC DD : Dahlgren, VA | 0.000 | 0.561 | Oct 2013 | 0.343 | Oct 2014 | 0.600 | Oct 2015 | - | | 0.600 | Continuing | Continuing | Continuing |
| 1.12 Common Equipment Development | WR | NAVAIR PMA266 : Patuxent River, MD | 0.000 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| 1.12 Common Equipment Development | C/CPFF | AAC : Uniontown, PA | 0.000 | 0.306 | Oct 2013 | 2.747 | Dec 2014 | 1.701 | Jan 2016 | - | | 1.701 | - | 4.754 | - |
| 1.12 Common Equipment Development | WR | PMW 760 : Various | 0.000 | 0.233 | Oct 2013 | 0.245 | Nov 2014 | - | | - | | - | - | 0.478 | - |
| 1.12 Common Equipment Development | WR | SPAWAR PACIFIC : San Diego, CA | 0.000 | 0.372 | Oct 2013 | 0.783 | Nov 2014 | 0.950 | Dec 2015 | - | | 0.950 | - | 2.105 | - |
| 1.12 Common Equipment Development | Sub Allot | PMW 760 : San Diego, CA | 0.000 | - | | - | | 0.238 | Nov 2015 | - | | 0.238 | - | 0.238 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603596N / *(U)LCS Mission Modules* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.12 Common Equipment Development | C/CPFF | ARL/UT : Austin, TX | 0.000 | 0.171 | Oct 2013 | 0.490 | Dec 2014 | - | | - | | - | - | 0.661 | - |
| 1.12 Common Equipment Development | C/CPFF | Progeny : Manassas, VA | 0.000 | - | | - | | 1.000 | Jan 2016 | - | | 1.000 | - | 1.000 | - |
| 1.13 MCM MP | WR | NSWC PC : Panama City, FL | 0.000 | 8.358 | Oct 2013 | 11.211 | Oct 2014 | 2.211 | Oct 2015 | - | | 2.211 | Continuing | Continuing | Continuing |
| 1.13 MCM MP | WR | NSWC CD : Little Creek, VA | 0.000 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| 1.13 MCM MP | Sub Allot | PMS 406 : Various | 0.000 | 3.629 | Oct 2013 | 8.232 | Dec 2014 | 16.000 | Jan 2016 | - | | 16.000 | - | 27.861 | - |
| 1.13 MCM MP | Sub Allot | PMS 495 : Various | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.13 MCM MP | C/CPFF | Lockheed Martin : Riviera Beach, FL | 0.000 | 4.782 | Oct 2013 | - | | - | | - | | - | - | 4.782 | - |
| 1.14 ASW MP | Sub Allot | PEO IWS5 : Various | 0.000 | 17.402 | Oct 2013 | 7.918 | Oct 2014 | 13.700 | Jan 2016 | - | | 13.700 | - | 39.020 | - |
| 1.14 ASW MP | WR | NUWC NPT : Newport, RI | 0.000 | 5.407 | Oct 2013 | 3.672 | Oct 2014 | 13.188 | Oct 2015 | - | | 13.188 | - | 22.267 | - |
| 1.14 ASW MP | TBD | Various : Various | 0.000 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| 1.14 ASW MP | WR | NSWC Dam Neck : Virginia Beach, VA | 0.000 | 0.802 | Oct 2013 | 0.587 | Oct 2014 | 0.807 | Oct 2015 | - | | 0.807 | - | 2.196 | - |
| 1.14 ASW MP | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | 0.374 | Oct 2013 | 1.273 | Dec 2014 | 3.500 | Jan 2016 | - | | 3.500 | - | 5.147 | - |
| 1.14 ASW MP | C/CPFF | SPA : Washington, DC | 0.000 | - | | 0.587 | Jun 2015 | 0.600 | Dec 2015 | - | | 0.600 | - | 1.187 | - |
| 1.14 ASW MP | Sub Allot | EDM Contractor : TBD | 0.000 | - | | 2.568 | Oct 2014 | 16.800 | Jan 2016 | - | | 16.800 | - | 19.368 | - |
| 1.14 ASW MP | WR | NSWC PCD : Panama City, FL | 0.000 | - | | 0.117 | Oct 2014 | - | | - | | - | - | 0.117 | - |
| 1.14 ASW MP | WR | NSWC DD : Dahlgren, VA | 0.000 | - | | 0.196 | Oct 2014 | 0.250 | Nov 2015 | - | | 0.250 | - | 0.446 | - |
| 1.14 ASW MP | C/CPFF | CACI : Arlingrton, VA | 0.000 | - | | 0.343 | Dec 2014 | 0.258 | Jan 2016 | - | | 0.258 | - | 0.601 | - |
| 1.14 ASW MP | WR | NUWC KPT : Keyport, WA | 0.000 | - | | 0.441 | Oct 2014 | 0.154 | Nov 2015 | - | | 0.154 | - | 0.595 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603596N / *(U)LCS Mission Modules* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.14 ASW MP | WR | SSC PAC : San Diego, CA | 0.000 | - | | 3.133 | Oct 2014 | 1.100 | Dec 2015 | - | | 1.100 | - | 4.233 | - |
| 1.15 SUW MP | WR | NSWC DD : Dahlgren, VA | 0.000 | 11.350 | Oct 2013 | 9.361 | Oct 2014 | 9.500 | Oct 2015 | - | | 9.500 | Continuing | Continuing | Continuing |
| 1.15 SUW MP | WR | NSWC PHD : Port Hueneme, CA | 0.000 | 4.009 | Oct 2013 | 5.128 | Oct 2014 | 12.000 | Dec 2015 | - | | 12.000 | Continuing | Continuing | Continuing |
| 1.15 SUW MP | WR | SPAWAR PACIFIC : San Diego, CA | 0.000 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| 1.15 SUW MP | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | 8.700 | Oct 2013 | 19.884 | Dec 2014 | 20.000 | Dec 2015 | - | | 20.000 | - | 48.584 | - |
| 1.15 SUW MP | Sub Allot | PEO IWS 3 : Various | 0.000 | - | | - | | 7.319 | Dec 2015 | - | | 7.319 | - | 7.319 | - |
| 1.15 SUW MP | WR | NAWC WD : Ridgecrest, CA | 0.000 | 3.868 | Oct 2013 | 1.958 | Oct 2014 | 2.000 | Jan 2016 | - | | 2.000 | - | 7.826 | - |
| 1.15 SUW MP | WR | NSWC CD : Crane, IN | 0.000 | - | | 0.196 | Oct 2014 | 0.200 | Dec 2015 | - | | 0.200 | - | 0.396 | - |
| 1.15 SUW MP | WR | NSWC Corona : Corona, CA | 0.000 | - | | 0.245 | Oct 2014 | 0.250 | Nov 2015 | - | | 0.250 | - | 0.495 | - |
| 1.16 MP-PCS Equipment | WR | Various : Various | 0.000 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| 1.19 Pre-Production Engineering | WR | Various : Various | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.20 Irregular Warfare Module | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.20 Irregular Warfare Module | WR | SPARWAR PAC : San Diego, CA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.1.7 System Engineering RAM-C Project | WR | Various : Various | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 0.000 | 79.801 | | 116.582 | | 150.211 | | - | | 150.211 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603596N / *(U)LCS Mission Modules* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5 Training Systems Development | WR | NAWC TSD : Orlando, FL | 0.000 | 0.803 | Oct 2013 | 2.007 | Oct 2014 | 0.750 | Jan 2016 | - | | 0.750 | Continuing | Continuing | Continuing |
| 1.5 Training Systems Development | WR | NSWC PC : Panama City, FL | 0.000 | 0.486 | Oct 2013 | 1.615 | Oct 2014 | 2.500 | Nov 2015 | - | | 2.500 | Continuing | Continuing | Continuing |
| 1.5 Training Systems Development | WR | NSWC PHD : Port Hueneme, CA | 0.000 | 0.728 | Oct 2013 | 1.266 | Oct 2014 | 1.500 | Nov 2015 | - | | 1.500 | Continuing | Continuing | Continuing |
| 1.5 Training Systems Development | C/CPFF | AAC : Uniontown, PA | 0.000 | 0.738 | Oct 2013 | 3.500 | Dec 2014 | 3.500 | Jan 2016 | - | | 3.500 | Continuing | Continuing | Continuing |
| 1.5 Training Systems Development | C/CPFF | CACI : Fairfax, VA | 0.000 | 0.370 | Oct 2013 | 0.734 | Dec 2014 | 1.250 | Jan 2016 | - | | 1.250 | - | 2.354 | - |
| 1.5 Training Systems Development | WR | CSCS : Dahlgren, VA | 0.000 | 0.853 | Oct 2013 | 1.713 | Oct 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| 1.5 Training Systems Development | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | 0.204 | Oct 2013 | 1.084 | Dec 2014 | 0.350 | Jan 2016 | - | | 0.350 | - | 1.638 | - |
| 1.5 Training Systems Development | WR | CNSF : San Diego, CA | 0.000 | 0.370 | Oct 2013 | 0.734 | Oct 2014 | 0.900 | Dec 2015 | - | | 0.900 | Continuing | Continuing | Continuing |
| 1.5 Training Systems Development | WR | NSWC, Dahlgren : Dahlgren, VA | 0.000 | - | | 0.269 | Oct 2014 | 0.275 | Oct 2015 | - | | 0.275 | - | 0.544 | - |
| 1.5 Training Systems Development | WR | NUWC, Newport : Newport, RI | 0.000 | - | | 1.224 | Oct 2014 | 0.070 | Oct 2015 | - | | 0.070 | - | 1.294 | - |
| 1.5 Training Systems Development | WR | JHU/APL : Laurel, MD | 0.000 | - | | 0.979 | Nov 2014 | 0.500 | Feb 2016 | - | | 0.500 | - | 1.479 | - |
| 1.5 Training Systems Development | Sub Allot | Various : Various | 0.000 | - | | - | | 1.520 | Oct 2015 | - | | 1.520 | - | 1.520 | - |
| 1.5 Training Systems Development | C/BA | CDSA, Dam Neck : Dam Neck, VA | 0.000 | - | | 1.713 | Oct 2014 | 2.800 | Oct 2015 | - | | 2.800 | - | 4.513 | - |
| 1.6 Program Technical Data | WR | NSWC PC : Panama City, FL | 0.000 | - | | 0.629 | Oct 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| 1.6 Program Technical Data | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | 0.133 | Oct 2013 | 0.942 | Dec 2014 | 2.071 | Jan 2016 | - | | 2.071 | - | 3.146 | - |
| 1.6 Program Technical Data | WR | CACI : Fairfax, VA | 0.000 | 0.110 | Oct 2013 | 0.274 | Dec 2014 | - | | - | | - | - | 0.384 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603596N / *(U)LCS Mission Modules* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1.10 Reliability, Maintainability, and Availability | C/CPFF | CACI : Fairfax, VA | 0.000 | 0.178 | Oct 2013 | 0.734 | Dec 2014 | 0.921 | Jan 2016 | - | | 0.921 | Continuing | Continuing | Continuing |
| 1.1.10 Reliability, Maintainability, and Availability | WR | NSWC PC : Panama City, FL | 0.000 | 0.708 | Oct 2013 | 0.881 | Oct 2014 | 0.217 | Nov 2015 | - | | 0.217 | Continuing | Continuing | Continuing |
| 1.1.10 Reliability, Maintainability, and Availability | WR | NUWC, NPT : Newport, RI | 0.000 | 0.074 | Oct 2013 | 1.129 | Oct 2014 | 0.116 | Oct 2015 | - | | 0.116 | Continuing | Continuing | Continuing |
| 1.1.10 Reliability, Maintainability, and Availability | C/BA | NSWC, Dahlgren : Dahlgren, VA | 0.000 | 0.890 | Oct 2013 | 0.250 | Oct 2014 | 0.233 | Nov 2015 | - | | 0.233 | - | 1.373 | - |
| 1.1.10 Reliability, Maintainability, and Availability | WR | NAVSEALOGCEN : Norfolk, VA | 0.000 | - | | - | | 0.731 | Oct 2015 | - | | 0.731 | - | 0.731 | - |
| 1.1.10 Reliability, Maintainability, and Availability | C/CPFF | Northrop Grumman : Bethpage, NY | 0.000 | - | | - | | 0.152 | Dec 2015 | - | | 0.152 | - | 0.152 | - |
| 1.1.10 Reliability, Maintainability, and Availability | WR | CDSA Dam Neck : Virginia Beach, VA | 0.000 | - | | - | | 0.116 | Oct 2015 | - | | 0.116 | - | 0.116 | - |
| 1.1.10 Reliability, Maintainability, and Availability | WR | NSWC PHD : Port Hueneme, CA | 0.000 | - | | - | | 0.343 | Nov 2015 | - | | 0.343 | - | 0.343 | - |
| | | **Subtotal** | 0.000 | 6.645 | | 21.677 | | 20.815 | | - | | 20.815 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.3 System Test and Evaluation | WR | NSWC PCD : Panama City, FL | 0.000 | 6.146 | Nov 2013 | 12.308 | Oct 2014 | 9.000 | Nov 2015 | - | | 9.000 | - | 27.454 | - |
| 1.3 System Test and Evaluation | WR | NSWC DD : Dahlgren, VA | 0.000 | 3.250 | Nov 2013 | 7.348 | Oct 2014 | 6.000 | Oct 2015 | - | | 6.000 | - | 16.598 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603596N / *(U)LCS Mission Modules* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.3 System Test and Evaluation | WR | NUWC NPT : Newport, RI | 0.000 | 0.485 | Nov 2013 | 0.743 | Oct 2014 | 0.800 | Oct 2015 | - | | 0.800 | - | 2.028 | - |
| 1.3 System Test and Evaluation | WR | NSWC PHD : Port Hueneme, CA | 0.000 | 5.160 | Nov 2013 | 7.768 | Oct 2014 | 8.500 | Dec 2015 | - | | 8.500 | - | 21.428 | - |
| 1.3 System Test and Evaluation | WR | SPAWAR PAC : San Diego, CA | 0.000 | 0.808 | Nov 2013 | 1.150 | Nov 2014 | 1.300 | Jan 2016 | - | | 1.300 | - | 3.258 | - |
| 1.3 System Test and Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 0.000 | 0.546 | Nov 2013 | 1.148 | Nov 2014 | 1.300 | Jan 2016 | - | | 1.300 | - | 2.994 | - |
| 1.3 System Test and Evaluation | WR | PMA 266 : Patuzent River, MD | 0.000 | 0.226 | Nov 2013 | 0.352 | Dec 2014 | 0.400 | Dec 2015 | - | | 0.400 | - | 0.978 | - |
| 1.3 System Test and Evaluation | C/BA | Silver Ships : Theodore, AL | 0.000 | 0.355 | Nov 2013 | 0.548 | Dec 2014 | - | | - | | - | - | 0.903 | - |
| 1.3 System Test and Evaluation | C/BA | CNSF : Norfolk, VA | 0.000 | 0.161 | Nov 2013 | 0.250 | Nov 2014 | - | | - | | - | - | 0.411 | - |
| 1.3 System Test and Evaluation | C/BA | NAWC WD : Point Mugu, CA | 0.000 | 1.617 | Nov 2013 | 2.333 | Nov 2014 | 3.000 | Jan 2016 | - | | 3.000 | - | 6.950 | - |
| 1.3 System Test and Evaluation | C/BA | NSWC Corona : Corona, CA | 0.000 | - | | 0.196 | Nov 2014 | 0.571 | Dec 2015 | - | | 0.571 | - | 0.767 | - |
| | | **Subtotal** | 0.000 | 18.754 | | 34.144 | | 30.871 | | - | | 30.871 | - | 83.769 | - |

**Management Services ($ in Millions)**

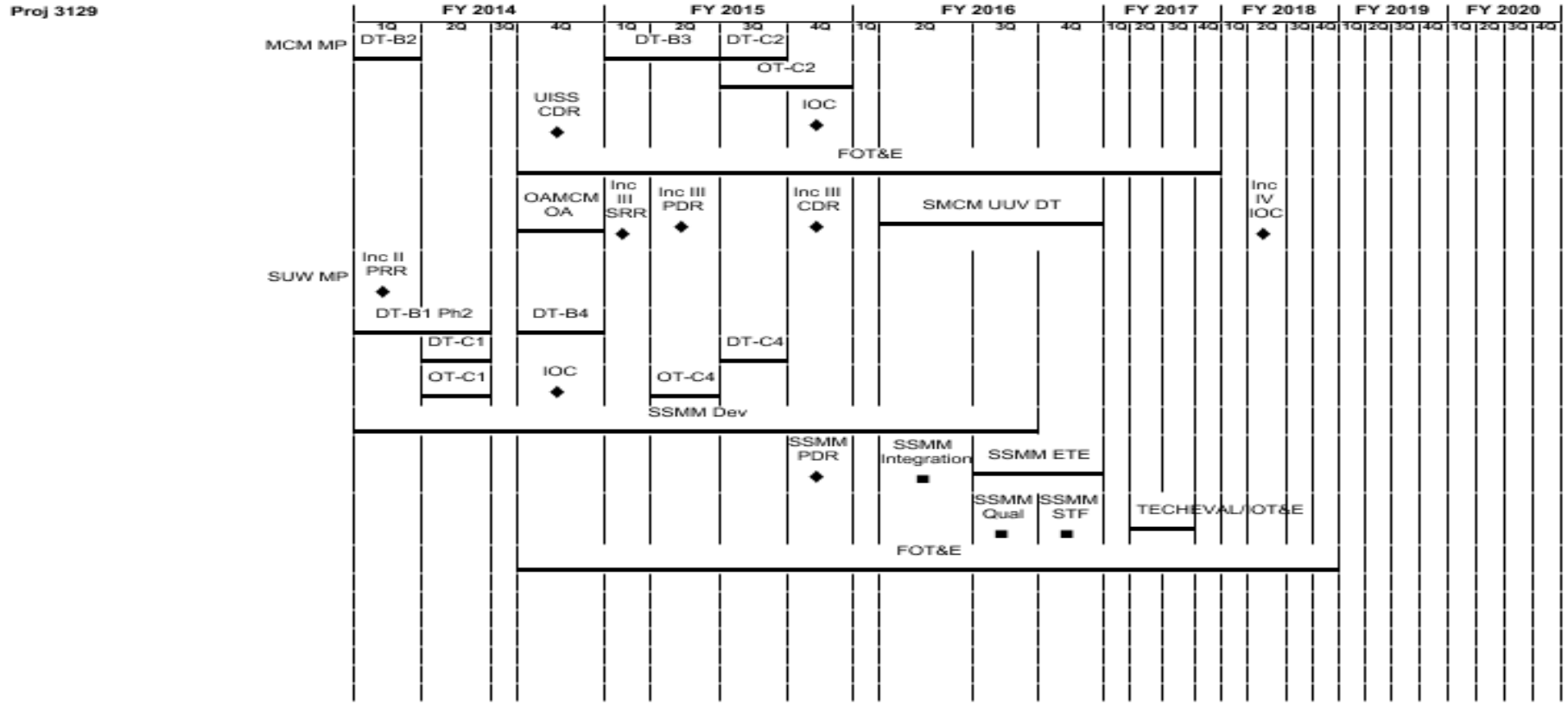
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Workforce | Various | Various : Various | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.2 Program Management | C/CPFF | CACI : Fairfax, VA | 0.000 | 0.482 | Nov 2013 | 4.545 | Dec 2014 | 2.873 | Jan 2016 | - | | 2.873 | - | 7.900 | - |
| 1.2 Program Management | WR | NSWC PCD : Panama City, FL | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.2 Program Management | WR | NSWC DD : Dahlgren, VA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| 1.2 Program Management | FFRDC | Mitre : McLean, VA | 0.000 | - | | - | | 1.379 | Nov 2015 | - | | 1.379 | - | 1.379 | - |
| | | **Subtotal** | 0.000 | 0.482 | | 4.545 | | 4.252 | | - | | 4.252 | - | 9.279 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603596N / *(U)LCS Mission Modules* | Project (Number/Name)<br>3129 / *LCS Mission Package Development* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 105.682 | | 176.948 | | 206.149 | | - | | 206.149 | - | - | - |

**Remarks**

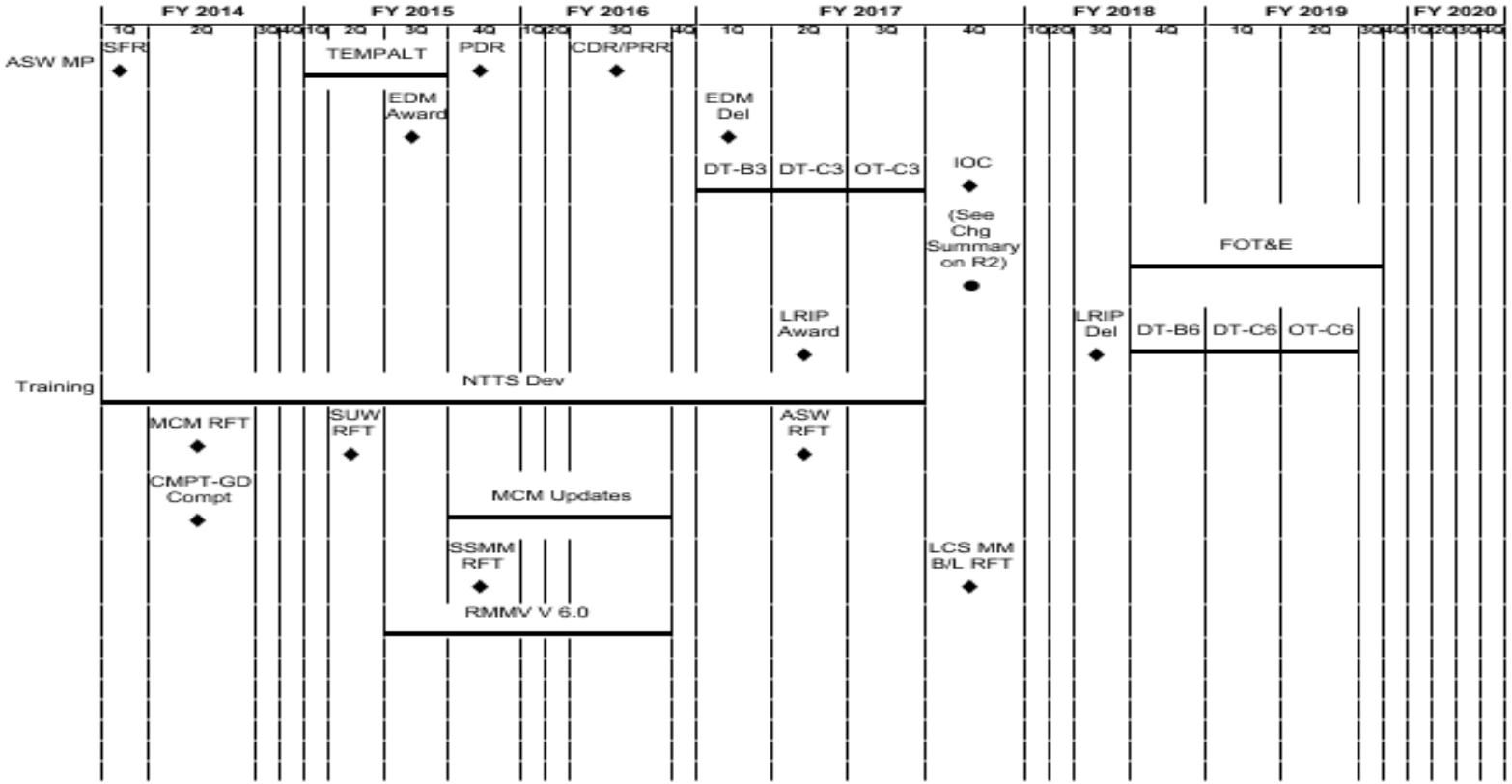
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |




*2016PB - 0603596N - 3129*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

Page 2




*2016PB - 0603596N - 3129*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3129*** | | | | |
| MCM MP: MCM MP Increment I DT-B3 (Freedom Variant) | 1 | 2015 | 2 | 2015 |
| MCM MP: MCM MP Increment I DT-B2 Phase 4 (Independence Variant) | 1 | 2014 | 1 | 2014 |
| MCM MP: MCM MP Increment I TECHEVAL DT-C2 (Independence Variant) | 3 | 2015 | 3 | 2015 |
| MCM MP: MCM MP Increment I IOT&E OT-C2 (Independence Variant) | 3 | 2015 | 4 | 2015 |
| MCM MP: MCM MP Increment I IOC | 4 | 2015 | 4 | 2015 |
| MCM MP: MCM - UISS CDR | 4 | 2014 | 4 | 2014 |
| MCM MP: MCM MP FOT&E | 4 | 2014 | 4 | 2017 |
| MCM MP: MCM MP OAMCM Operational Assessment (Independence Variant) | 4 | 2014 | 4 | 2014 |
| MCM MP: MCM MP Increment III Delta SRR | 1 | 2015 | 1 | 2015 |
| MCM MP: MCM MP Increment III Delta PDR | 2 | 2015 | 2 | 2015 |
| MCM MP: MCM MP Increment III Delta CDR | 4 | 2015 | 4 | 2015 |
| MCM MP: MCM Increment IV Developmental Testing | 2 | 2016 | 4 | 2016 |
| MCM MP: MCM MP Increment IV IOC | 2 | 2018 | 2 | 2018 |
| SUW MP: SUW MP Increment II PRR (MSM) | 1 | 2014 | 1 | 2014 |
| SUW MP: SUW MP Increment I & II DT-B1 Phase 2 (Freedom Variant) | 1 | 2014 | 2 | 2014 |
| SUW MP: SUW MP Increment I & II DT-B4 (Independence Variant) | 4 | 2014 | 4 | 2014 |
| SUW MP: SUW MP Increment I & II TECHEVAL DT-C1 (Freedom Variant) | 2 | 2014 | 2 | 2014 |
| SUW MP: SUW MP Increment I & II TECHEVAL DT-C4 (Independence Variant) | 3 | 2015 | 3 | 2015 |
| SUW MP: SUW MP Increment I & II IOT&E OT-C1 (Freedom Variant) | 2 | 2014 | 2 | 2014 |
| SUW MP: SUW MP Increment I & II IOT&E OT-C4 (Independence Variant) | 2 | 2015 | 2 | 2015 |
| SUW MP: SUW MP Increment I & II IOC | 4 | 2014 | 4 | 2014 |
| SUW MP: SUW MM SSMM Development | 1 | 2014 | 3 | 2016 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| SUW MP: SUW MM SSMM PDR | 4 | 2015 | 4 | 2015 |
| SUW MP: SUW MM (SSMM End-to-End Testing) | 3 | 2016 | 4 | 2016 |
| SUW MP: Surface-to-Surface Missle Module Functional Integration Test (FIT) on LCS | 2 | 2016 | 2 | 2016 |
| SUW MP: SSMM Qualification Testing Complete | 3 | 2016 | 3 | 2016 |
| SUW MP: SSMM Structural Test Fire | 4 | 2016 | 4 | 2016 |
| SUW MP: SSMM TECHEVAL/IOT&E | 2 | 2017 | 3 | 2017 |
| SUW MP: SUW MP FOT&E | 4 | 2014 | 4 | 2018 |
| ***Page 2*** | | | | |
| ASW MP: ASW MP Increment II SFR | 1 | 2014 | 1 | 2014 |
| ASW MP: ASW MP Increment II PDR | 4 | 2015 | 4 | 2015 |
| ASW MP: LCS-1 TEMPALT TDP (for OA Test) | 1 | 2015 | 3 | 2015 |
| ASW MP: ASW MP Increment II CDR/PRR | 3 | 2016 | 3 | 2016 |
| ASW MP: ASW MP Increment II EDM/PRA Award | 3 | 2015 | 3 | 2015 |
| ASW MP: ASW MP Increment II EDM 1 Delivery | 1 | 2017 | 1 | 2017 |
| ASW MP: ASW MP Increment II DT-B3 (Freedom Variant) | 1 | 2017 | 1 | 2017 |
| ASW MP: ASW MP Increment II TECHEVAL DT-C3 (Freedom Variant) | 2 | 2017 | 2 | 2017 |
| ASW MP: ASW MP Increment II IOT&E OT-C3 (Freedom Variant) | 3 | 2017 | 3 | 2017 |
| ASW MP: ASW MP Increment II IOC | 4 | 2017 | 4 | 2017 |
| ASW MP: (See Change Summary on R2) | 4 | 2017 | 4 | 2017 |
| ASW MP: Independence Variant Testing | 4 | 2018 | 3 | 2019 |
| ASW MP: ASW MP Increment II DT-B6 (Independence Variant) | 4 | 2018 | 4 | 2018 |
| ASW MP: ASW MP Increment II TECHEVAL DT-C6 (Independence Variant) | 1 | 2019 | 1 | 2019 |
| ASW MP: ASW MP Increment II IOT&E OT-C6 (Independence Variant) | 2 | 2019 | 2 | 2019 |
| ASW MP: ASW MP Increment II LRIP 1 Award | 2 | 2017 | 2 | 2017 |
| ASW MP: ASW MP Increment LRIP 1 Delivery | 3 | 2018 | 3 | 2018 |
| Training: NTTS (MPTS) HW/SW Development | 1 | 2014 | 3 | 2017 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603596N / *(U)LCS Mission Modules* | **Project (Number/Name)**<br>3129 / *LCS Mission Package Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Training: MCM LTF Initial Ready For Training | 2 | 2014 | 2 | 2014 |
| Training: SUW LTF Initial Ready For Training | 2 | 2015 | 2 | 2015 |
| Training: ASW LTF Initial Ready For Training | 2 | 2017 | 2 | 2017 |
| Training: CMPT - GD Tactical Team Trainer Integration Complete | 2 | 2014 | 2 | 2014 |
| Training: MCM Courseware Update (MCM UUV, RMMV & UISS IOC) | 4 | 2015 | 3 | 2016 |
| Training: SUW Courseware Update (SSMM IOC) | 4 | 2015 | 4 | 2015 |
| Training: Initial LCS MM Baseline Final Ready for Training | 4 | 2017 | 4 | 2017 |
| Training: MCM Annual Training Update (RMMV v6.0) | 3 | 2015 | 3 | 2016 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603597N *I (U)Automated Test and Re-Test (ATRT)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | 9.639 | 8.115 | 8.000 | - | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | Continuing | Continuing |
| 9B88: *Automated Test and Re-Test* | 0.000 | 9.639 | 8.115 | 8.000 | - | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | Continuing | Continuing |

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

From FY2015 and prior, the Navy, through Automated Test and Re-Test (ATRT) is developing an automated test/analysis capability, which is applicable at phases within system development and integration which provides reproducible and quantitative evaluation of system performance with reduced levels of effort and schedule in order to support one of the Navy's priority initiatives of reduction of Total Ownership Cost (TOC). Funding will provide additional work towards ongoing testing and analysis efforts within the Combat Systems Integration, AEGIS Combat System Advanced Capability Build (ACB) 12, Antisubmarine Warfare Integrated Common Processor/ Acoustic Rapid Commercial Off The Shelf (COTS) Insertion, the Littoral Combat Ship (LCS) Mission Module development and other major acquisition programs. In addition, funding will support the development of guidance to facilitate NAVSEA-affiliated programs' adoption of this TOC-reducing discipline and technology.

Starting in FY2016 and through the out-years, the project has been renamed Automated Test and Analysis (ATA). ATA will extend the use of automated test methods currently in use such as Automated Test and Re-Test, research new methods of testing and use of automated test technologies, and standardize test practices, methods and tools across the Naval Enterprise. In addition, funding will support the development of enterprise level strategies to apply ATA to the software-intensive acquisition programs, establish standards, specifications, and guidance, as well as use business case analysis to select future pilot projects and applications.

The ATRT project is funded on Program Element 0603597N under Project Unit 9B88: "Automated Test and Re-Test". Starting in FY16 and through the out-years, the project will be renamed "Automated Test and Analysis" on Program Element 0603597N under Project Unit 9B88 to be consistent with the program's enterprise approach to develop automated test tools.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 10.005 | 8.115 | 8.236 | - | 8.236 |
| Current President's Budget | 9.639 | 8.115 | 8.000 | - | 8.000 |
| Total Adjustments | -0.366 | - | -0.236 | - | -0.236 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.366 | - | | | |
| • Program Adjustments | - | - | -0.236 | - | -0.236 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603597N *I (U)Automated Test and Re-Test (ATRT)* |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $.236 million to account for the availability of prior years execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603597N / *(U)Automated Test and Re-Test (ATRT)* | Project (Number/Name)<br>9B88 / *Automated Test and Re-Test* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9B88: *Automated Test and Re-Test* | - | 9.639 | 8.115 | 8.000 | - | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

From FY2015 and prior, the Navy, through Automated Test and Re-Test (ATRT) is developing an automated test/analysis capability, which is applicable at phases within system development and integration which provides reproducible and quantitative evaluation of system performance with reduced levels of effort and schedule in order to support one of the Navy's priority initiatives of reduction of Total Ownership Cost (TOC). Funding will provide additional work towards ongoing testing and analysis efforts within the Combat Systems Integration, AEGIS Combat System Advanced Capability Build (ACB) 12, Antisubmarine Warfare Integrated Common Processor/ Acoustic Rapid Commercial Off The Shelf (COTS) Insertion, the Littoral Combat Ship (LCS) Mission Module development and other major acquisition programs. In addition, funding will support the development of guidance to facilitate NAVSEA-affiliated programs' adoption of this TOC-reducing discipline and technology.

Starting in FY2016 and through the out-years the project moves from N96 to N84 and has been renamed Automated Test and Analysis (ATA). ATA will extend the use of automated test methods currently in use such as Automated Test and Re-Test, research new methods of testing and use of automated test technologies, and standardize test practices, methods and tools across the Naval Enterprise. In addition, funding will support the development of enterprise level strategies to apply ATA to the software-intensive acquisition programs, establish standards, specifications, and guidance, as well as use business case analysis to select future pilot projects and applications.

The ATRT project is funded on Program Element 0603597N under Project Unit 9B88: "Automated Test and Re-Test". Starting in FY16 and through the out-years, the project will be renamed "Automated Test and Analysis" on Program Element 0603597N under Project Unit 9B88 to be consistent with the program's enterprise approach to develop automated test tools.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Automated Test and Re-Test | 9.639 | 8.115 | 8.000 | - | 8.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>In FY14, the ATRT program successfully completed eight (8) FY13 ATRT projects to be employed on Navy Surface, Undersea, Littoral, and Mine Warfare Combat System Programs. These Programs are strategically transitioning developed ATRT capabilities into test processes for further use. The ATRT program awarded nine (9) new projects via the ATRT Executive Selection Panel (ESP) to NAVSEA-affiliated PEOs. Projects were | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603597N / *(U)Automated Test and Re-Test (ATRT)* | **Project (Number/Name)**<br>9B88 / *Automated Test and Re-Test* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| evaluated and prioritized by an ATRT Screening Panel represented by each NAVSEA-affiliated PEO, who then made recommendations to the Executive Committee for final selections.<br><br>The program has continued to mature training modules and share best practices for Navy ATRT users which will be further developed in FY15 to the Navy automated testing community. The Program successfully completed Congressional taskers for both the Chief of Naval Operations and the Secretary of the Navy.<br>***FY 2015 Plans:***<br>The ATRT program will continue a number of ATRT efforts with the intent of increasing the widespread use of automated testing in software intensive program execution. Also, the ATRT program will continue to advocate the maturation/development of standards, specifications, and contract language that would improve test tool commonality and reuse across the Navy testing domains. NAVSEA will investigate the applicability of ATRT to Warfare System Certification Testing.<br>***FY 2016 Base Plans:***<br>The ATA program will continue to explore enterprise-level pilot projects accelerating ATA implementation as part of acquisition program development across the Navy. As part of this enterprise approach, the Navy will institute a governance structure that will establish an overarching enterprise perspective, broaden stakeholder participation and ensure the use of ATA across all SYSCOMs (NAVSEA, NAVAIR, SPAWAR) that can use these automated test technologies. Also, the ATA program will continue to advocate the maturation/development of standards, specifications, and contract language that would improve test tool commonality and reuse across the Navy testing domains.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 9.639 | 8.115 | 8.000 | - | 8.000 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

The Program Strategy for the ATA program includes the following:

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603597N / *(U)Automated Test and Re-Test (ATRT)* | **Project (Number/Name)**<br>9B88 / *Automated Test and Re-Test* |

- Investigation of applicable similarities to industry standards, specifications, and processes that are relevant to ATA program to recognize best practices and leverage opportunities
- Development of standards and specifications for ATA tools/processes
- Funding and execution of ATA startup projects within acquisition programs per submission of proposals and Business Case Analyses (BCA)
- Development of training and outreach efforts to promote awareness of automated test technologies and tools/processes
- Setup and maintenance of an ATA portal for the collection and dissemination of body of knowledge

**E. Performance Metrics**

Progress towards meeting the objectives of the ATA efforts will be monitored via the following:
- Progress Briefs at Quarterly ATA Executive Steering Group Meetings
- Bi- Monthly ATA Program Reviews
- Return-on-Investment Metrics based on work hours for test process execution - before and after automation
- Return-on-Investment Metrics based on work hours for test process execution - before and after automation

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603597N / *(U)Automated Test and Re-Test (ATRT)* | Project (Number/Name)<br>9B88 / *Automated Test and Re-Test* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Auto Test & Retest | C/CPFF | Innovative Defense Technologies (IDT) : Ballston, VA | 0.000 | 8.576 | Mar 2014 | 7.575 | Jan 2015 | 7.166 | Jan 2016 | - | | 7.166 | Continuing | Continuing | Continuing |
| Auto Test & Retest | WR | Various NSWCs : Not Specified | 0.000 | 0.613 | Apr 2014 | 0.389 | Jan 2015 | 0.578 | Jan 2016 | - | | 0.578 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 9.189 | | 7.964 | | 7.744 | | - | | 7.744 | - | - | - |

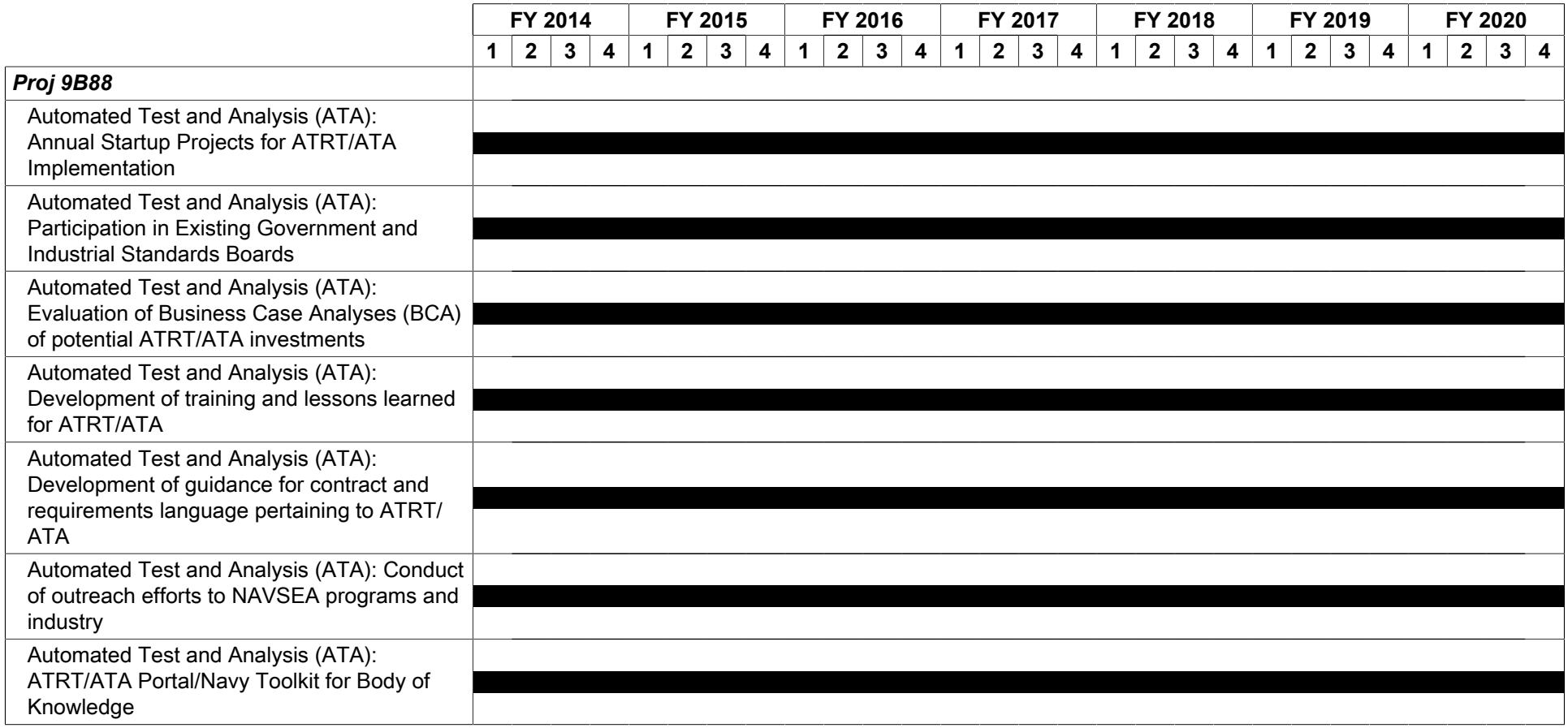
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Auto Test & Retest | C/BA | Gryphon Technologies : Washington, DC | 0.000 | 0.263 | Jul 2014 | 0.151 | Jan 2015 | 0.256 | Jan 2016 | - | | 0.256 | Continuing | Continuing | Continuing |
| Auto Test & Retest | C/BA | Alion Sciences : McLean, VA | 0.000 | 0.187 | Jul 2014 | - | | - | | - | | - | - | 0.187 | - |
| | | **Subtotal** | 0.000 | 0.450 | | 0.151 | | 0.256 | | - | | 0.256 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 9.639 | | 8.115 | | 8.000 | | - | | 8.000 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603597N / *(U)Automated Test and Re-Test (ATRT)* | **Project (Number/Name)**<br>9B88 / *Automated Test and Re-Test* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603597N / *(U)Automated Test and Re-Test (ATRT)* | **Project (Number/Name)**<br>9B88 / *Automated Test and Re-Test* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9B88*** | | | | |
| Automated Test and Analysis (ATA): Annual Startup Projects for ATRT/ATA Implementation | 1 | 2014 | 4 | 2020 |
| Automated Test and Analysis (ATA): Participation in Existing Government and Industrial Standards Boards | 1 | 2014 | 4 | 2020 |
| Automated Test and Analysis (ATA): Evaluation of Business Case Analyses (BCA) of potential ATRT/ATA investments | 1 | 2014 | 4 | 2020 |
| Automated Test and Analysis (ATA): Development of training and lessons learned for ATRT/ATA | 1 | 2014 | 4 | 2020 |
| Automated Test and Analysis (ATA): Development of guidance for contract and requirements language pertaining to ATRT/ATA | 1 | 2014 | 4 | 2020 |
| Automated Test and Analysis (ATA): Conduct of outreach efforts to NAVSEA programs and industry | 1 | 2014 | 4 | 2020 |
| Automated Test and Analysis (ATA): ATRT/ATA Portal/Navy Toolkit for Body of Knowledge | 1 | 2014 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603609N *I Conventional Munitions* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 206.754 | 8.380 | 7.603 | 7.678 | - | 7.678 | 9.208 | 9.000 | 8.611 | 8.790 | Continuing | Continuing |
| 0363: *Insensitive Munitions Adv. Development* | 206.754 | 8.380 | 7.603 | 7.678 | - | 7.678 | 9.208 | 9.000 | 8.611 | 8.790 | Continuing | Continuing |

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

Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet or fragment impact, thus presenting a great hazard to ships, aircraft and personnel. The Insensitive Munitions Advanced Development (IMAD) program will provide, validate, and transition technology to all new weapon developments and priority weapon systems and enable production of munitions insensitive to these stimuli with no reduction in combat performance. Insensitive Munitions (IM) is the Navy's focused effort on propellants, propulsion units, explosives, warheads, fuses and pyrotechnics to reduce the severity of cook-off and bullet/ fragment impact reactions, minimizing the probability for sympathetic detonation, both in normal storage and in use, increasing ship and platform survivability and satisfying performance and readiness requirements.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 8.404 | 7.603 | 9.210 | - | 9.210 |
| Current President's Budget | 8.380 | 7.603 | 7.678 | - | 7.678 |
| Total Adjustments | -0.024 | - | -1.532 | - | -1.532 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.024 | - | | | |
| • Program Adjustments | - | - | - | - | - |
| • Rate/Misc Adjustments | - | - | -1.532 | - | -1.532 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $0.935 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603609N / *Conventional Munitions* | Project (Number/Name)<br>0363 / *Insensitive Munitions Adv. Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0363: *Insensitive Munitions Adv. Development* | 206.754 | 8.380 | 7.603 | 7.678 | - | 7.678 | 9.208 | 9.000 | 8.611 | 8.790 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Energetic materials producibility is demonstrated to assure national capability to produce and load munitions systems. The program leverages are being closely coordinated with other military departments, North Atlantic Treaty organization (NATO) and allied countries to eliminate redundant efforts and maximize efficiency. A joint service IM requirement has been developed and through the IM strategic planning process, all Program Executive Offices (PEO) are implementing IM in their priority munitions. IM are identified as a Department of Defense (DoD) critical technology requirement and considered as part of a weapon design. The IMAD program matures the technology developed by a variety of Science and Technology (S&T) sources for program management integration into weapons systems to meet the IM technical deficiencies documented in the PEO IM Strategic Plans. IMAD provides the link between S&T programs and the program managers (PM) by optimizing IM technologies to meet Navy requirements. IMAD offers risk mitigation for the PMs in terms of IM technical knowledge, expertise and manpower with the state of the art expertise across IM products. Each technology area is divided into subtasks addressing specific munition and munition class IM deficiencies.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Insensitive Munitions Adv. Development | 8.380 | 7.603 | 7.678 | - | 7.678 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Validate and assess weapon systems plan of action and milestones for IM compliance. Review Insensitive Munitions Strategic Plan (IMSP) for Navy compile and analyze weapon system, energetic material and generic technology IM test data. Perform Threat Hazard Assessments (THAs). Perform analysis of energetic material properties logistic process. Review IM certification and waivers. Support Insensitive Munitions Council (IMC), Insensitive Munitions Coordination Group (IMCG), and IMC Working Group. Support and develop Insensitive Munitions Technology Tool (IMT2). Support North Atlantic Treaty Organization Standardization Agreement (NATO STANAG) and Advanced Operations (AOP) development. Support IMAD program briefs. Support all Navy Joint Services Insensitive Munitions Technical Panel (JSIMTP) meetings. Support Explosive Safety Working Group (ESWG) meetings. Provide task management support for financial management, review of programmatic deliverables and overall task coordination. | | | | | |
| ***FY 2014 Accomplishments:***<br>Evaluated and demonstrated IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603609N / *Conventional Munitions* | **Project (Number/Name)**<br>0363 / *Insensitive Munitions Adv. Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| concepts to demonstrate compliance with IM and performance requirements. Demonstrate an insensitive multi-mission, high performance rocket motor. Evaluated options for minimum smoke propellants for shoulder launched applications. Evaluated and demonstrated IM boost propellant formulation for future Tomahawk systems providing improved and comparable performance to in-service systems and better IM characteristics. Assessed combined candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Design a composite booster case for Tomahawk which will improve IM performance for cook-off and impact scenarios. Looked at new ways to develop rocket propellant formulations that meet performance requirements and solve IM deficiencies. Resolve IM problems using top down approach. Evaluated ordnance and container concepts. Assessed the operations utility of current and projected IM improvements to determine current state of IM and prioritize future funding for IM technology. Assessed shielding evaluation of Tomahawk VLS storage canister. Reviewed modeling to solve impact and cook-off with AUR pallet in support of a cooperative effort with AGS LRLAP. The technical focus is on new weapons and PIP. Evaluated and demonstrated MK54 ASROC VLA solid propellant rocket IM capabilities that meet performance. Demonstrated and qualify improved booster explosives and insensitive metalized propellants that are IM compliant for Tomahawk weapon systems. Evaluation of all issues and concerns related to heated RDX discoloration. Performed demonstration and qualification testing of AMRAAM and Sidewinder for joint insensitive munitions to improve response to combat and hazards. Evaluated and provide a modular ballistic shield for protection of Navy munitions. Assessed characterization of MEMS in support of IM Navy qualifications. Demonstrated and qualified insensitive primer for large caliber gun propellant charges. IMAD works collaboratively with the JIMTP to transition JIMTP's S&T products to address PEO IM requirements. The PEOs IMSPs provide a comprehensive IM technology requirements list that helps to focus IM technology thrusts throughout DoD.<br><br>Additional resources were necessary in FY 2014 to support additional efforts such as: the demonstration and qualification of IM improved booster explosive for General Purpose (GP) Bombs; the demonstration and qualification of insensitive metalized propellants in IM compliant rocket motors for high performance systems such as Standard Missile and Tomahawk; and to perform process development of cook-off resistant Thermoplastic Elastomer Explosives (TPE) a potential replacement for all explosives.<br><br>***FY 2015 Plans:***<br>Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Demonstrate an insensitive multi-mission, high performance rocket motor. Evaluate options for minimum smoke propellants for shoulder | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603609N / *Conventional Munitions* | **Project (Number/Name)**<br>0363 / *Insensitive Munitions Adv. Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| launched applications. Evaluate and demonstrate IM boost propellant formulation for future Tomahawk systems providing improved and comparable performance to in-service systems and better IM characteristics. Assess combined candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Design a composite booster case for Tomahawk which will improve IM performance for cook-off and impact scenarios. Look at new ways to develop rocket propellant formulations that meet performance requirements and solve IM deficiencies. Resolve IM problems using top down approach. Evaluate ordnance and container concepts. Assess the operations utility of current and projected IM improvements to determine current state of IM and prioritize future funding for IM technology. Assess shielding evaluation of Tomahawk VLS storage canister. Review modeling to solve impact and cook-off with AUR pallet in support of a cooperative effort with AGS LRLAP. The technical focus is on new weapons and PIP. Evaluate and demonstrate MK54 ASROC VLA solid propellant rocket IM capabilities that meet performance. Demonstrate and qualify improved booster explosives and insensitive metalized propellants that are IM compliant for Tomahawk weapon systems. Evaluation of all issues and concerns related to heated RDX discoloration. Perform demonstration and qualification testing of AMRAAM and Sidewinder for joint insensitive munitions to improve response to combat and hazards. Evaluate and provide a modular ballistic shield for protection of Navy munitions. Assess characterization of MEMS in support of IM Navy qualifications. Demonstrate and qualify Insensitive Primer for large caliber gun propellant charges. IMAD works collaboratively with the JIMTP to transition JIMTP's S&T products to address PEO IM requirements. The PEOs IMSPs provide a comprehensive IM technology requirements list that helps to focus IM technology thrusts throughout DoD.<br><br>FY 2015 will also support additional efforts such as: the demonstration and qualification of IM improved booster explosive for GP Bombs; the demonstration and qualification of insensitive metalized propellants in IM compliant rocket motors for high performance systems such as Standard Missile and Tomahawk; and to perform process development of cook-off resistant TPE a potential replacement for all explosives.<br><br>***FY 2016 Base Plans:***<br>Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Demonstrate an insensitive multi-mission, high performance rocket motor. Evaluate options for minimum smoke propellants for shoulder launched applications. Evaluate and demonstrate IM boost propellant formulation for future Tomahawk systems providing improved and comparable performance to in-service systems and better IM characteristics. Assess combined candidate IM propellants and case concepts to demonstrate compliance with IM and performance | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603609N / *Conventional Munitions* | **Project (Number/Name)**<br>0363 / *Insensitive Munitions Adv. Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| requirements. Design a composite booster case for Tomahawk which will improve IM performance for cook-off and impact scenarios. Look at new ways to develop rocket propellant formulations that meet performance requirements and solve IM deficiencies. Resolve IM problems using top down approach. Evaluate ordnance and container concepts. Assess the operations utility of current and projected IM improvements to determine current state of IM and prioritize future funding for IM technology. Assess shielding evaluation of Tomahawk VLS storage canister. Review modeling to solve impact and cook-off with AUR pallet in support of a cooperative effort with AGS LRLAP. The technical focus is on new weapons and PIP. Evaluate and demonstrate MK54 ASROC VLA solid propellant rocket IM capabilities that meet performance. Demonstrate and qualify improved booster explosives and insensitive metalized propellants that are IM compliant for Tomahawk weapon systems. Evaluation of all issues and concerns related to heated RDX discoloration. Perform demonstration and qualification testing of AMRAAM and Sidewinder for joint insensitive munitions to improve response to combat and hazards. Evaluate and provide a modular ballistic shield for protection of Navy munitions. Assess characterization of MEMS in support of IM Navy qualifications. Demonstrate and qualify Insensitive Primer for large caliber gun propellant charges. IMAD works collaboratively with the JIMTP to transition JIMTP's S&T products to address PEO IM requirements. The PEOs IMSPs provide a comprehensive IM technology requirements list that helps to focus IM technology thrusts throughout DoD.<br><br>FY 2016 will continue to support additional efforts such as: the demonstration and qualification of IM improved booster explosive for GP Bombs; the demonstration and qualification of insensitive metalized propellants in IM compliant rocket motors for high performance systems such as Standard Missile and Tomahawk; and to perform process development of cook-off resistant TPE a potential replacement for all explosives.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 8.380 | 7.603 | 7.678 | - | 7.678 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

IMAD is assigned as a non-ACAT program and therefore does not have program milestones like the ACAT I to IV programs. IMAD develops and evaluates IM technologies for use in Navy weapon systems and is not part of a particular weapon acquisition program.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603609N / *Conventional Munitions* | **Project (Number/Name)**<br>0363 / *Insensitive Munitions Adv. Development* |

**E. Performance Metrics**

Quarterly program reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603609N / *Conventional Munitions* | **Project (Number/Name)**<br>0363 / *Insensitive Munitions Adv. Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PROPULSION DEV. AND EVAL. | WR | NAWC DIV/CHINA LAKE : WX | 92.664 | 2.191 | Nov 2013 | 2.350 | Nov 2014 | 2.447 | Nov 2015 | - | | 2.447 | Continuing | Continuing | Continuing |
| EXPLOSIVES DEV. AND EVAL. | WR | NSWC/INDIAN HEAD DIV. : WX | 78.368 | 2.271 | Nov 2013 | 1.884 | Nov 2014 | 1.843 | Nov 2015 | - | | 1.843 | Continuing | Continuing | Continuing |
| ORDNANCE DEV. AND EVAL. | WR | NSWC/DAHLGREN : WX | 22.750 | 1.397 | Nov 2013 | 1.213 | Nov 2014 | 0.992 | Nov 2015 | - | | 0.992 | Continuing | Continuing | Continuing |
| GUN PROPULSION AND EVAL. | WR | NSWC/INDIAN HEAD DIV. : WX | 5.207 | 1.573 | Nov 2013 | 1.309 | Nov 2014 | 1.442 | Nov 2015 | - | | 1.442 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 198.989 | 7.432 | | 6.756 | | 6.724 | | - | | 6.724 | - | - | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PROGRAM MANAGEMENT SUPT | WR | NOSSA : IN HEAD MD | 5.653 | 0.156 | Nov 2013 | 0.157 | Nov 2014 | 0.159 | Nov 2015 | - | | 0.159 | Continuing | Continuing | Continuing |
| PROGRAM MANAGEMENT SUPPORT | MIPR | DTIC : FT BELVOIR VA | 2.112 | 0.792 | Nov 2013 | 0.690 | Nov 2014 | 0.795 | Nov 2015 | - | | 0.795 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 7.765 | 0.948 | | 0.847 | | 0.954 | | - | | 0.954 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 206.754 | 8.380 | | 7.603 | | 7.678 | | - | | 7.678 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603609N / *Conventional Munitions* | **Project (Number/Name)**<br>0363 / *Insensitive Munitions Adv. Development* |

| | FY 2014 | | | | FY 2015 | | | | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 0363*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Insensitive Munitions Adv. Development: TBD | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603609N / *Conventional Munitions* | **Project (Number/Name)**<br>0363 / *Insensitive Munitions Adv. Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0363*** | | | | |
| Insensitive Munitions Adv. Development: TBD | 1 | 2014 | 1 | 2020 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603611M *I Marine Corps Assault Vehicles* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 95.182 | 34.956 | 105.749 | 219.082 | - | 219.082 | 160.691 | 179.554 | 62.252 | 38.095 | Continuing | Continuing |
| 0025: *New Amphibious Vehicle* | 95.182 | 34.956 | 105.749 | 219.082 | - | 219.082 | 160.691 | 179.554 | 62.252 | 38.095 | Continuing | Continuing |

**Note**

ACV Increment 1.1 leverages and continues the work that was previously accomplished under the Marine Personnel Carrier (MPC) program, funded in PE 0206623M; Project 9C85.

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

The New Amphibious 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 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 122.967 | 105.749 | 199.239 | - | 199.239 |
| Current President's Budget | 34.956 | 105.749 | 219.082 | - | 219.082 |
| Total Adjustments | -88.011 | - | 19.843 | - | 19.843 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -4.979 | - | | | |
| • SBIR/STTR Transfer | -4.232 | - | | | |
| • Program Adjustments | - | - | 46.600 | - | 46.600 |
| • Rate/Misc Adjustments | - | - | -26.757 | - | -26.757 |
| • Congressional Rescission Adjustments | -78.800 | - | - | - | - |

**Change Summary Explanation**

The FY16 increase will properly fund ACV Increment 1.1 Engineering, Manufacturing and Development (EMD) contracts as well as associated program support.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603611M / *Marine Corps Assault Vehicles* | Project (Number/Name)<br>0025 / *New Amphibious Vehicle* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0025: *New Amphibious Vehicle* | 95.182 | 34.956 | 105.749 | 219.082 | - | 219.082 | 160.691 | 179.554 | 62.252 | 38.095 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The New Amphibious 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. The increase in funding from FY15 to FY16 will support ACV Increment 1.1 Engineering, Manufacturing and Development (EMD) contracts and associated program support.

Note: ACV Increment 1.1 leverages and continues the work that was previously accomplished under the Marine Personnel Carrier (MPC) program, funded in PE 0206623M; Project 9C85.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | 15.229 | 67.708 | 203.959 | - | 203.959 |
| ***Articles:*** | - | 32 | - | - | - |
| ***Description:*** System Design and Development | | | | | |
| ***FY 2014 Accomplishments:***<br>-Initiated award of Technology Exploration contracts to assess the technical and cost impacts of requirements that require modularity and also conduct experiments of the proposed designs submitted during the Requirements Refinement phase. | | | | | |
| ***FY 2015 Plans:***<br>-Funding will support the EMD contract award for two vendors to build 16 test vehicles each (32 total) for drive-off competition, blast testing, and Tactics, Techniques, and Procedures (TTP) development. The contract will award in 1QFY16 and will combine FY15 and FY16 funding per the approved acquisition strategy. | | | | | |
| ***FY 2016 Base Plans:***<br>-Initiate award of EMD contracts to two vendors to build 16 test vehicles each (32 total) for drive-off competition, blast testing, and Tactics, Techniques, and Procedures (TTP) development. This effort will combine FY15 and FY16 funding per the approved acquisition strategy. | | | | | |
| ***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603611M / *Marine Corps Assault Vehicles* | **Project (Number/Name)**<br>0025 / *New Amphibious Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Engineering Technical Support | 16.577 | 37.016 | 8.076 | - | 8.076 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** Engineering Technical Support

***FY 2014 Accomplishments:***
-Initiated new amphibious vehicle innovation efforts to reduce vehicle weight, technical risk and cost. Pursued technology development and other studies to advance high water speed capability.
-Continued engineering and technical services in support of technology integration and demonstration activities, and concept development efforts.
-Continued engineering and management support for program planning, analysis, and execution.
-Continued Digital Integration Facility (DIF) Architecture support.

***FY 2015 Plans:***
-Continue evaluation of technology development efforts and other studies to advance high water speed capability.
-Continue engineering and technical services in support of technology integration and demonstration activities, and concept development efforts.
-Continue engineering and management support for program planning, analysis, and execution.
-Continue Digital Integration Facility (DIF) Architecture support.
-Continue engineering efforts in support of Request for Proposal (RFP) development and analysis, System Readiness Review (SRR) support, and support for requirements analysis and finalization. Additionally, Aft Lifting Body Full Scale testing of promising high water speed concepts will be conducted.
-Initiate procurement of EMD Government Furnished Equipment (GFE) for contractor integration.

***FY 2016 Base Plans:***
-Initiate detailed planning efforts in support of ACV Increment 1.1 test activities related to EMD.
-Continue Digital Integration Facility (DIF) Architecture support.
-Continue engineering and technical services in support of technology integration and demonstration activities, and concept development efforts.

***FY 2016 OCO Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603611M / *Marine Corps Assault Vehicles* | **Project (Number/Name)**<br>0025 / *New Amphibious Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Program Management Support | 3.150 | 1.025 | 7.047 | - | 7.047 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Program Management Support<br><br>***FY 2014 Accomplishments:***<br>-Continued transportation/shipment of government equipment in support of Hull Survivability Demonstrator (HSD) test activities.<br>-Continued travel in support of program requirements.<br>-Continued program management support for acquisition documentation preparation.<br><br>***FY 2015 Plans:***<br>-Initiate program management support for acquisition documentation preparation and statement of work development in support of Request for Proposal (RFP) release.<br>-Initiate acquisition documentation support in preparation for Milestone B decision.<br>-Continue providing transportation/shipment of government equipment.<br>-Continue to travel in support of program requirements.<br><br>***FY 2016 Base Plans:***<br>-Initiate and provide program management support for source selection.<br>-Continue acquisition documentation support in preparation for Milestone B decision as well as Preliminary Design Review (PDR) and Capability Design Review (CDR) support.<br>-Continue providing transportation/shipment of government equipment.<br>-Continue to travel in support of program requirements.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 34.956 | 105.749 | 219.082 | - | 219.082 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/2025: *Amphibious Combat Vehicle* | - | - | - | - | - | - | 167.900 | 191.200 | 187.800 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603611M / *Marine Corps Assault Vehicles* | **Project (Number/Name)**<br>0025 / *New Amphibious Vehicle* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

Acquisition strategy is to award competitive Engineering, Manufacturing and Development (EMD) contracts to two vendors to build 16 test vehicles each (32 total). The ACV Increment 1.1 will enter the acquisition cycle at Milestone B in FY16 which will lead to a down select to one vendor in FY18 entering into Low Rate Initial Production (LRIP).

**E. Performance Metrics**

Milestone Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603611M / *Marine Corps Assault Vehicles* | Project (Number/Name)<br>0025 / *New Amphibious Vehicle* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Design & Development | C/CPFF | TBD : TBD | 60.865 | - | | 67.708 | Nov 2015 | 203.959 | Nov 2015 | - | | 203.959 | 113.395 | 445.927 | - |
| Technology Exploration | SS/CPFF | BAE : Arlington, VA | 0.000 | 7.882 | Jun 2014 | - | | - | | - | | - | - | 7.882 | - |
| Technology Exploration | SS/CPFF | GDLS : Woodbridge, VA | 0.000 | 7.347 | Jun 2014 | - | | - | | - | | - | - | 7.347 | - |
| | | **Subtotal** | 60.865 | 15.229 | | 67.708 | | 203.959 | | - | | 203.959 | 113.395 | 461.156 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering and Technical Services | TBD | Various : Various | 25.362 | 16.577 | Jan 2015 | 16.816 | Apr 2015 | 6.592 | Apr 2016 | - | | 6.592 | Continuing | Continuing | Continuing |
| Test and Evaluation - EMD Detailed Planning | TBD | Various : Various | 1.069 | - | | - | | 1.484 | Apr 2016 | - | | 1.484 | Continuing | Continuing | Continuing |
| Propulsion System Demonstrator | WR | NSWC Carderock - SSES Philly : Philadelphia, PA | 1.193 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Remote Weapon Station GFE | C/FP | Kongsberg : Johnstown, PA | 0.000 | - | | 9.000 | May 2015 | - | | - | | - | - | 9.000 | - |
| C3 GFE | Various | Various : Various | 0.000 | - | | 11.200 | May 2015 | - | | - | | - | - | 11.200 | - |
| | | **Subtotal** | 27.624 | 16.577 | | 37.016 | | 8.076 | | - | | 8.076 | - | - | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | Various | Various : Various | 1.037 | 0.075 | Apr 2014 | 0.075 | Apr 2015 | 0.100 | Apr 2016 | - | | 0.100 | - | 1.287 | - |
| Program Management Support | SS/FFP | TBD : TBD | 5.057 | 3.000 | Apr 2015 | 0.750 | Apr 2015 | 6.847 | Apr 2016 | - | | 6.847 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603611M / *Marine Corps Assault Vehicles* | **Project (Number/Name)**<br>0025 / *New Amphibious Vehicle* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Various | Various : Various | 0.599 | 0.075 | Jan 2015 | 0.200 | Jan 2015 | 0.100 | Jan 2016 | - | | 0.100 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 6.693 | 3.150 | | 1.025 | | 7.047 | | - | | 7.047 | - | - | - |

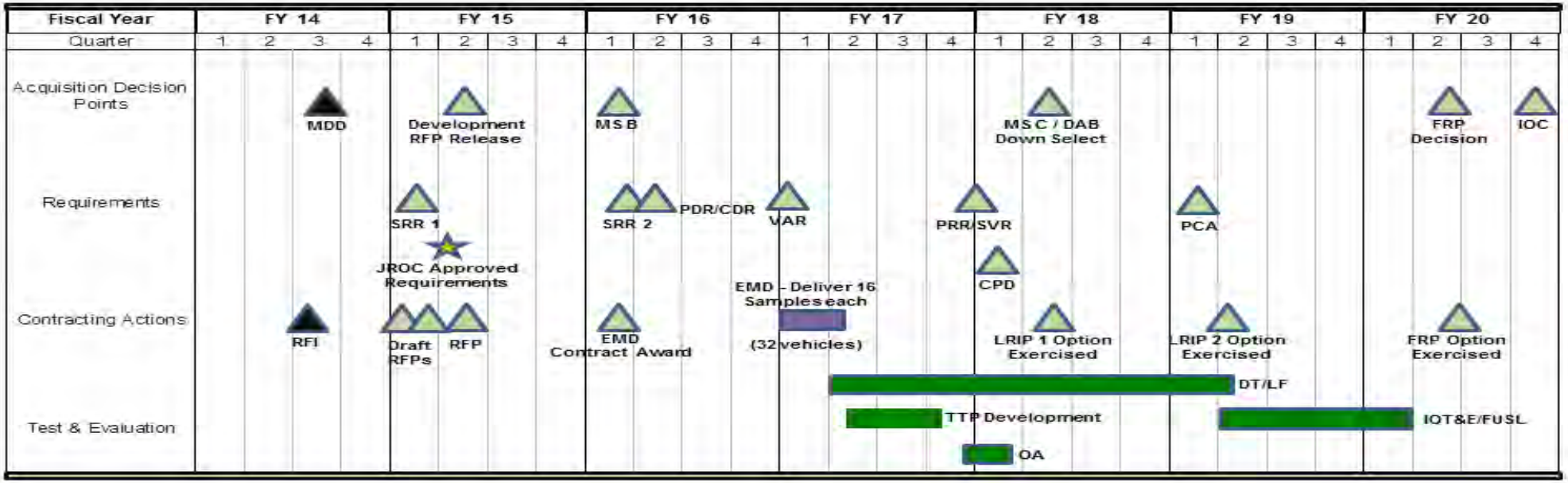
| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 95.182 | 34.956 | | 105.749 | | 219.082 | | - | | 219.082 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603611M / *Marine Corps Assault Vehicles* | **Project (Number/Name)**<br>0025 / *New Amphibious Vehicle* |

# ACV Program Schedule

As of 19 Nov 14




Unclassified(U)

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603611M / *Marine Corps Assault Vehicles* | **Project (Number/Name)**<br>0025 / *New Amphibious Vehicle* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0025*** | | | | |
| MDD | 3 | 2014 | 3 | 2014 |
| Request for Information (RFI) | 3 | 2014 | 3 | 2014 |
| Draft Request for Proposal (RFP) 1 | 1 | 2015 | 1 | 2015 |
| Draft Request for Proposal (RFP) 2 | 1 | 2015 | 1 | 2015 |
| System Readiness Review 1 | 1 | 2015 | 1 | 2015 |
| JROC Approved Requirements | 2 | 2015 | 2 | 2015 |
| Development RFP Release | 2 | 2015 | 2 | 2015 |
| MS B | 1 | 2016 | 1 | 2016 |
| EMD Contract Award | 1 | 2016 | 1 | 2016 |
| System Readiness Review 2 | 1 | 2016 | 1 | 2016 |
| Preliminary Design Review/Critical Design Review | 2 | 2016 | 2 | 2016 |
| EMD Vehicle Delivery (32 Vehicles) | 1 | 2017 | 2 | 2017 |
| Vehicle Acceptance Review | 1 | 2017 | 1 | 2017 |
| Development Test/Live Fire Test | 2 | 2017 | 2 | 2019 |
| TTP Development | 2 | 2017 | 4 | 2017 |
| Operational Assessment (OA) | 4 | 2017 | 1 | 2018 |
| PRR/System Verification Review (SVR) | 1 | 2018 | 1 | 2018 |
| Capabilities Production Document (CPD) | 1 | 2018 | 1 | 2018 |
| LRIP Option 1 Exercised | 2 | 2018 | 2 | 2018 |
| MS C/DAB Down Select | 2 | 2018 | 2 | 2018 |
| PCA | 1 | 2019 | 1 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603611M / *Marine Corps Assault Vehicles* | **Project (Number/Name)**<br>0025 / *New Amphibious Vehicle* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Initial Operational Test & Evaluation (IOT&E)/Full Up System Level (FUSL) | 2 | 2019 | 1 | 2020 |
| LRIP Option 2 Exercised | 2 | 2019 | 2 | 2019 |
| FRP Decision | 2 | 2020 | 2 | 2020 |
| FRP Option Exercised | 2 | 2020 | 2 | 2020 |
| IOC | 4 | 2020 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603635M *I Marine Corps Grnd Cmbt/Supt Sys* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 31.102 | 1.362 | 1.342 | 0.623 | - | 0.623 | 1.444 | 1.436 | 1.358 | 1.383 | Continuing | Continuing |
| 1964: *Anti-Armor Weapon System* | 1.925 | 1.057 | 1.005 | 0.378 | - | 0.378 | 1.025 | 1.032 | 0.987 | 1.005 | Continuing | Continuing |
| 2614: *SMAW Follow-On* | 29.177 | 0.305 | 0.337 | 0.245 | - | 0.245 | 0.419 | 0.404 | 0.371 | 0.378 | Continuing | Continuing |

**Note**

The Joint Light Tactical Vehicle (JLTV) program, Project number 3209 transitioned to BA 04 PE 0605812M beginning in FY 2013.

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

This PE supports the demonstration and validation of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air-Ground Expeditionary Force amphibious operations. This program is funded under Demonstration & Validation because it develops and integrates hardware for experimental tests related to specific ground weapon systems.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 1.489 | 1.342 | 1.271 | - | 1.271 |
| Current President's Budget | 1.362 | 1.342 | 0.623 | - | 0.623 |
| Total Adjustments | -0.127 | - | -0.648 | - | -0.648 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.123 | - | | | |
| • SBIR/STTR Transfer | -0.004 | - | | | |
| • Program Adjustments | - | - | -0.093 | - | -0.093 |
| • Rate/Misc Adjustments | - | - | -0.555 | - | -0.555 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $0.549M to account for the availability of prior year execution balances. The decrease from FY15 to FY16 reflects re-phasing of development funds to better align with the revised program development schedules.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | Project (Number/Name)<br>1964 / *Anti-Armor Weapon System* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1964: *Anti-Armor Weapon System* | 1.925 | 1.057 | 1.005 | 0.378 | - | 0.378 | 1.025 | 1.032 | 0.987 | 1.005 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The M41A4 Saber system is the primary heavy, anti-armor launch system for the TOW Missile within the Ground Combat Element of the Marine Corps. The Anti-Armor Weapons System-Heavy (AAWS-H) program, working in concert with the U.S. Army, will develop and integrate technology improvements into the Improved Target Acquisition System (ITAS) to meet Increment II system requirements as jointly agreed. Improvements centered on integration of sight image enhancements were concluded in FY13. Other efforts have focused on providing engineering and technical support such as the study of densified propellant and Saber battery replacement for the Saber system (far-target location accuracy improvements). Battlefield networking communications capability and a laser designation capability have been postponed due to prioritization of Saber battery upgrade/replacement efforts.

The decrease in funding from FY15 to FY16 reflects re-phasing of development funds to better align with the revised program development schedules.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Densified Propellant | 0.498 | 0.200 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued investigation and qualification to use densified propellant. | | | | | |
| ***FY 2015 Plans:***<br>Continue the qualification of densified propellant. | | | | | |
| ***FY 2016 Base Plans:***<br>N/A | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Saber Battery Replacement | 0.385 | 0.805 | 0.378 | - | 0.378 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | **Project (Number/Name)**<br>1964 / *Anti-Armor Weapon System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Initiated research of a replacement battery for Saber to address safety concerns, while maintaining the same or increased capabilities for power and longevity.<br>***FY 2015 Plans:***<br>-Continue research of a replacement battery for Saber to address safety concerns, while maintaining the same or increased capabilities for power and longevity.<br>-Initiate testing of replacement battery.<br>***FY 2016 Base Plans:***<br>-Continue research of a replacement battery for Saber to address safety concerns, while maintaining the same or increased capabilities for power and longevity.<br>-Continue testing of replacement battery.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Test Launch Stand | 0.174 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Initiated investigation and qualification of a missile launch testing capability to qualify missiles without user or system error being introduced into the test.<br>***FY 2015 Plans:***<br>NA<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.057 | 1.005 | 0.378 | - | 0.378 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | **Project (Number/Name)**<br>1964 / *Anti-Armor Weapon System* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/3017: *Anti-Armor Weapon Systems-Heavy* | 1.125 | 1.589 | 0.668 | - | 0.668 | 1.437 | 1.334 | 1.376 | 1.260 | - | 144.270 |

**Remarks**

**D. Acquisition Strategy**

The Saber system is a joint program with the U.S. Army. In FYs14-16 funding supports the development, integration, and qualification of incremental improvements to meet objective requirements and assesses emergent technologies.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | Project (Number/Name)<br>1964 / *Anti-Armor Weapon System* | |

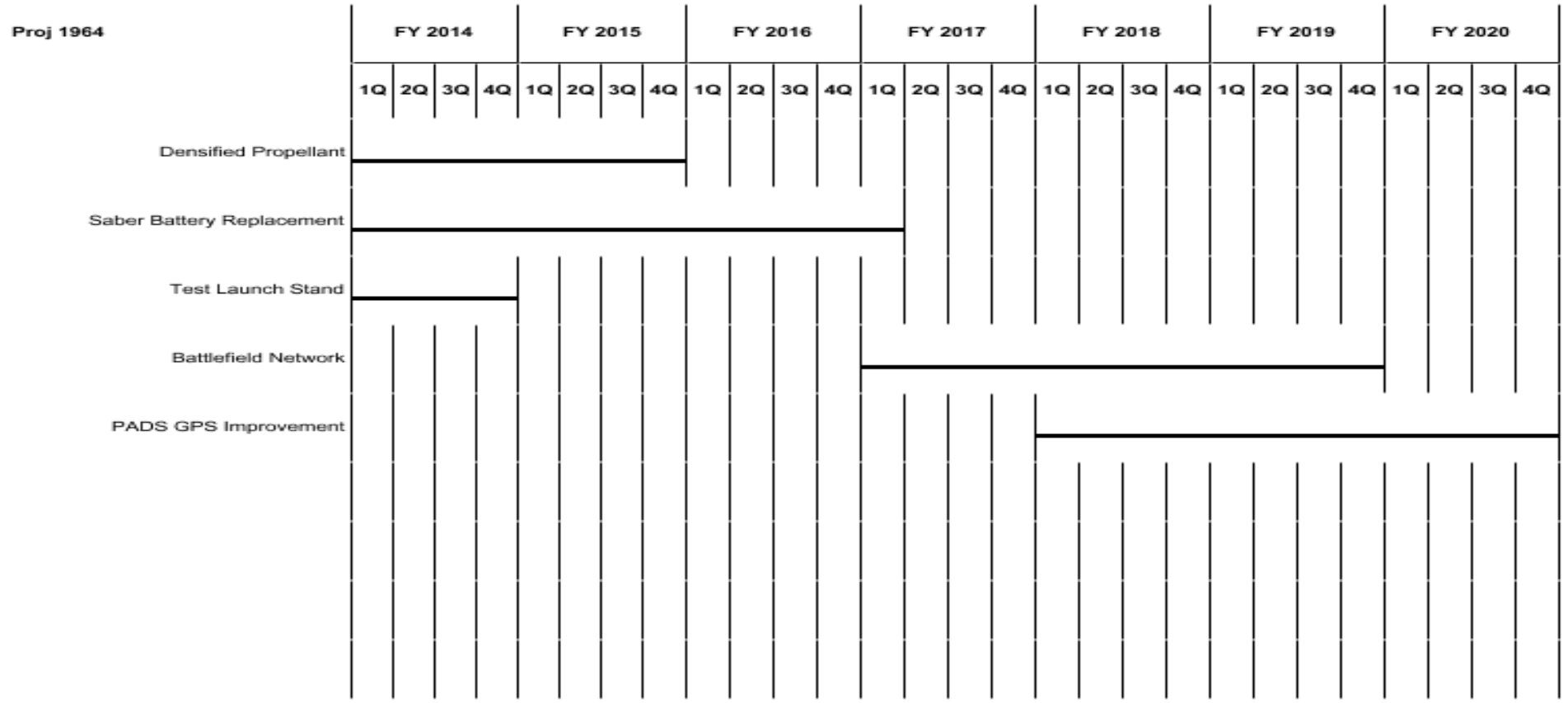
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anti Armor | WR | NSWC Indian Head : Indian Head, MD | 1.925 | 0.498 | Nov 2013 | 0.200 | Oct 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Anti Armor | WR | NSWC Crane : Crane, IN | 0.000 | 0.385 | Apr 2014 | 0.805 | Oct 2014 | 0.378 | Oct 2015 | - | | 0.378 | - | 1.568 | - |
| Anti Armor | WR | Yumas Test Ground : Yuma, AZ | 0.000 | 0.174 | Feb 2014 | - | | - | | - | | - | - | 0.174 | - |
| | | **Subtotal** | 1.925 | 1.057 | | 1.005 | | 0.378 | | - | | 0.378 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1.925 | 1.057 | | 1.005 | | 0.378 | | - | | 0.378 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | **Project (Number/Name)**<br>1964 / *Anti-Armor Weapon System* |




*2016DON - 0603635M - 1964*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | **Project (Number/Name)**<br>1964 / *Anti-Armor Weapon System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1964*** | | | | |
| Densified Propellant: Densified Propellant | 1 | 2014 | 4 | 2015 |
| Saber Battery Replacement: Saber Battery Replacement | 1 | 2014 | 1 | 2017 |
| Test Launch Stand: Test Launch Stand | 1 | 2014 | 4 | 2014 |
| Battlefield Network: Battlefield Network | 1 | 2017 | 4 | 2019 |
| PADS GPS Improvement: PADS GPS Improvement | 1 | 2018 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | Project (Number/Name)<br>2614 / *SMAW Follow-On* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2614: *SMAW Follow-On* | 29.177 | 0.305 | 0.337 | 0.245 | - | 0.245 | 0.419 | 0.404 | 0.371 | 0.378 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The mission of the SMAW Mod 2 is to provide short-range assault fires in support of infantry forces attacking fortified positions and urban structures under all field and environmental conditions. This includes employment under Mission Oriented Protective Posture (MOPP) IV Level Chemical, Biological, Radiological and Nuclear (CBRN) conditions. The SMAW Mod 2 consists of a new SMAW launcher that will be physically and functionally compatible with all current SMAW ammunition variants. Additionally, work is being performed to develop new propellant technologies for an enhanced rocket motor.

In FY15, Full Rate Production of the SMAW Mod 2 launcher will begin and work will continue on the Densified Propellant. In FY16, work will be continued on the further development and integration of Densified Propellant into the SMAW rocket motor in support of future fire from enclosure capability.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Engineer and technical support. | 0.205 | 0.337 | 0.245 | - | 0.245 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Initiated engineering support for the development and testing of the Densified Propellant. | | | | | |
| ***FY 2015 Plans:***<br>Continue engineering support for the development and testing of the Densified Propellant. | | | | | |
| ***FY 2016 Base Plans:***<br>Continue engineering support for the development and testing of the Densified Propellant. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Operational test support planning and document preparation | 0.100 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Conducted and reported the results of the SMAW Mod 2 launcher IOT&E; provided operational test expertise to all programmatic and technical reviews. | | | | | |
| ***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | **Project (Number/Name)**<br>2614 / *SMAW Follow-On* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.305 | 0.337 | 0.245 | - | 0.245 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/301600: *Follow on to SMAW* | 0.105 | 4.867 | 4.872 | - | 4.872 | 24.907 | 25.245 | - | - | - | 124.203 |

**Remarks**

**D. Acquisition Strategy**

FY14-16 strategy is to complete development and qualification of the SMAW MOD 2 system (i.e. new SMAW Launcher).

**E. Performance Metrics**

Milestone Reviews; Technical Reviews.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | **Project (Number/Name)**<br>2614 / *SMAW Follow-On* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year Cumulative Funding | Various | various : various | 1.748 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.748 | - | | - | | - | | - | | - | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year Cumulative Funding | Various | various : various | 16.300 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Engineering & Technical Support | WR | NSWC Indian Head : Indian Head, VA | 0.324 | 0.205 | Aug 2014 | 0.337 | Dec 2014 | 0.245 | Dec 2015 | - | | 0.245 | - | 1.111 | - |
| | | **Subtotal** | 16.624 | 0.205 | | 0.337 | | 0.245 | | - | | 0.245 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Testing & Support | WR | Marine Corps Operational Test & Eval Activity : Quantico, VA | 5.064 | 0.100 | Jan 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Prior year cumulative funding | Various | various : various | 0.326 | - | | - | | - | | - | | - | - | 0.326 | - |
| | | **Subtotal** | 5.390 | 0.100 | | - | | - | | - | | - | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | Project (Number/Name)<br>2614 / *SMAW Follow-On* | |

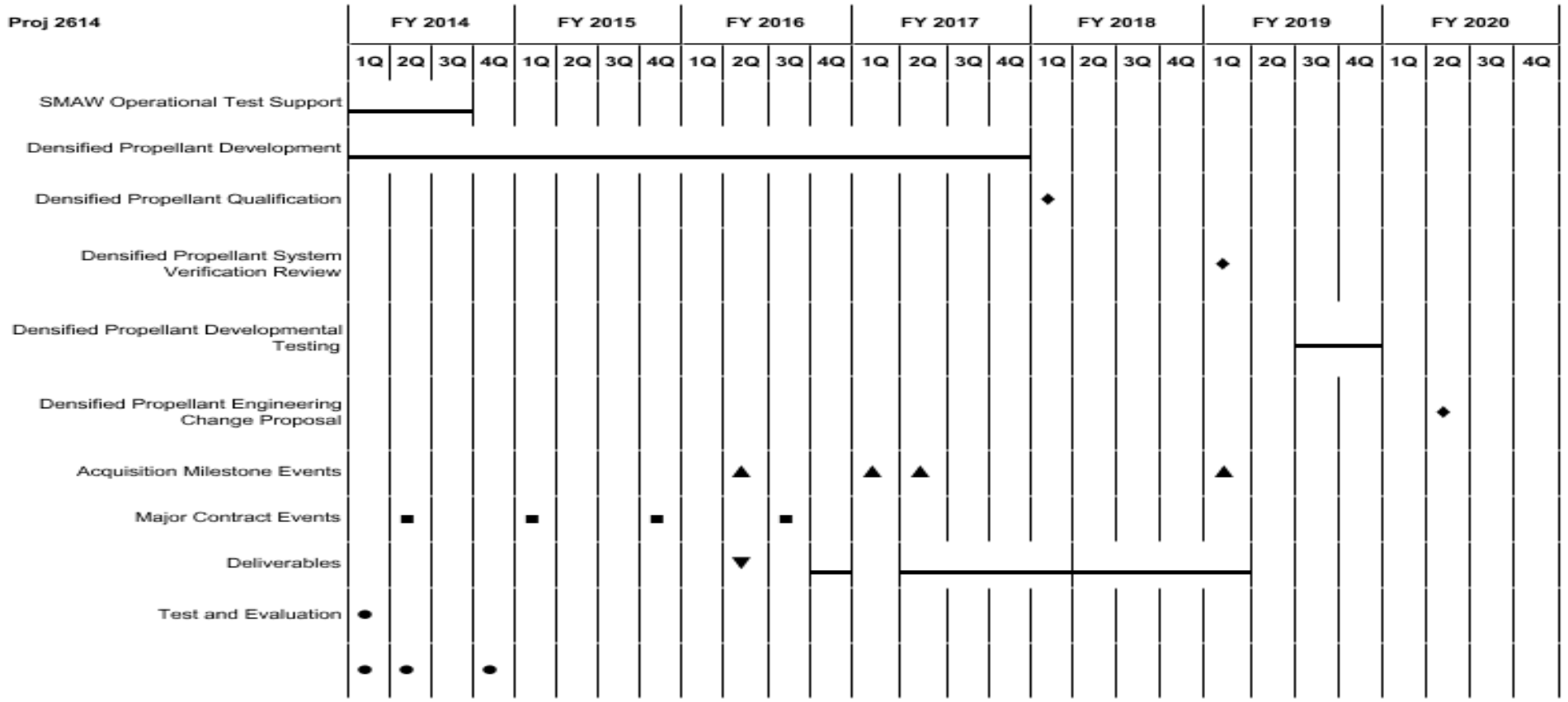
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year cumulative funding | Various | various : various | 5.415 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 5.415 | - | | - | | - | | - | | - | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 29.177 | 0.305 | | 0.337 | | 0.245 | | - | | 0.245 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | **Project (Number/Name)**<br>2614 / *SMAW Follow-On* |




*2016OSD - 0603635M - 2614*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | **Project (Number/Name)**<br>2614 / *SMAW Follow-On* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2614*** | | | | |
| SMAW Operational Test Support: SMAW Operational Test Support | 1 | 2014 | 3 | 2014 |
| Densified Propellant Development: Densified Propellant Development | 1 | 2014 | 4 | 2017 |
| Densified Propellant Qualification: Densified Propellant Qualification | 1 | 2018 | 1 | 2018 |
| Densified Propellant System Verification Review: Densified Propellant System Verification Review | 1 | 2019 | 1 | 2019 |
| Densified Propellant Developmental Testing: Densified Propellant Developmental Testing | 3 | 2019 | 4 | 2019 |
| Densified Propellant Engineering Change Proposal: Densified Propellant Engineering Change Proposal | 2 | 2020 | 2 | 2020 |
| Acquisition Milestone Events: Milestone C | 2 | 2016 | 2 | 2016 |
| Acquisition Milestone Events: Full Rate Production | 1 | 2017 | 1 | 2017 |
| Acquisition Milestone Events: Initial Operational Capability | 2 | 2017 | 2 | 2017 |
| Acquisition Milestone Events: Full Operational Capability | 1 | 2019 | 1 | 2019 |
| Major Contract Events: Request for Information Release | 2 | 2014 | 2 | 2014 |
| Major Contract Events: Request for Proposal | 1 | 2015 | 1 | 2015 |
| Major Contract Events: Contract Award | 4 | 2015 | 4 | 2015 |
| Major Contract Events: Final Contractor Award Downselect | 3 | 2016 | 3 | 2016 |
| Deliverables: Production Representative Articles | 2 | 2016 | 2 | 2016 |
| Deliverables: First Article Test | 4 | 2016 | 4 | 2016 |
| Deliverables: Lot 1 | 2 | 2017 | 1 | 2018 |
| Deliverables: Lot 2 | 2 | 2018 | 1 | 2019 |
| Test and Evaluation: Operational Test Readiness Review | 1 | 2014 | 1 | 2014 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603635M / *Marine Corps Grnd Cmbt/ Supt Sys* | **Project (Number/Name)**<br>2614 / *SMAW Follow-On* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test and Evaluation: Developmental Test/Operation Test | 1 | 2014 | 1 | 2014 |
| Test and Evaluation: Initial Operational Test and Evaluation | 2 | 2014 | 2 | 2014 |
| Test and Evaluation: Test and Evaluation Master Plan Update | 4 | 2014 | 4 | 2014 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603654N *I JT Service Explosive Ordn Dev* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 507.261 | 34.773 | 21.384 | 18.260 | - | 18.260 | 41.524 | 38.263 | 33.914 | 34.599 | Continuing | Continuing |
| 0377: *JT Service Expl Ord Disp System* | 330.451 | 15.470 | 10.197 | 6.077 | - | 6.077 | 15.198 | 13.665 | 11.650 | 11.889 | Continuing | Continuing |
| 1317: *EOD Diving System* | 100.867 | 2.585 | 2.050 | 2.612 | - | 2.612 | 5.528 | 5.119 | 4.498 | 4.588 | Continuing | Continuing |
| 4023: *VSW MCM/Force Protection UUV* | 75.943 | 16.718 | 9.137 | 9.571 | - | 9.571 | 20.798 | 19.479 | 17.766 | 18.122 | Continuing | Continuing |

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

This is a Joint Service Program. This program provides for the development of Explosive Ordnance Disposal tools and equipment for use by all military services. The responsibility is assigned to the Navy as single service manager, by Department of Defense Directive 5160.62 of 26 April 1989, for management of the Joint Service Explosive Ordnance Disposal Research and Development Program. Proliferation of sophisticated types of foreign and domestic ordnance and Improvised Explosive Devices necessitate a continuing development program to provide Explosive Ordnance Disposal personnel of all military services with the special equipment and tools required to support this mission. This program also provides life support related equipment necessary to support the performance of Navy Explosive Ordnance Disposal tasks underwater. This equipment must have inherently low acoustic and magnetic signatures in order to allow the Explosive Ordnance Disposal technician to safely approach, render-safe and dispose of sea mines and other underwater ordnance. This program also provides force protection of all military services against Radio Controlled Improvised Explosive Devices (RCIED) to prevent initiation. The Navy has been designated as DOD Executive Agent and Single Manager for Military Ground-Based Counter Radio-Controlled Improvised Explosive Electronic Warfare (CREW) Technology by DOD Directive 5101.14 of 11 June 2007, requiring RDT&E to develop capabilities that meet joint requirements.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 34.958 | 21.399 | 29.982 | - | 29.982 |
| Current President's Budget | 34.773 | 21.384 | 18.260 | - | 18.260 |
| Total Adjustments | -0.185 | -0.015 | -11.722 | - | -11.722 |
| • Congressional General Reductions | - | -0.015 | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.185 | - | | | |
| • Program Adjustments | - | - | 1.044 | - | 1.044 |
| • Rate/Misc Adjustments | - | - | -12.766 | - | -12.766 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603654N *I JT Service Explosive Ordn Dev* |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $8.6 million to account for the availability of prior year execution balances.

Program Adjustments: FY16 $11.722M in Other Rate Adjustments.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603654N / *JT Service Explosive Ordn Dev* | Project (Number/Name)<br>0377 / *JT Service Expl Ord Disp System* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0377: *JT Service Expl Ord Disp System* | 330.451 | 15.470 | 10.197 | 6.077 | - | 6.077 | 15.198 | 13.665 | 11.650 | 11.889 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Provides Explosive Ordnance Disposal personnel of all military services with the specialized equipment and tools required to support their mission of detection/location, identification, render-safe, recovery, field and laboratory evaluation, and disposal of unexploded ordnance (UXO) that is a threat to military operations, installations, personnel, or material. UXO includes foreign and domestic, both conventional and non-conventional, including Improvised Explosive Devices (IEDs). High Fidelity Weapons Mass Destruction performs detection and identification of hazardous materials contained in devices using radiological and biological means. Advanced EOD Robot System (AEODRS) consists of multiple interoperable robot systems. The first class of robot and the architecture for the system will be developed first, then the other classes of robots will be developed.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** EOD FUTURE RADIOGRAPHIC SYSTEMS (FRS) AND EOD DECISION SUPPORT SYSTEMS (DSS) | 5.227 | 1.762 | 1.643 | - | 1.643 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued improvements to the JEOD Decision Support System (DSS) based upon user input, development of the Future Radiographic Systems (FRS) and provide Analysis of Alternatives for warfighter initiated improvements. | | | | | |
| ***FY 2015 Plans:***<br>Continue improvements to the JEOD Decision Support System (DSS) based on prioritized user input, and provide Analysis of Alternatives for warfighter initiated improvements. | | | | | |
| ***FY 2016 Base Plans:***<br>Continue limited improvements to JEOD Decision Support System (DSS) based on user input, provide Analysis of Alternatives for warfighter initiated improvements and conduct procurement, testing and evaluation of potential commercial non-development items (CNDI) meeting EOD warfighter needs. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** HIGH FIDELITY WEAPONS MASS DESTRUCTION (WMD) IDENTIFICATION AND DETECTION | 0.610 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>0377 / *JT Service Expl Ord Disp System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Continued to develop Weapons Mass Destruction (WMD) family of systems focused on development of the Explosives Identification Kit (ID).<br>***FY 2015 Plans:***<br>Evaluate WMD & Detection subsystems maturity for integration into single system to meet requirements.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** EOD ROBOTICS | 8.633 | 7.435 | 4.234 | - | 4.234 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued development of Advanced EOD Robotic Systems Increments 1,2 and 3 to fill capability gap and to replace existing EOD Robotic Platforms.<br>***FY 2015 Plans:***<br>Expand Advanced EOD Robotics Increment 1 architecture for use in Increments 2 & 3 resulting in prototype development and testing.<br>***FY 2016 Base Plans:***<br>Conduct development and test of Advanced EOD Robotics System Increments 1 first articles. Continue development of Advanced EOD Robotics System Increments 2 only.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** TCM AN/PLT-XXX SYSTEMS | 1.000 | 1.000 | 0.200 | - | 0.200 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued upgrades to EOD TCM loadsets to account for continually changing threats.<br>***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>0377 / *JT Service Expl Ord Disp System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Development of loadsets beyond current threater. Upgrade current theater loadsets to remain current with continually changing threats.<br>***FY 2016 Base Plans:***<br>Continue limited loadset upgrades for fielded EOD TCM systems to remain current with continually changing threats.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 15.470 | 10.197 | 6.077 | - | 6.077 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/5509: *EOD Equipment (VN075)* | 8.080 | - | 12.712 | - | 12.712 | 18.655 | 6.721 | 9.050 | 9.360 | - | 74.381 |

**Remarks**

**D. Acquisition Strategy**

Analysis of Alternatives (AOA) studies are always conducted prior to the initiation of new subprojects. The AOA addresses and emphasizes acquisition strategies of the most cost-effective solution over the subprojects' life-cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modification), non-developmental item (including modification), and lastly, developmental programs. Contracting for RDT&E, if required, is always competitive and when feasible, production options are included.

**E. Performance Metrics**

Processed 35 Joint Service EOD Decision Support System (DSS) change requests resulting in the release of 3718 Mobile Field Kit and Publication Suite Software copies to the Joint Services including USN. Completed TCM, AN/PLT-5 loadset upgrade for EOD use in-theatre based upon new IED/UXO threats seen during operations. Released AEODRS Increment 1 request for proposal (RFP). FRS first article acceptance and achieved full rate production. Completed ECPs to increase MTRS MK2 capability (added 360 degree camera and -universal real-time data & display (UDAD) kit, vision and fast pan & tilt camera and replaced existing data radio with suitable for rest of world. Completed AoA for Advanced Ordnance Locator.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603654N / *JT Service Explosive Ordn Dev* | Project (Number/Name)<br>0377 / *JT Service Expl Ord Disp System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | EODTD : Indian Head, MD | 142.193 | 7.704 | Oct 2013 | 5.684 | Oct 2014 | 2.977 | Oct 2015 | - | | 2.977 | Continuing | Continuing | Continuing |
| Software Development | WR | EODTD : Indian Head, MD | 25.234 | 2.700 | Oct 2013 | 1.528 | Oct 2014 | 1.000 | Oct 2015 | - | | 1.000 | Continuing | Continuing | Continuing |
| ILS | WR | EODTD : Indiah Head, MD | 47.090 | 1.000 | Oct 2013 | 0.500 | Oct 2014 | 0.450 | Oct 2015 | - | | 0.450 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 214.517 | 11.404 | | 7.712 | | 4.427 | | - | | 4.427 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | ITT : Arlington, VA | 6.997 | 0.436 | Oct 2013 | 0.500 | Oct 2014 | 0.250 | Oct 2015 | - | | 0.250 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 6.997 | 0.436 | | 0.500 | | 0.250 | | - | | 0.250 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | EODTD : Indian Head, MD | 72.849 | 2.630 | Oct 2013 | 1.000 | Oct 2014 | 0.600 | Oct 2015 | - | | 0.600 | Continuing | Continuing | Continuing |
| Operation Test & Evaluation | WR | EODTD : Indian Head, MD | 10.483 | 0.500 | Oct 2013 | 0.500 | Oct 2014 | 0.500 | Oct 2015 | - | | 0.500 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 83.332 | 3.130 | | 1.500 | | 1.100 | | - | | 1.100 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603654N / *JT Service Explosive Ordn Dev* | Project (Number/Name)<br>0377 / *JT Service Expl Ord Disp System* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Manangement Support | WR | EODTD : Indian Head, MD | 9.153 | 0.500 | Oct 2013 | 0.485 | Oct 2014 | 0.300 | Oct 2015 | - | | 0.300 | Continuing | Continuing | Continuing |
| Miscellaneous | WR | EODTD : Indian Head, MD | 16.452 | - | Oct 2013 | - | Oct 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 25.605 | 0.500 | | 0.485 | | 0.300 | | - | | 0.300 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 330.451 | 15.470 | | 10.197 | | 6.077 | | - | | 6.077 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>0377 / *JT Service Expl Ord Disp System* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>0377 / *JT Service Expl Ord Disp System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0377*** | | | | |
| Title: EOD DECISION SUPPORT SYSTEM | 1 | 2014 | 4 | 2020 |
| DSS Continous Improvement | 1 | 2014 | 4 | 2020 |
| Title: ELECTRONIC SAFE/ARM FUZE - IED/UXO | 1 | 2014 | 4 | 2014 |
| Technology Evaluation & Development | 1 | 2014 | 4 | 2014 |
| Title: TCM, AN/PLT-XXX (CLASSIFIED III) | 1 | 2014 | 4 | 2020 |
| AN/PLT-XXX Continous Improvement | 1 | 2014 | 4 | 2020 |
| Title: EOD FUTURE RADIOGRAPHIC SYSTEM | 1 | 2014 | 4 | 2015 |
| Production | 1 | 2014 | 4 | 2015 |
| Increment I (DEV) | 1 | 2014 | 4 | 2014 |
| Increment I (TEST) | 2 | 2014 | 1 | 2015 |
| Title: JS EOD WMD | 1 | 2014 | 4 | 2020 |
| Research | 1 | 2014 | 4 | 2014 |
| WMD Testing | 1 | 2014 | 4 | 2014 |
| Procurement | 3 | 2014 | 2 | 2015 |
| Increment I (RESEARCH/TESTING) | 1 | 2014 | 4 | 2020 |
| Increment I (PROD READNESS MODEL) | 1 | 2019 | 4 | 2020 |
| Title: ADVANCED EOD ROBOT SYSTEM | 1 | 2014 | 4 | 2020 |
| Testing (#1) | 1 | 2014 | 3 | 2016 |
| Production Decision (INCREMENT #1) | 4 | 2016 | 4 | 2016 |
| Development (INCREMENT # 2 & 3) | 1 | 2014 | 3 | 2019 |
| Testing (INCREMENT # 2 & 3) | 2 | 2016 | 3 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>0377 / *JT Service Expl Ord Disp System* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Production (INCREMENT 1, 2 & 3) | 4 | 2016 | 4 | 2020 |
| Continous Improvement 3 | 1 | 2017 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603654N / *JT Service Explosive Ordn Dev* | Project (Number/Name)<br>1317 / *EOD Diving System* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1317: *EOD Diving System* | 100.867 | 2.585 | 2.050 | 2.612 | - | 2.612 | 5.528 | 5.119 | 4.498 | 4.588 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Provides for development of Diver Safety/Life Support Equipment, Advanced Diver Integrated Sensors and Advanced Firing Systems to support Navy Explosive Ordnance Disposal (EOD) underwater operations and Expeditionary MCM Company establishment by US Fleet Forces Command. The equipment must have inherently low acoustic and magnetic signatures in order to allow the EOD divers to safely approach, render-safe, recover, exploit, and dispose of underwater explosive threats to include sea mines, limpet mines, underwater improvised explosive devices, and unexploded ordnance.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** DIVER SAFETY & LIFE SUPPORT SYSTEMS | 1.056 | 1.600 | 2.362 | - | 2.362 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** Diver Safety & Life Support Systems: Develop diver safety tools to include more capable life support systems for EOD, and Mobile Diving & Salvage Units (MDSU) operations. Specific tools include but are not limited to Underwater Breathing Apparatus (UBA), specialized dive masks, heads-up displays, emergency life support systems and the ability to train divers and to evaluate Mine Countermeasures (MCM)/Explosive Ordnance Disposal (EOD) tools, tactics and procedures with regard to influence cleanliness against sea mines both at home and in controlled threat areas prior to commencing EOD operations.

***FY 2014 Accomplishments:***
Continued the EOD UBA AoA acquisition efforts to develop, test, and field future Expeditionary Mine Countermeasures (EUMCM) systems in accordance with approved OPNAV requirements.

***FY 2015 Plans:***
Continue EOD UBA acquisition initiative and develop improvements to Mine Warfare EOD Training and Readiness Evaluation Systems (METRES) tool set.

***FY 2016 Base Plans:***
Enter engineering and manufacturing development phase in progressing towards a production decision. Continue development, testing and evaluation of METRES product improvements.

***FY 2016 OCO Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>1317 / *EOD Diving System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** ADVANCED DIVER INTEGRATED SENSORS | 0.901 | 0.399 | 0.200 | - | 0.200 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop Advanced Diver Integrated Sensors equipment to enhance EOD and MDSU ability to detect, access, neutralize and gather intelligence on underwater targets of interest. Requirements include Diver Hull Inspection Navigation System (DHINS) and improvements to the Underwater Imaging System (UIS).<br>***FY 2014 Accomplishments:***<br>Continued CIP integration with DHINS. Prepared documentation for initiation of UIS product improvement drawing on results of (AOA) conducted in FY13.<br>***FY 2015 Plans:***<br>Enter into risk reduction phase for the development of the next generation Advanced Integrated Sensor System for EOD divers as a replacement of the UIS. Continue CIP integration with DHINS.<br>***FY 2016 Base Plans:***<br>Initiate acquisition program for the next generation Advanced Integrated Sensor System for Expeditionary MCM forces.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** ADVANCED FIRING SYSTEM | 0.628 | 0.051 | 0.050 | - | 0.050 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develops product improvements to existing systems for below and above water neutralization of underwater threats to support EOD and MDSU operations.<br>***FY 2014 Accomplishments:***<br>Continued development, testing and evaluation of miniaturized Acoustic Firing Control Transmitter (AFCT).<br>***FY 2015 Plans:***<br>Begin fielding miniaturized AFCT to meet approved inventory objectives. Analyze and develop alternatives for improvement to acoustic firing device (AFD) receivers.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>1317 / *EOD Diving System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Complete testing, evaluation and fielding of AFCTs, and begin development and testing of product improvement to AFD receiver subsystems.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.585 | 2.050 | 2.612 | - | 2.612 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/0977a: *Underwater EOD Program (Cost Code UQ034)* | 4.588 | 1.000 | 1.000 | - | 1.000 | 2.180 | 1.540 | 2.000 | 1.785 | - | 34.250 |
| • OPN/0977b: *UW EOD (UQ036)* | 2.000 | - | 0.338 | - | 0.338 | 1.650 | 0.805 | 2.500 | 8.410 | - | 16.903 |

**Remarks**

**D. Acquisition Strategy**

Analysis of Alternatives (AOA) studies are always conducted prior to the initiation of new sub-projects. The AOA addresses and emphasizes acquisition strategies of the most cost-effective solution over the sub-projects life-cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modification), non-developmental item (including modification), and lastly, developmental programs. Contracting for RDT&E, if required, is always competitive and when feasible, production options are included.

**E. Performance Metrics**

Research and Develop technologies for the design of Diver Safety Systems, Advanced Diver Integrated Sensors and Advanced Underwater Firing Systems used to render safe, recover, exploit, and dispose of sea limpet mines and unexploded ordnance.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603654N / *JT Service Explosive Ordn Dev* | Project (Number/Name)<br>1317 / *EOD Diving System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | EODTECHDIV : IH, MD | 40.612 | 0.654 | Oct 2013 | 0.470 | Oct 2014 | 0.467 | Oct 2015 | - | | 0.467 | Continuing | Continuing | Continuing |
| Software Development | WR | EODTECHDIV : IH MD | 4.299 | 0.218 | Oct 2013 | 0.250 | Oct 2014 | 0.689 | Oct 2015 | - | | 0.689 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | EODTECHDIV : IH MD | 8.228 | - | | - | | - | | - | | - | - | 8.228 | - |
| ILS | WR | EODTECHDIV : IH MD | 11.916 | - | | - | | - | | - | | - | - | 11.916 | - |
| Systems Engineering | WR | NSWC : Panama City | 1.537 | 0.191 | Oct 2013 | 0.200 | Oct 2014 | 0.300 | Oct 2015 | - | | 0.300 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | SPAWAR : San Diego | 2.881 | 0.381 | Oct 2013 | 0.192 | Oct 2014 | 0.180 | Oct 2015 | - | | 0.180 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 69.473 | 1.444 | | 1.112 | | 1.636 | | - | | 1.636 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support1 | C/CPFF | ITT : Arlington VA | 3.537 | - | | - | | - | | - | | - | - | 3.537 | - |
| Program Management Support2 | C/CPFF | ITT : Arlington VA | 3.150 | 0.221 | Oct 2013 | 0.250 | Oct 2014 | 0.250 | Oct 2015 | - | | 0.250 | Continuing | Continuing | Continuing |
| Integrated Logistics Support | WR | Not Specified : Not Specified | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Configuration Management | WR | Not Specified : Not Specified | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Technical Data | WR | Not Specified : Not Specified | 0.000 | - | | - | | - | | - | | - | - | - | - |
| GFE | WR | Not Specified : Not Specified | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Award Fees | WR | Not Specified : Not Specified | 0.000 | - | | - | | - | | - | | - | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603654N / *JT Service Explosive Ordn Dev* | Project (Number/Name)<br>1317 / *EOD Diving System* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 6.687 | 0.221 | | 0.250 | | 0.250 | | - | | 0.250 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | WR | EODTECHDIV : IH MD | 6.914 | 0.572 | Oct 2013 | 0.356 | Oct 2014 | 0.338 | Oct 2015 | - | | 0.338 | Continuing | Continuing | Continuing |
| Operational Test & Evaluation | WR | EODTECHDIV : IH MD | 1.560 | - | | - | | - | | - | | - | - | 1.560 | - |
| | | **Subtotal** | 8.474 | 0.572 | | 0.356 | | 0.338 | | - | | 0.338 | - | - | - |

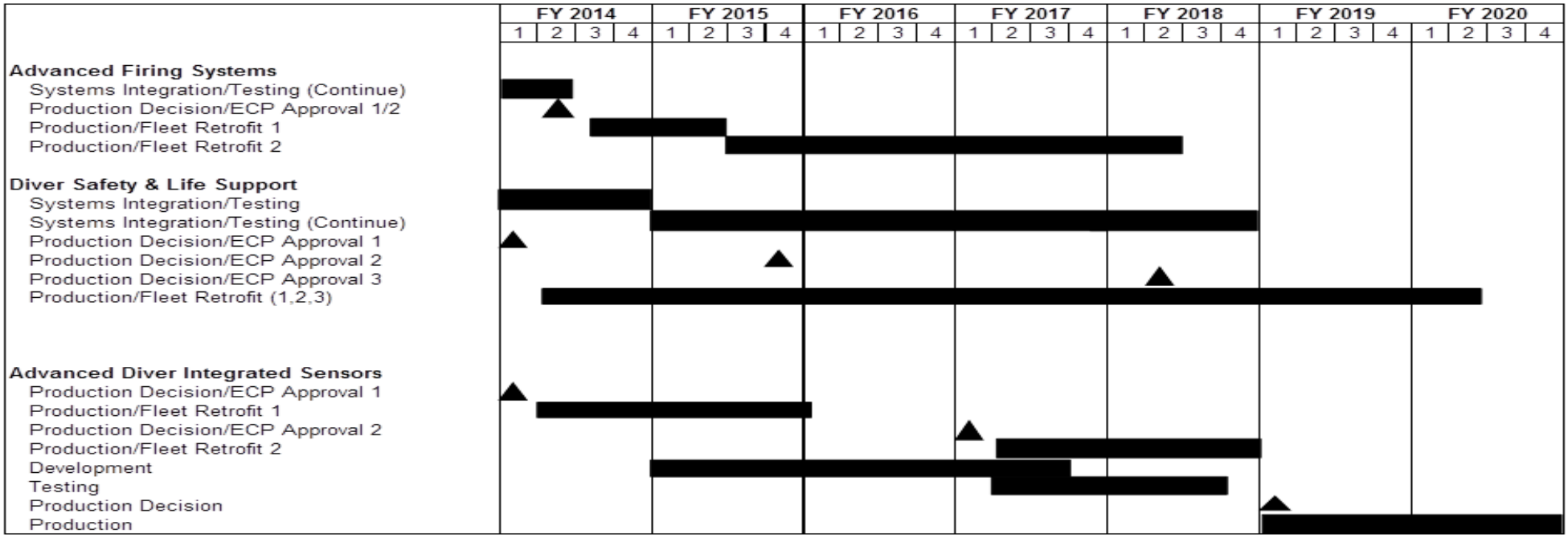
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | EODTECHDIV : IH MD | 9.373 | 0.252 | Oct 2013 | 0.332 | Oct 2014 | 0.328 | Oct 2015 | - | | 0.328 | - | 10.285 | - |
| Miscellaneous | WR | NSWC, Activities : Not Specified | 6.847 | 0.096 | Oct 2013 | - | Oct 2014 | 0.060 | Oct 2015 | - | | 0.060 | - | 7.003 | - |
| Acquisition Workforce Fund | Various | Various : Various | 0.013 | - | | - | | - | | - | | - | - | 0.013 | - |
| | | **Subtotal** | 16.233 | 0.348 | | 0.332 | | 0.388 | | - | | 0.388 | - | 17.301 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 100.867 | 2.585 | | 2.050 | | 2.612 | | - | | 2.612 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>1317 / *EOD Diving System* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>1317 / *EOD Diving System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1317*** | | | | |
| Title: ADVANCED FIRING SYSTEMS | 1 | 2019 | 4 | 2019 |
| Systems Integration/Testing (Continue) | 1 | 2014 | 2 | 2014 |
| Production Decision/ECP Approval 1/2 | 2 | 2014 | 2 | 2014 |
| Production/Fleet Retrofit 1 | 3 | 2014 | 2 | 2015 |
| Production/Fleet Retrofit 2 | 3 | 2015 | 2 | 2018 |
| Title: DIVER SAFETY & LIFE SUPPORT | 1 | 2019 | 4 | 2019 |
| Systems Integration/Testing | 1 | 2014 | 4 | 2014 |
| System Integration/Testing (Continue) | 1 | 2015 | 4 | 2018 |
| "Production Decision/ECP Approval 1" | 1 | 2014 | 1 | 2014 |
| "Production Decision/ECP Approval 2" | 4 | 2015 | 4 | 2015 |
| Production Decision/ECP Approval 3 | 2 | 2018 | 2 | 2018 |
| Production/Fleet Retrofit (1,2,3) | 2 | 2014 | 2 | 2020 |
| Title: ADVANCED DIVER INTEGRATED SENSORS | 1 | 2019 | 4 | 2019 |
| Production Decision/ECP Approval 1 | 1 | 2014 | 1 | 2014 |
| Production/Fleet Retrofit 1 | 2 | 2014 | 4 | 2015 |
| Production Decision/ECP Approval 2 | 1 | 2017 | 1 | 2017 |
| Production/Fleet Retrofit 2 | 2 | 2017 | 4 | 2018 |
| Development | 1 | 2015 | 3 | 2017 |
| Testing | 2 | 2017 | 3 | 2018 |
| Production Decision | 1 | 2015 | 1 | 2015 |
| Production | 1 | 2019 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603654N / *JT Service Explosive Ordn Dev* | Project (Number/Name)<br>4023 / *VSW MCM/Force Protection UUV* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4023: *VSW MCM/Force Protection UUV* | 75.943 | 16.718 | 9.137 | 9.571 | - | 9.571 | 20.798 | 19.479 | 17.766 | 18.122 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Provides for development of affordable expeditionary, unmanned underwater systems to support Navy Expeditionary forces including Explosive Ordnance (EOD). Mobile Diving and Salvage Units, and Shallow Water (SW), Very Shallow Water (VSW) and Underwater Mine Countermeasures (UMCM) mission operations. The equipment must be highly portable in order to support the Navy EOD technician to safely approach, render safe, recover, exploit and dispose of underwater explosive threats to include sea mines, limpet mines and unexploded ordnance. Provides support for the Navy's high priority missions of Maritime Homeland Defense, MCM, including clandestine reconnaissance and mine clearance in support of amphibious operations. Development of Expeditionary UUV systems to support localization render-safe and detailed intelligence gathering of UXO including Underwater Improvised Explosive Devices. This project supports CNO N957 MCM UUV Roadmap.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** VSW MCM/Force Protection UUV | 16.718 | 9.137 | 9.571 | - | 9.571 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** This program supports development, testing and Fleet approval for evolving generations of affordable, expeditionary Unmanned Underwater Vehicles (UUV), support equipment, and Common Operator Interface Navy (COIN) systems to address validated requirements in support of Expeditionary SW and VSW UMCM mission areas. Mission areas include: open and confined areas, hulls, piers and pilings to search, classify, map, re-acquire, identify, and neutralize sea and limpet mines and underwater improvised explosive devices.

***FY 2014 Accomplishments:***

FY14 plans leveraged prior UOES testing and ONR Science and Technology (S&T) investments in standoff neutralization capabilities to prepare for initiation of a 1st increment of UUV-Neutralization (UUV-N program) to counter naval mines and other underwater explosive threats. Developed Joint Capability Integration Development System (JCIDS) documentation as required to support future improvements. Continued to enhance the MK 18 MOD 2 MCM UUV's and the MK 19 MOD 0 HULS with pre-planned product improvements to meet approved OPNAV operational requirements. UOES and RCT&E were used to validate operational capabilities.

***FY 2015 Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>4023 / *VSW MCM/Force Protection UUV* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue to develop, test and evaluate mature technology solutions to support integration into block upgrades via ECP retrofits to fielded MK 18 MOD 1 UUV and HULS, and to development and execution of MK 18 MOD 2 UUV systems capability increments, and Neutralization systems. Plan and execute structured UOES and requirements compliance testing and evaluation associated with program execution (RCT&E) to evaluate effectiveness, supportability and suitability of prototype block upgrade retrofit kits.<br>***FY 2016 Base Plans:***<br>Continue testing evaluation, fielding and installation of MK 18 MOD 1 and MOD 2 UUV Systems to meet US Fleet Forces Command inventory objectives in support of the Expeditionary MCM Company capability establishment. Continue testing and evaluation of MK 18 UUV family of systems (FoS) capability increments and HULS ECP product improvements. Initiate acquisition of Expeditionary UUV Neutralization System (EUNS) program to develop standoff explosives threat object investigation, assessment, neutralization and battle damage assessment capabilities.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 16.718 | 9.137 | 9.571 | - | 9.571 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/0977: *Underwater EOD Program (Cost Code UQ034)* | 14.400 | 41.362 | 33.706 | - | 33.706 | 12.296 | 31.204 | 28.471 | 23.493 | - | 215.152 |

**Remarks**

**D. Acquisition Strategy**

Analysis of Alternatives (AOA) studies are always conducted prior to the initiation of new sub-projects. The AOA addresses and emphasizes acquisitions strategies of the most cost-effective solution over the sub-projects' life -cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modifications), non-developmental item (including modifications), and lastly, developmental programs. Contracting for RDT&E, if required is always competitive and when feasible, production options are included.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>4023 / *VSW MCM/Force Protection UUV* |

This ongoing program capitalizes on a User Operational Evaluation System (UOES) effort involving Fleet operators engaged in tactical experimentation with prototype UUVs prior to fielding baseline systems and capability improvement package increments. These UUV operators also participate in detailed requirements analyses and definition. Operational capabilities with UUV have been realized at designated operational units, with a competitive acquisition strategy. The addition of enhanced capabilities through an evolutionary acquisition approach to the UUV toolbox is programmed for delivery in accordance with approved CNO requirements and ONR TTAs. Further improvements to the toolbox to add basic mine and underwater explosive threats neutralization capabilities will be pursued.

**E. Performance Metrics**

Research and Develop technologies for the design of Unmanned Underwater Systems to provide enhanced fleet capabilities to locate, classify, identify, assess, neutralize and conduct post-neutralization battle damage assessment/verification ofd mines and unexploded ordnance.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603654N / *JT Service Explosive Ordn Dev* | Project (Number/Name)<br>4023 / *VSW MCM/Force Protection UUV* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | Multiple Activites : Not Specified | 11.759 | 4.227 | Oct 2013 | 1.896 | Oct 2014 | 2.017 | Oct 2015 | - | | 2.017 | - | 19.899 | - |
| Systems Engineering | WR | NSWC, Activities : Not Specified | 6.093 | 4.004 | Oct 2013 | 1.615 | Oct 2014 | 1.912 | Oct 2015 | - | | 1.912 | - | 13.624 | - |
| Primary Hardware Development | WR | EODTECHDIV : IH, MD | 16.238 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Systems Engineering | WR | EODTECHDIV : IH, MD | 15.144 | 2.893 | Oct 2013 | 2.064 | Oct 2014 | 2.051 | Oct 2015 | - | | 2.051 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 49.234 | 11.124 | | 5.575 | | 5.980 | | - | | 5.980 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technical Support | C/CPFF | ITT : ARLINGTON, VA | 4.523 | 0.505 | Oct 2013 | 0.355 | Oct 2014 | 0.315 | Oct 2015 | - | | 0.315 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 4.523 | 0.505 | | 0.355 | | 0.315 | | - | | 0.315 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | Multiple Activities : Not Specified | 7.106 | 3.037 | Oct 2013 | 1.800 | Oct 2014 | 1.684 | Oct 2015 | - | | 1.684 | - | 13.627 | - |
| Operational Test & Evaluation | WR | NSWC, Activities : Not Specified | 1.100 | 0.748 | Oct 2013 | 0.544 | Oct 2014 | 0.763 | Oct 2015 | - | | 0.763 | - | 3.155 | - |
| Developmental Test & Evaluation | WR | EODTECHDIV : IH, MD | 7.446 | 0.617 | Oct 2013 | 0.456 | Oct 2014 | 0.529 | Oct 2015 | - | | 0.529 | Continuing | Continuing | Continuing |
| Operational Test & Evaluation | WR | EODTECHDIV : IH, MD | 1.424 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 17.076 | 4.402 | | 2.800 | | 2.976 | | - | | 2.976 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>4023 / *VSW MCM/Force Protection UUV* |

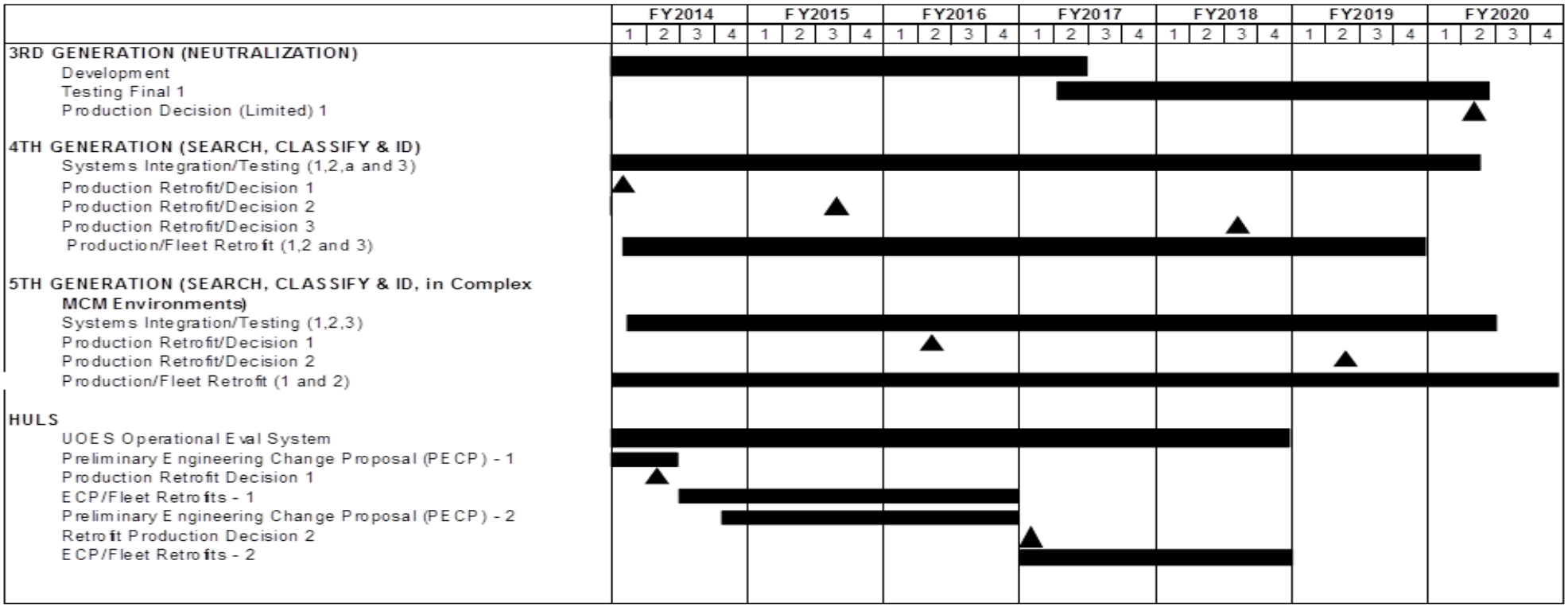
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | EODTECHDIV : IH, MD | 3.016 | 0.460 | Oct 2013 | 0.407 | Oct 2014 | 0.200 | Oct 2015 | - | | 0.200 | Continuing | Continuing | Continuing |
| Miscellaneous | WR | NSWC, Activities : Not Specified | 2.076 | 0.227 | Oct 2013 | - | Oct 2014 | 0.100 | Oct 2015 | - | | 0.100 | Continuing | Continuing | Continuing |
| DAWDF | Various | Not Specified : Not Specified | 0.018 | - | | - | | - | | - | | - | - | 0.018 | - |
| | | **Subtotal** | 5.110 | 0.687 | | 0.407 | | 0.300 | | - | | 0.300 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 75.943 | 16.718 | | 9.137 | | 9.571 | | - | | 9.571 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>4023 / *VSW MCM/Force Protection UUV* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>4023 / *VSW MCM/Force Protection UUV* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4023*** | | | | |
| 3RD GENERATION (NEUTRALIZATION) | 1 | 2014 | 4 | 2020 |
| Development | 1 | 2014 | 2 | 2017 |
| Testing Final 1 | 2 | 2017 | 2 | 2020 |
| Production Decision (Limited) 1 | 2 | 2020 | 2 | 2020 |
| Title: 4th GENERATION (SEARCH-CLASSIFY & ID) | 1 | 2014 | 4 | 2020 |
| Systems Integration/Testing (1,2,and 3) | 1 | 2014 | 2 | 2020 |
| Production/Retrofit/Decision 1 | 1 | 2014 | 1 | 2014 |
| Production/Retrofit Decision 2 | 2 | 2015 | 2 | 2015 |
| Production/Retrofit Decision 3 | 3 | 2018 | 3 | 2018 |
| Production/Fleet Retrofit (1,2,and 3) | 2 | 2014 | 1 | 2018 |
| 5th GENERATION (SEARCH, CLASSIFY & ID, IN COMPLEX MCM ENVIRONMENTS | 1 | 2014 | 4 | 2020 |
| Systems Integration/Testing (1,2,3) | 2 | 2014 | 3 | 2020 |
| Production Retrofit/Decision 1 | 2 | 2016 | 2 | 2016 |
| Production Retrofit/Decision 2 | 2 | 2019 | 2 | 2019 |
| Production/Fleet Retrofit (1 and 2) | 1 | 2014 | 4 | 2020 |
| Title: HULS | 1 | 2014 | 4 | 2020 |
| UOES Operational Eval System | 1 | 2014 | 4 | 2018 |
| Preliminary Engineering Change Proposal (PECP) - 1 | 1 | 2014 | 2 | 2014 |
| Production Retrofit Decision 1 | 2 | 2014 | 2 | 2014 |
| ECP/Fleet Retrofits - 1 | 3 | 2014 | 4 | 2016 |
| Preliminary Engineering Change Proposal (PECP) - 2 | 4 | 2014 | 4 | 2016 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603654N / *JT Service Explosive Ordn Dev* | **Project (Number/Name)**<br>4023 / *VSW MCM/Force Protection UUV* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Retrofit Production Decision 2 | 1 | 2017 | 1 | 2017 |
| ECP/Fleet Retrofits - 2 | 1 | 2017 | 4 | 2018 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603658N *I Cooperative Engagement* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 433.767 | 52.539 | 37.310 | 76.247 | - | 76.247 | 81.475 | 81.489 | 85.265 | 81.253 | Continuing | Continuing |
| 2039: *COOP Engagement* | 433.767 | 52.539 | 37.310 | 76.247 | - | 76.247 | 81.475 | 81.489 | 85.265 | 81.253 | Continuing | Continuing |
| **MDAP/MAIS Code:** 582 | | | | | | | | | | | | |

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

Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real-time, composite track picture to support integrated fire control. CEC distributes sensor data from each USMC Command Control Unit, USA Aerostat, US Navy Ship, and US Navy Aircraft, or cooperating unit (CU), to all other CUs in the battle force through a real-time, line of sight, high data rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapons system. CEC significantly improves our Battle Force defense in depth, including both local area and ship defense capabilities against current and future AAW threats. Moreover, CEC provides critical connectivity and integration of over-land air defense systems capable of countering emerging air threats, including land attack cruise missiles, in a complex littoral environment.

Each military Service funds CEC development for their combat systems. The CEC Program Office oversees CEC development for all services.

CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and interface with Combat Systems and sensors. The DDS encodes and distributes own-ship sensor and engagement data and is a high capacity, jam resistant, directive system providing a precision gridlocking and high throughput of data. The CEP is a high capacity distributed processor that processes force levels of data in near real-time. The data is passed to the ship's combat system as high quality data for which the ship can cue its onboard sensors or use the data to engage targets without actually tracking them.

The Navy implemented a Signal Data Processor (SDP) approach to modify the current equipment to meet reduced size, weight, cost, power and cooling objectives. This SDP approach also supports continuity for interoperability improvements and program protection, as well as supporting open architecture initiatives, and comms independence. The SDP hardware complies with Category 3 Open Architecture Computing Environment (OACE) standards. The SDP-S is being fielded fleet-wide to all US Navy, USMC, US Army, and FMS CEC units.

A family of antennas approach will be used to satisfy CEC requirements with lower life cycle costs (procurement, installation, and maintenance) and reduced weight (on mast and below deck). These antennas enable future capability as well as providing a solution extensible to additional platforms. This effort for development and production of Common Array Block (CAB) antennas was competitively awarded in late FY2013.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603658N *I Cooperative Engagement* |

In support of Interoperability, CEC will continue to work collaboratively with other Combat Systems programs (AWS, E-2C, E-2D, SSDS, CDLMS, C2P, and SGS/AC) to develop the software and implement design corrections and system changes. CEC will analyze the interactions of interoperability issues and impacts and provide collaboration for development of CEC and other system changes, develop the long term solutions, including the engineering process to validate small parts of developmental software ideas, and utilize M&S to validate design approaches in the systems engineering realm.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 53.572 | 43.578 | 73.429 | - | 73.429 |
| Current President's Budget | 52.539 | 37.310 | 76.247 | - | 76.247 |
| Total Adjustments | -1.033 | -6.268 | 2.818 | - | 2.818 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -6.268 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.033 | - | | | |
| • Program Adjustments | - | - | 3.420 | - | 3.420 |
| • Rate/Misc Adjustments | - | - | -0.602 | - | -0.602 |

**Change Summary Explanation**

FY 2014 reduction reflect SBIR reductions.

FY 2015 reduction reflect $6.268 million for Common Array Block Antenna (CAB) and Program Execution adjustments.

FY 2016 funding request was reduced by $6.380 million to account for the availability of prior year execution balances.

FY 2016 increases of $9.800 million reflect additions for CEC/E-2D Dual Tracks Interoperability and CEC-AEGIS ACB 16/SM-6 BLK IA Integration (Naval Integrated Fire Control-Counter Air (NIFC-CA).

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | Date: February 2015 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603658N / *Cooperative Engagement* | | | | Project (Number/Name)<br>2039 / *COOP Engagement* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 2039: *COOP Engagement* | 433.767 | 52.539 | 37.310 | 76.247 | - | 76.247 | 81.475 | 81.489 | 85.265 | 81.253 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real-time, composite track picture to support integrated fire control. CEC distributes sensor data from each USMC Command Control Unit, USA Aerostat, US Navy Ship, and US Navy Aircraft, or cooperating unit (CU), to all other CUs in the battle force through a real-time, line of sight, high data rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapons system. CEC significantly improves our Battle Force defense in depth, including both local area and ship defense capabilities against current and future AAW threats. Moreover, CEC provides critical connectivity and integration of over-land air defense systems capable of countering emerging air threats, including land attack cruise missiles, in a complex littoral environment.

Each military Service funds CEC development for their combat systems. The CEC Program Office oversees CEC development for all services.

CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and interface with Combat Systems and sensors. The DDS encodes and distributes own-ship sensor and engagement data and is a high capacity, jam resistant, directive system providing a precision gridlocking and high throughput of data. The CEP is a high capacity distributed processor that processes force levels of data in near real-time. The data is passed to the ship's combat system as high quality data for which the ship can cue its onboard sensors or use the data to engage targets without actually tracking them.

The Navy implemented a Signal Data Processor (SDP) approach to modify the current equipment to meet reduced size, weight, cost, power and cooling objectives. This SDP approach also supports continuity for interoperability improvements and program protection, as well as supporting open architecture initiatives, and comms independence. The SDP hardware complies with Category 3 Open Architecture Computing Environment (OACE) standards. The SDP-S is being fielded fleet-wide to all US Navy, USMC, US Army, and FMS CEC units.

A family of antennas approach will be used to satisfy CEC requirements with lower life cycle costs (procurement, installation, and maintenance) and reduced weight (on mast and below deck). These antennas enable future capability as well as providing a solution extensible to additional platforms. This effort for development and production of Common Array Block (CAB) antennas was competitively awarded in late FY2013.

In support of Interoperability, CEC will continue to work collaboratively with other Combat Systems programs (AWS, E-2C, E-2D, SSDS, CDLMS, C2P, and SGS/AC) to develop the software and implement design corrections and system changes. CEC will analyze the interactions of interoperability issues and impacts and provide collaboration for development of CEC and other system changes. Develop the long term solutions, including the engineering process to validate small parts of developmental software ideas, and utilize M&S to validate design approaches in the systems engineering realm.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** E-2D | 3.000 | - | 4.500 | - | 4.500 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed debug and develop corrections to software issues found during OT-IIIF. Completed Track File concurrence and Dual Tracks. | | | | | |
| ***FY 2015 Plans:***<br>N/A | | | | | |
| ***FY 2016 Base Plans:***<br>Commence corrections of E-2D/CEC dual track issues created as a result of the E-2D radar integration with the Mission Computer to allow coordinated defense against raid attacks. Resolving the dual tracks issue will enhance Aegis and E-2D air defense over the horizon engagement capability. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** B/L 2.1 INTEGRATION AND FOT&E TESTING | 4.700 | 7.300 | 6.186 | - | 6.186 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed Developmental Testing (DT-D1A) of AN/USG-2B with Aegis Baseline 9 Cruisers. Completed testing and certification of midterm interoperability enterprise upgrade (AMIIP) on Aegis, SSDS, and E-2C Hawkeye 2000 platforms. Commence Developmental Testing (DT-D1C) of AN/USG-2B with Aegis Baseline 9 Destroyers. | | | | | |
| ***FY 2015 Plans:***<br>Support developmental testing of NIFC-CA. Complete Operational Testing (OT-D1A) of AN/USG-2B with Aegis Baseline 9 Cruisers. Complete Developmental Testing (DT-D1C) of AN/USG-2B with Aegis Baseline 9 Destroyers. Commence Developmental Testing (DT-D2) of AN/USG-2B with CVN78. Commence Developmental Testing (DT-D3) of AN/USG-2B with DDG 1000. | | | | | |
| ***FY 2016 Base Plans:***<br>Complete Operational testing (OT-D1C) of AN/USG-2B with Aegis Baseline 9. Continue Developmental Testing (DT-D2) of AN/USG-2B with CVN 78. Continue Developmental Testing (DT-D3) of AN/USG-2B with DDG 1000. Continue support of developmental testing of NIFC-CA. Commence testing of mid-term interoperability enterprise upgrade Accelerated Midterm Interoperability Improvement Project (AMIIP) on E-2D. | | | | | |
| ***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** SYSTEM IMPROVEMENTS | 12.646 | 9.280 | 20.079 | - | 20.079 |
| ***Articles:*** | - | - | - | - | - |

***FY 2014 Accomplishments:***
Supported Joint Track Management Capability (JTMC) development planning. Continued CEC system improvements at Land Based Test Sites (LBTS) to accurately reflect CEC equipment in the fleet, monitor IA posture and develop Engineering Change Proposal (ECP) to significantly enhance Information Assurance (IA) posture and program protection.

***FY 2015 Plans:***
Continue system improvements at Land Based Test Sites (LBTS) to accurately reflect CEC equipment in the fleet. Support development of a CEC Adaptive Layer for Advanced Combat Baseline 16 (ACB-16) to include supporting Technical Interchange Meetings (TIM), Modeling and Simulation updates, and inital Wrap Around Simulation Program Development. Conduct CEC ACB-16 System Requirement Review (SRR) and System Functional Review (SFR). Continue to monitor IA posture and program protection and begin software development of IA specific ECPs.

***FY 2016 Base Plans:***
Significantly ramp up efforts to meet the rigor of the ACB-16 Preliminary Design Review (PDR); deliver CEC to CSEDS with a CEC system supporting the ACB-16 combat system prototype. Coincident with that, integrate with ACB-16's updated sensors, find and resolve trouble reports and conduct associated analysis. Ramp up integration efforts for CEC with the CVN 78 combat system and also ramp up integration efforts with the DDG 1000 combat system. Conduct multiple integration events with the CVN 78 Combat system, including SSDS and Dual Band Radar (DBR) at the Wallops Island Land Based Test Sites and multiple integration events with the DDG 1000 combat system, including the TSCE combat system, and Multi-Function Radar, also at the Wallops Island Land Based Test Sites. The integration with DBR and Multi-Function Radar (MFR) are first of their kind and require significant integration work with a radar system that is different from any previously used by CEC. Conduct certification of Information Assurance (IA) Engineering Change Proposals (ECP) to the entire CEC baseline and begin fielding. Commence development efforts for Fire Control Loop Improvement Project (FCLIP) Phase 2. Coordinate FCLIP improvements with host combat system and other combat system elements. Integrate the updated FCLIP software with other elements of the combat system. Prepare for testing of FCLIP improvements in FY17 and commence fielding of FCLIP improvements in FY18. Update CEC element certification on all platforms whenever a new feature is put into the CEC baseline. This involves testing to garner evidence, analyzing the results and then obtaining permission from the CEC Element certification panel and then

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| from the Combat System certification panel(s) to field the update. This is done for seven versions of Aegis, (6.1, 6.3, 7.1.3, 7.1R, 8.1, 9) five versions of SSDS (MK 2, Mods 1-4 and 6).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** FIELD ACTIVITIES | 8.229 | 6.324 | 8.409 | - | 8.409 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued field activity support of CEC development and fielding efforts (i.e. SE/IA, Technical Direction Agent, In-Service Engineering, Integrated Logistics Support planning) and program management support.<br>***FY 2015 Plans:***<br>Continue field activity support of CEC development and fielding efforts (i.e. SE/IA, Technical Direction Agent, In-Service Engineering, Integrated Logistics Support planning) and program management support.<br>***FY 2016 Base Plans:***<br>Continue field activity support of CEC development and fielding efforts (i.e. SE/IA, Technical Direction Agent, In-Service Engineering, Integrated Logistics Support planning) and program management support. Commence development of CEC Increment II. This encompasses increased funding to the Technical Direction Agent (TDA) for the following work breakdown structure: threat analysis, system analysis and concept development required for a Capabilities Development Document (CDD). The TDA will conduct the critical systems of system analysis supporting capability development; warfighting functionality integration against emerging threats; operational need for larger networks; and improved network performance.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** NETWORK ENABLED ELECTRONIC DEFENSE SYSTEM (NEEDS) | 11.137 | 7.331 | 8.900 | - | 8.900 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Completed formal System Requirement Review (SRR). Developed NEEDS requirements, algorithyms, and M&S capabilities to respond to emergent operational needs to provide improved surveillance, tracking, ID and engagement capabilities. Commenced analysis, definition and development of NEEDS capability, system architecture and design, external interface requirements, development of prototype implementation, evaluation | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| of real time processing load, development of WASP capabilities, and development of recorded data playback capability, and support for TIMs, Interface Control Working Groups (ICWG) and In-Process Reviews (IPR).<br>***FY 2015 Plans:***<br>Continue analysis, definition and development of NEEDS capability, system architecture and design, external interface requirements, development of prototype implementation, evaluation of real time processing load, development of WASP capabilities, and development of recorded data playback capability, and support for TIMs, Interface Control Working Groups (ICWG) and In-Process Reviews (IPR). Conduct Preliminary Design Review (PDR). Refine NEEDS algorithyms, and Modeling & Simulation (M&S) capabilities. Develop Technical Performance Measures (TPM) and update the CEC Critical Test Integration (CTI) Notebook. Conduct robust data collect and continue analysis, definition and development of NEEDS capability, system architecture and design, and evaluation of prototype implementations and real-time processing load in Software Integration Laboratory (SIL) environments using recorded real world system data.<br>***FY 2016 Base Plans:***<br>Continue analysis, definition and development of NEEDS capability, system architecture and design, external interface requirements, development of prototype implementation, evaluation of real time processing load, development of WASP capabilities, and development of recorded data playback capability, and support for TIMs, Interface Control Working Groups (ICWG) and In-Process Reviews (IPR). Conduct Critical Design Review (CDR). Begin iterative Code Unit and Test (CUT) software development process. Continue to collect real world data and in Software Integration Laboratory (SIL) facilities replay real world data to refine initial NEEDS Software Module and update M&S capabilities. Continue to refine Technical Performance Measures (TPM) and CEC Critical Test Integration (CTI) Notebook.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** LINK 16/INTEROPERABILITY | 2.800 | 0.800 | 5.200 | - | 5.200 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued to field AMIIP upgrade on Aegis ships. Test, debug, certify and field the AMIIP enterprise upgrade for SSDS ships and E-2C aircraft. Commence development of far term interoperability enterprise upgrade.<br>***FY 2015 Plans:***<br>Continue development of far term interoperability enterprise upgrade.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Commence robust collaborative design efforts with Shipboard Gridlock System with Automated Correlation (SGS/AC) and Link-16 along with coordination with Aegis, SSDS, E-2C, E-2D, and CAC2S combat systems. Allocate requirements, develop the design, refine our system of systems modeling and simulation capability, conduct analysis and begin developmental testing at Land Based Test Site facilities with deliveries of engineering loads, analysis and field developmental testing in close coordination with SPAWAR networks, NAVAIR aircraft, USMC combat systems, USN carriers, Amphibious ships, Aegis Cruisers and Aegis Destroyers.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** COMMON ARRAY BLOCK (CAB) ANTENNA | 7.277 | 6.275 | 7.466 | - | 7.466 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Conducted System Functional Review (SFR) and System Requirement Review (SRR). Continued to refine critical Gallium Nitride (GaN) based Monolithic Microwave Integrated Circuit (MMIC) Design. Refined USMC CAB-Expeditionary antenna maintainability requirements to enhance warfighter ability to maintain the system at the USMC Squadron level.<br>***FY 2015 Plans:***<br>Conduct Preliminary Design Review (PDR) and develop and begin test of Engineering Design Model (EDM) CAB-Ship and CAB-Expeditionary antenna systems to inform system trades, refine system models, optimize thermal capacities, and refine path for final design.<br>***FY 2016 Base Plans:***<br>Conduct Critical Design Review (CDR) and complete testing and evaluation of Engineering Design Models (EDM) of the CAB-Ship and CAB-Expeditionary antennas. Conduct Production Readiness Review (PRR) and Test Readiness Review (TRR). Begin system qualification functional and environmental testing. Begin initial fabrication of Pre-Production Antenna systems.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** NIFC-CA | - | - | 2.457 | - | 2.457 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>Support Increment I refinement against increasingly challenging test cases at White Sands Missile Range (WSMR) and At-Sea with test support, model updates, post-test analysis, and software updates. Also begin development of NIFC-CA Increment 2 capability with Interface Design Description (IDD) refinement, model updates and development of initial software loads for test at WSMR.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** AIR AND MISSILE DEFENSE RADAR (AMDR) | 2.750 | - | 13.050 | - | 13.050 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued development of CEC/AMDR Interface Requirements Specification (IRS) and began development of AMDR/CEP Interface Design Description (IDD), design of CEC Adaptive Layer code, initial development of CEC Wrap Around Simulator Program (WASP) requirements, support Technical Interchange Meetings (TIM), CEC/ AMDR IPRs, Combat System Interface Support Equipment (CSISE) System Requirement Review (SRR) and AMDR System Preliminary Design Review (PDR).<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>Continue support for Technical Interchange Meetings (TIM) and CEC/AMDR IPRs. Continue development of AMDR model and Adaptation Layer code for CEP WASP. Continue WASP Accreditation process. Conduct CEC Test Readiness Review (TRR) for AMDR Integration. Continue development of AMDR Interface Design Description (IDD). Develop Cooperative Engagement Processor(CEP) Kernel changes and software updates. Assist in development of DT & OT test plans for AMDR Milestone C. Provide Information Assurance assessment of new CEP interfaces. Support Combat System Interface Support Equipment (CSISE) Critical Design Review CDR. Develop and Deliver initial CEC Sensor Adaptive Layer with SA-CEP and WASP capability to Pacific Missile Radar Facility (PMRF). Support Combat System Interface Support Equipment | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| testing (CSISE)and conduct analysis. Provide support to pre ISE Testing CIT-1 & 2 Grooming and Product Acceptance Test, ISE DT Phase 1, and ISE DT Phase 2.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 52.539 | 37.310 | 76.247 | - | 76.247 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN: *Navy, SCN* | 6.400 | 11.400 | 11.600 | - | 11.600 | 18.500 | 18.200 | 12.200 | 12.400 | 44.457 | 431.588 |
| • APN/0204152N: *Navy, APN* | 13.062 | 13.314 | 13.578 | - | 13.578 | 16.619 | 14.126 | 11.527 | 11.758 | - | 298.905 |
| • OPN/2606: *CEC* | 29.592 | 33.939 | 25.695 | - | 25.695 | 29.336 | 29.983 | 30.704 | 31.349 | - | 939.416 |
| • RDT&E/0206313M: *USMC* | 7.484 | 1.506 | 0.686 | - | 0.686 | 0.571 | 0.299 | 0.678 | 0.689 | - | 27.733 |
| • RDT&E,A/0102419A: *JLENS* | 0.475 | - | - | - | - | - | - | - | - | - | 42.317 |
| • O&M,N/0206626M: *USMC* | 3.595 | 2.475 | 0.994 | - | 0.994 | 1.263 | 1.230 | 1.272 | 1.293 | - | 14.074 |
| • PMC/0206313M: *USMC* | - | 0.380 | - | - | - | - | - | - | - | - | 1.160 |
| • OPN/0960: *CG/MOD* | - | 9.000 | - | - | - | 5.900 | 6.000 | - | - | - | 52.537 |
| • OPN/0900: *DDG/MOD* | 4.700 | 0.030 | 0.040 | - | 0.040 | - | - | - | - | - | 56.581 |

**Remarks**

**D. Acquisition Strategy**

CEC Acquisition Strategy (AS) approved by OSD (AT&L) on 19 January 2010. CEC Acquistion Plan (AP) approved September 2013. Full Rate Production for CEC AN/USG-3B variant approved April 2014.

Contracts:
Common Array Block (CAB) antenna - contract competitively awarded 4Qtr FY2013.
CEC Design Agent/Engineering Services (DA/ES) follow-on sole source contract awarded 4Qtr FY2013.
CEC Production - New contract will be competitively awarded in 2Qtr FY2015.
CEC DA/ES contract will be competitively awarded 1Qtr FY2019.

**E. Performance Metrics**

- Complete the adaptive layer development for the E-2D aircraft. Provide technical support for installation and integration in the Northrop Grumman Systems Integration Laboratory, on board the test aircraft and support the Developmental testing. Continue E-2D Advanced Hawkeye aircraft CEC integration efforts.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

- Continue AEGIS Advance Capability Builds CEC integration and demonstration efforts.
- Continue Naval Integrated Fire Control - Counter Air (NIFC-CA) CEC integration and demonstration efforts.
- Continue Crypto Modernization Tech Refresh efforts.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603658N / *Cooperative Engagement* | Project (Number/Name)<br>2039 / *COOP Engagement* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AN/USG-2/3 Design Agent/Engineering Services | C/CPFF | Raytheon : St. Petersburg, FL | 98.585 | 11.464 | Nov 2013 | 6.663 | Feb 2015 | 12.863 | Nov 2015 | - | | 12.863 | Continuing | Continuing | Continuing |
| TDA | C/CPFF | JHU/APL : Laurel, MD | 58.185 | 6.692 | Nov 2013 | 6.574 | Feb 2015 | 12.503 | Nov 2015 | - | | 12.503 | Continuing | Continuing | Continuing |
| SI/DA | C/CPAF | General Dynamics : Fairfax, VA | 23.979 | - | | - | | - | | - | | - | - | 23.979 | - |
| SI/DA | C/CPAF | Award Fees : Not Specified | 2.903 | - | | - | | - | | - | | - | - | 2.903 | - |
| DDG 1000 | C/CPAF | Raytheon : Massachusetts | 10.983 | - | | - | | - | | - | | - | - | 10.983 | - |
| DDG 1000 | C/CPAF | Award Fees : Not Specified | 0.447 | - | | - | | - | | - | | - | - | 0.447 | - |
| NIFC-CA Integration | TBD | Various : Not Specified | 39.342 | - | | - | | 2.457 | Dec 2015 | - | | 2.457 | Continuing | Continuing | Continuing |
| In-Service Engineering Activity | WR | NSWC : Port Hueneme, CA | 2.506 | 1.284 | Nov 2013 | 0.848 | Nov 2014 | 1.925 | Nov 2015 | - | | 1.925 | Continuing | Continuing | Continuing |
| Software Support Activity/ SEIA | WR | NSWC : Dahlgren, VA | 14.285 | 2.257 | Nov 2013 | 1.119 | Nov 2014 | 2.357 | Nov 2015 | - | | 2.357 | Continuing | Continuing | Continuing |
| Production Engineering Activity | WR | NSWC : Crane, IN | 5.694 | - | | - | | - | | - | | - | - | 5.694 | - |
| JTRS | TBD | Various : Not Specified | 8.500 | - | | - | | - | | - | | - | - | 8.500 | - |
| Various | TBD | Miscellaneous : Not Specified | 29.133 | - | | - | | 2.840 | Nov 2015 | - | | 2.840 | Continuing | Continuing | Continuing |
| NAVSSI | WR | SPAWAR : San Diego, CA | 0.368 | - | | - | | - | | - | | - | - | 0.368 | - |
| Certification | MIPR | NSA : Fort Meade, MD | 1.200 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Certification | WR | SPAWAR : Charleston, SC | 0.930 | - | | - | | - | | - | | - | - | 0.930 | - |
| Joint Exercises | WR | Various : Not Specified | 3.744 | - | | - | | - | | - | | - | - | 3.744 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603658N / *Cooperative Engagement* | Project (Number/Name)<br>2039 / *COOP Engagement* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LBTS Testing | WR | CDSA Damneck : Virginia Beach, VA | 6.070 | 0.425 | Nov 2013 | 0.500 | Nov 2014 | 0.500 | Nov 2015 | - | | 0.500 | Continuing | Continuing | Continuing |
| LBTS Testing | WR | SCSC : Wallops Island, VA | 5.330 | 0.553 | Nov 2013 | 0.700 | Jan 2015 | 0.700 | Nov 2015 | - | | 0.700 | Continuing | Continuing | Continuing |
| E-2D Integration | TBD | Various : Not Specified | 41.258 | 3.000 | Nov 2013 | - | | 4.500 | Nov 2015 | - | | 4.500 | Continuing | Continuing | Continuing |
| MSI/NCCT | MIPR | Wright Patterson AFB : Dayton, OH | 1.228 | - | | - | | - | | - | | - | - | 1.228 | - |
| Common Array Block Development | C/CPFF | Various : Not Specified | 11.900 | 7.277 | Jan 2014 | 6.275 | Jan 2015 | 7.466 | Dec 2015 | - | | 7.466 | Continuing | Continuing | Continuing |
| NEEDS | C/CPFF | Various : Not Specified | 6.160 | 11.137 | Dec 2013 | 7.331 | Feb 2015 | 8.900 | Dec 2015 | - | | 8.900 | Continuing | Continuing | Continuing |
| AMDR | C/CPFF | Various : Not Specified | 0.500 | 2.750 | Dec 2013 | - | | 13.050 | Dec 2015 | - | | 13.050 | Continuing | Continuing | Continuing |
| JTMC | C/CPFF | Raytheon : St. Petersburg | 0.000 | 1.000 | Dec 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 373.230 | 47.839 | | 30.010 | | 70.061 | | - | | 70.061 | - | - | - |

**Remarks**

Explanations for the use of "WR and Reqn" in the Contract method & type" column are as follows:
- When using "WR", these documents are sent to Navy activities who obligate funding on their vehicles to accomplish tasking for CEC. These activities are the only ones who can accomplish these tasks for the program.
- E-2D Integration/NIFC-CA "Various/TBDs" are for classified programs and several document types.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test/ACB Support | C/CPFF | Raytheon : St. Petersburg, FL | 3.197 | 0.271 | Nov 2013 | 0.630 | Feb 2015 | 0.530 | Nov 2015 | - | | 0.530 | Continuing | Continuing | Continuing |
| Test/ACB Support | C/CPFF | JHU/APL : Laurel, MD | 0.759 | 0.271 | Nov 2013 | 0.630 | Feb 2015 | 0.530 | Nov 2015 | - | | 0.530 | Continuing | Continuing | Continuing |
| Test Support | WR | NRL : Washington, DC | 0.313 | - | | - | | - | | - | | - | - | 0.313 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603658N / *Cooperative Engagement* | Project (Number/Name)<br>2039 / *COOP Engagement* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test/ACB Support | WR | NSWC : Port Hueneme, CA | 18.880 | 1.661 | Nov 2013 | 2.050 | Feb 2015 | 1.795 | Nov 2015 | - | | 1.795 | Continuing | Continuing | Continuing |
| Air Operations Test Support | WR | NAVAIR (PMA207) : Patuxent River, MD | 8.411 | 0.226 | Nov 2013 | 0.525 | Feb 2015 | 0.425 | Nov 2015 | - | | 0.425 | Continuing | Continuing | Continuing |
| Test Data Reduction Analysis | WR | NWAS : Corona, CA | 12.805 | 1.524 | Nov 2013 | 1.732 | Feb 2015 | 1.477 | Nov 2015 | - | | 1.477 | Continuing | Continuing | Continuing |
| Test Support | WR | COMOPTEVFOR : Norfolk, VA | 9.446 | 0.605 | Nov 2013 | 1.405 | Feb 2015 | 1.151 | Nov 2015 | - | | 1.151 | Continuing | Continuing | Continuing |
| Test/ACB Support | WR | NSWC : Dahlgren, VA | 1.296 | 0.142 | Nov 2013 | 0.328 | Feb 2015 | 0.278 | Nov 2015 | - | | 0.278 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 55.107 | 4.700 | | 7.300 | | 6.186 | | - | | 6.186 | - | - | - |

**Remarks**

Explanation for the use of "WR" in the "Contract method & type" column are as follows:

When using "WR", these documents are sent to Navy activities who obligate funding on their vehicles to accomplish tasking for CEC. These activities are the only ones who can accomplish these tasks for the program.

Test support also includes the following funding for ACB integration support:
FY14 - $3.0M

**Management Services ($ in Millions)**

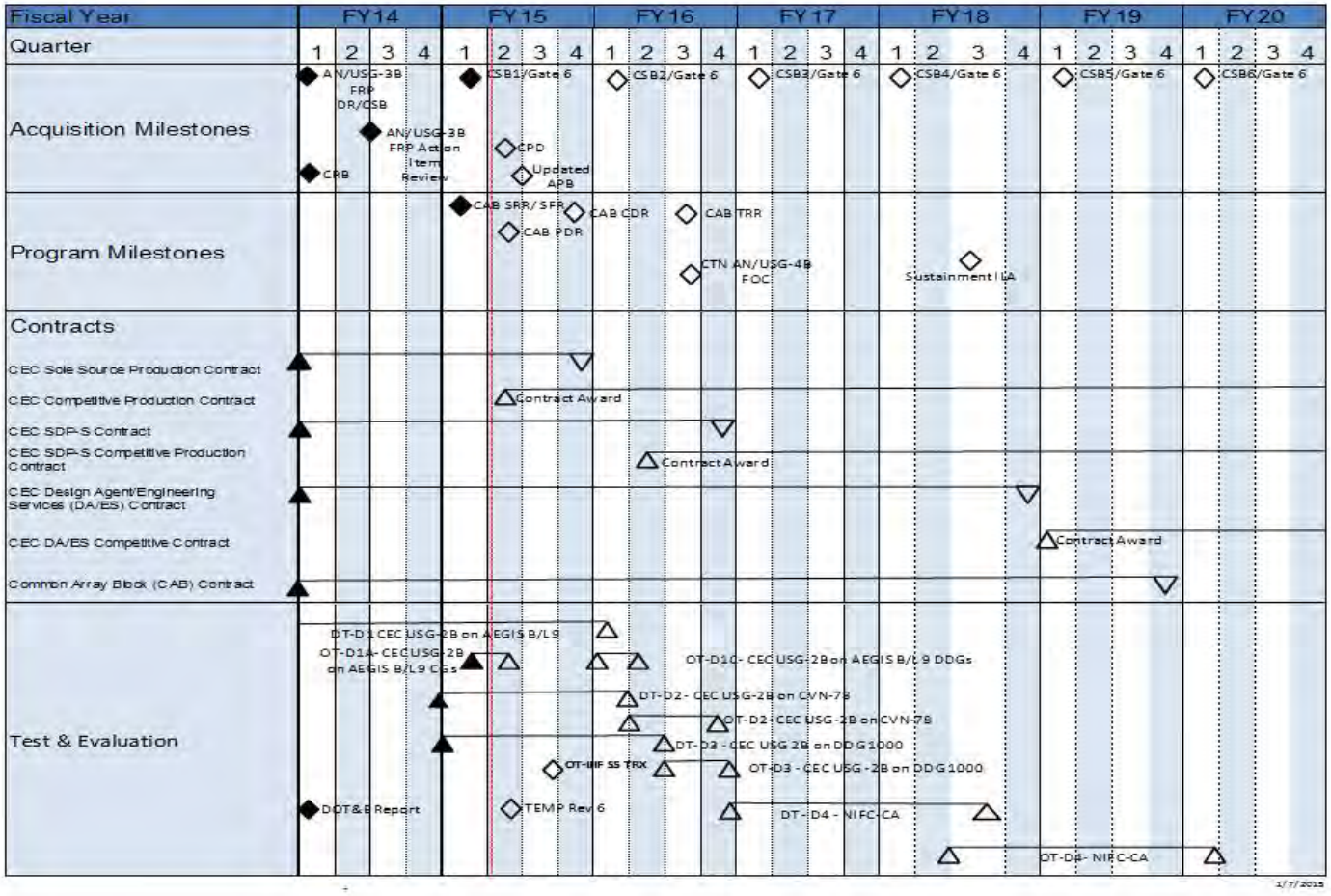
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/FFP | Booz Allen & Hamilton : Washington, DC | 5.070 | - | | - | | - | | - | | - | - | 5.070 | - |
| Program Management Support | C/FFP | Tech Marine Business : Washington, DC | 0.360 | - | | - | | - | | - | | - | - | 0.360 | - |
| | | **Subtotal** | 5.430 | - | | - | | - | | - | | - | - | 5.430 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603658N / *Cooperative Engagement* | Project (Number/Name)<br>2039 / *COOP Engagement* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 433.767 | 52.539 | | 37.310 | | 76.247 | | - | | 76.247 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |




**Acronym List**

APB: Acquisition Program Baseline
AN/USG-2: CEC shipboard designation
AN/USG-3: CEC airborne designation
CAB: Common Array Block
CDR: Critical Design Review
CEC: Cooperative Engagement Capability
CPD: Capabilities Production Document
CRB: Cost Review Board
CSB: Configuration Steering Board
DOT&E: Director of Operational Test and Evaluation
DR: Decision Review
DT/OT: Development Test/Operational Test
FOC: Full Operational Capability
FRP: Full Rate Production
ILA: Independent Logistics Assessment
IOC: Initial Operational Capabilities
NIFC-CA: Naval Integrated Fire Control - Counter Air
PDR: Preliminary Design Review
PRR: Production Readiness Review
R3B: Resources Requirements Review Board
SS TRX: Supersonic Tracking Exercise
TEMP: Test & Evaluation Master Plan

Actual Milestone Completion
Planned Milestone Completion
Actual Event Start/Completion
Planned Event Start/Completion

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2039*** | | | | |
| AN/USG-3B FRP DR/CSB | 1 | 2014 | 1 | 2014 |
| CRB | 1 | 2014 | 1 | 2014 |
| AN/USG-3B FRP Action Item Review | 2 | 2014 | 2 | 2014 |
| CSB1 - Gate 6 | 1 | 2015 | 1 | 2015 |
| CSB2 - Gate 6 | 1 | 2016 | 1 | 2016 |
| CSB3 - Gate 6 | 1 | 2017 | 1 | 2017 |
| CSB4 - Gate 6 | 1 | 2018 | 1 | 2018 |
| CSB5 - Gate 6 | 1 | 2019 | 1 | 2019 |
| CSB6 - Gate 6 | 1 | 2020 | 1 | 2020 |
| CPD | 2 | 2015 | 2 | 2015 |
| Updated APB | 2 | 2015 | 2 | 2015 |
| CAB SRR/SFR | 1 | 2015 | 1 | 2015 |
| CAB PDR | 2 | 2015 | 2 | 2015 |
| CAB CDR | 4 | 2015 | 4 | 2015 |
| CAB TRR | 3 | 2016 | 3 | 2016 |
| CTN AN/USG-4B FOC | 3 | 2016 | 3 | 2016 |
| Sustainment ILA | 3 | 2018 | 3 | 2018 |
| CEC Sole Source Production Contract | 1 | 2014 | 4 | 2015 |
| CEC Competitive Production Contract | 2 | 2015 | 4 | 2020 |
| CEC SDP-S Contract | 1 | 2014 | 4 | 2016 |
| CEC SDP-S Competitive Production Contract | 2 | 2016 | 4 | 2020 |
| CEC DA/ES Contract | 1 | 2014 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603658N / *Cooperative Engagement* | **Project (Number/Name)**<br>2039 / *COOP Engagement* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| CEC DA/ES Competitive Contract | 1 | 2019 | 4 | 2020 |
| Common Array Block (CAB) Contract | 1 | 2014 | 4 | 2019 |
| DT-D1 CEC USG-2B on AEGIS B/L 9 | 1 | 2014 | 1 | 2016 |
| OT-D1A CEC USG-2B on AEGIS B/L 9 CGs | 1 | 2015 | 2 | 2015 |
| OT-D1C CEC USG-2B on AEGIS B/L 9 DDGs | 1 | 2016 | 2 | 2016 |
| DT-D2 CEC USG-2B on CVN-78 | 4 | 2014 | 1 | 2016 |
| OT-D2 CEC USG-2B on CVN-78 | 1 | 2016 | 4 | 2016 |
| DT-D3 CEC USG 2B on DDG 1000 | 4 | 2014 | 2 | 2016 |
| OT-IIIF SS TRX | 3 | 2015 | 3 | 2015 |
| OT-D3 CEC USG-2B on DDG-1000 | 2 | 2016 | 4 | 2016 |
| DOT&E Report | 1 | 2014 | 1 | 2014 |
| TEMP Rev 6 | 2 | 2015 | 2 | 2015 |
| DT-D4-NIFC-CA | 4 | 2016 | 3 | 2018 |
| OT-D4-NIFC-CA | 2 | 2018 | 1 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603713N *I Ocean Engineering Tech Dev* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 108.012 | 7.530 | 6.264 | 4.520 | - | 4.520 | 5.946 | 5.906 | 5.713 | 5.832 | Continuing | Continuing |
| 0099: *Deep Submergence Bio Med Dev* | 25.571 | 3.078 | 2.173 | 4.000 | - | 4.000 | 4.382 | 4.437 | 4.461 | 4.555 | Continuing | Continuing |
| 0394: *Shallow Depth Diving EQ* | 82.441 | 4.452 | 4.091 | 0.520 | - | 0.520 | 1.564 | 1.469 | 1.252 | 1.277 | Continuing | Continuing |

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

Developments in this program will enable the U.S. Navy to overcome deficiencies that constrain underwater operations in the areas of search, location, rescue, recovery, salvage, underwater ship husbandry, construction, and protection of offshore assets. This program develops medical technology, diver life support equipment, and the vehicles, systems, tools, and procedures to permit manned underwater operations.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 7.696 | 7.764 | 5.372 | - | 5.372 |
| Current President's Budget | 7.530 | 6.264 | 4.520 | - | 4.520 |
| Total Adjustments | -0.166 | -1.500 | -0.852 | - | -0.852 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -1.500 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.004 | - | | | |
| • SBIR/STTR Transfer | -0.161 | - | | | |
| • Rate/Misc Adjustments | -0.001 | - | -0.852 | - | -0.852 |

**Change Summary Explanation**

FY 2015 was reduced due to Submarine Rescue System program delay.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603713N / *Ocean Engineering Tech Dev* | Project (Number/Name)<br>0099 / *Deep Submergence Bio Med Dev* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0099: *Deep Submergence Bio Med Dev* | 25.571 | 3.078 | 2.173 | 4.000 | - | 4.000 | 4.382 | 4.437 | 4.461 | 4.555 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project:
1) Develops advanced biomedical and bioengineering technology for enhancing medical and life support for submarine escape and rescue;
2) Conducts research for diver health, safety and effectiveness; and
3) Supports deeper, longer, and more flexible dives.

Deliverables for DISSUB (disabled submarine) include: medical procedures for submarine escape and rescue (including new Submarine Rescue Diving and Recompression System (SRDRS)), life support parameters, medical procedures for life support, exposure guidance for atmospheric contaminants, non-chemical CO2 scrubbing, prevention and treatment of decompression illness, and senior survivor expert decision system.
Deliverables for diver enhancement include: exposure guidance for diver underwater continuous noise, impulse noise, and underwater blast, exposure guidance for oxygen breathing, collection of operational diving depth/time profiles to predict decompression risk, enhanced underwater swimming efficiency, enhanced diver thermal protection, and real-time decompression guidance.
Requirements: NAPDD #587-873, Deep Submergence Biomedical Development, 23 November 1999.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Deep Submergence Bio Med Dev - Diver Health and Safety | 1.539 | 1.087 | 2.000 | - | 2.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Diver Health and Safety Research: Pulmonary oxygen toxicity exposure limits. Procedures for assessing and mitigating risk for diving in contaminated water. Procedure to determine remaining CO2 scrubber duration. Development of advanced insulation garments for diver thermal protection. Develop guidance for optimizing thermal control during decompression. Continue collection of operational dive profiles for advanced modeling. Novel methods for diver thermal protection. Improve resistance to O2 toxicity. Diver anthropometry. Chemical hardening of diving equipment. Predictive index of visual and auditory O2 toxicity. Guidelines for flying after diving. Guidelines for infra- and ultra-sound diver exposure. Develop an advanced diver thermal model. Electronic collection of operational dive data. Diver sound monitor. Investigation of diver in-water maladies, develop/improve real-time decompression guidance and dive planning. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0099 / *Deep Submergence Bio Med Dev* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Initiate development of a Flexible Portable Double Lock Recompression Chamber. Determine condensation requirements in very high pressure air supplies. Initiate development of recompression treatments for blow up from 300 feet. Evaluate Underwater Breathing Apparatus (UBA) breathing resistance under various conditions. Evaluate human performance during long dives. Continue to evaluate probabilistic and deterministic decompression modeling. Decompression effectiveness of Heliox and Trimix Bounce dives. Develop procedures for contaminated water diving from saturation platform (SAT FADS).<br>***FY 2015 Plans:***<br>Continue FY14 projects.<br>***FY 2016 Base Plans:***<br>Complete above projects. Initiate scientific and operational studies of enhanced diver communications and hearing protection, cognitive and performance effects of diver CO2 levels, direct contribution of oxygen to decompression stress, identification of decompression sickness biomarkers, development of optimal heat distribution for cold water diving, mitigation of performance decrements from long oxygen diving.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Deep Submergence Bio Med Dev - Submarine Rescue | 1.539 | 1.086 | 2.000 | - | 2.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Submarine Rescue: Decompression procedures for pressurized SRDRS operators. Use of perfluorocarbons to accelerate decompression in submarine rescue. Adjunctive therapies for treating DISSUB survivors. Guidance for food, water, clothing, medical supplies to enhance survival of submarine crews awaiting rescue. Flexible computer generated decompression schedules for wide range of conditions in a DISSUB. Develop DISSUB triage procedures. DISSUB survival trial. Develop oxygen metabolizer for closed vehicles. Treatment guidance for decompression sickness and arterial gas embolism in submarine escape and rescue. Interventions for toxicological problems with rescued submariners. Minimizing decompression sickness and arterial gas embolism with Submarine Escape and Immersion Suit (SEIS) training. Use of pharmacologic agents to reduce decompression risk in submarine rescuees. Development of toxic gas analyzer for use in pressurized DISSUB. | | | | | |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0099 / *Deep Submergence Bio Med Dev* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Develop Oxygen prebreathe schedules for saturation dropout for DISSUB decompression sickness prediction. Complete prescribed drug efforts from FY13. Use vigabatrin to reduce O2 Central Nervous System (CNS) toxicity in O2 pre-breathe.<br>***FY 2015 Plans:***<br>Continue FY14 projects.<br>***FY 2016 Base Plans:***<br>Complete Saturation drop out predictions for decompression sickness (DCS). Initiate scientific studies of Titotropium inhaler use to reduce pulmonary oxygen toxicity in DISSUB survivors, and executive decision performance decrements in chronic and acute exposures of submariners to very mild elevations of CO2.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.078 | 2.173 | 4.000 | - | 4.000 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Integrated thrust area teams (e.g., decompression research) are established with university, commercial, and in-house Navy labs to jointly execute biomedical R&D. Peer review of research proposals accomplished by independent Technical Advisory Board. Annual review of progress by Executive Review Board (CNO/NAVSEA/ONR/BUMED). Program management by 0-6 Undersea Medical Officer. Contracting by competitive process using BAA and leveraging ONR capabilities.

**E. Performance Metrics**

Quarterly Program Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0099 / *Deep Submergence Bio Med Dev* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diving Equipment Product Development | C/CPAF | Phoenix International : Largo, MD | 0.000 | 0.738 | Jun 2014 | - | | - | | - | | - | - | 0.738 | - |
| Diving Equipment Product Development | WR | Various : Various | 0.000 | 0.600 | May 2014 | - | | - | | - | | - | - | 0.600 | - |
| | | **Subtotal** | 0.000 | 1.338 | | - | | - | | - | | - | - | 1.338 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | WR | NEDU : Panama City, FL | 17.733 | 0.958 | Apr 2014 | 1.239 | Nov 2014 | 1.100 | Nov 2015 | - | | 1.100 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | WR | NMRC : Silver Spring, MD | 6.548 | 0.456 | Apr 2014 | 0.247 | Nov 2014 | 0.250 | Nov 2015 | - | | 0.250 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | WR | DUKE UNIV : Durham, NC | 0.300 | 0.238 | Jun 2014 | 0.300 | Nov 2014 | 0.300 | Nov 2015 | - | | 0.300 | - | 1.138 | - |
| Development Test & Evaluation | WR | NIST : Gaithersburg, MD | 0.040 | - | | - | | - | | - | | - | - | 0.040 | - |
| Development Test & Evaluation | C/CPAF | GPC : Irvine, CA | 0.200 | - | | - | | - | | - | | - | - | 0.200 | - |
| Development Test & Evaluation | C/CPFF | ROH : Arlington, VA | 0.000 | 0.030 | Apr 2014 | - | | - | | - | | - | - | 0.030 | - |
| Development Test & Evaluation | TBD | TBD : Not Specified | 0.000 | - | | 0.217 | Nov 2014 | 2.230 | Oct 2015 | - | | 2.230 | - | 2.447 | - |
| Development Test & Evaluation | WR | NSWCCD-NAVSSES : Philadelphia, PA | 0.000 | - | Aug 2014 | - | | - | | - | | - | - | - | - |
| Development Test & Evaluation | C/CPFF | Unknown : Not Specified | 0.000 | - | | 0.050 | Mar 2015 | - | | - | | - | - | 0.050 | - |
| | | **Subtotal** | 24.821 | 1.682 | | 2.053 | | 3.880 | | - | | 3.880 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603713N / *Ocean Engineering Tech Dev* | Project (Number/Name)<br>0099 / *Deep Submergence Bio Med Dev* | |

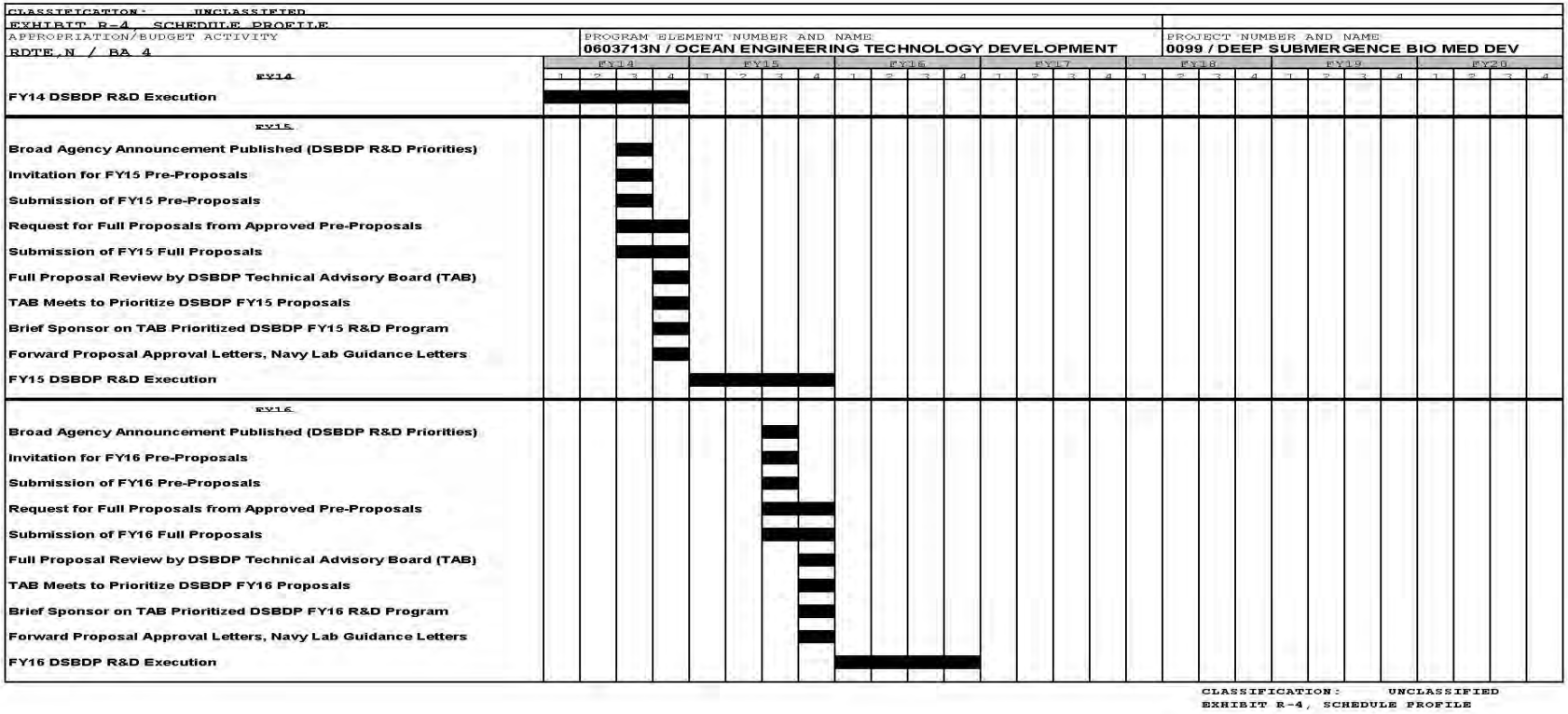
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | Various | NEDU : Panama City | 0.229 | - | | - | | - | | - | | - | - | 0.229 | - |
| Travel | Various | Various : Various | 0.323 | 0.058 | Jul 2014 | 0.070 | Oct 2014 | 0.070 | Oct 2015 | - | | 0.070 | Continuing | Continuing | Continuing |
| *SBIR Assessment | Various | Various : Various | 0.182 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Acquisition Workforce | Various | Various : Various | 0.016 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Program Management Support | C/CPFF | Unknown : Not Specified | 0.000 | - | | 0.050 | Mar 2015 | 0.050 | Oct 2015 | - | | 0.050 | - | 0.100 | - |
| | | **Subtotal** | 0.750 | 0.058 | | 0.120 | | 0.120 | | - | | 0.120 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 25.571 | 3.078 | | 2.173 | | 4.000 | | - | | 4.000 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0099 / *Deep Submergence Bio Med Dev* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0099 / *Deep Submergence Bio Med Dev* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0099*** | | | | |
| FY14 DSBDP R&D Execution | 1 | 2014 | 4 | 2014 |
| FY15 Broad Agency Announcement Published (DSBDP R&D Priorities) | 3 | 2014 | 3 | 2014 |
| Invitation for FY15 Pre-Proposals | 3 | 2014 | 3 | 2014 |
| Submission of FY15 Pre-Proposals | 3 | 2014 | 3 | 2014 |
| Request for Full Proposals from Approved FY15 Pre-Proposals | 3 | 2014 | 4 | 2014 |
| Submission of FY15 Full Proposals | 3 | 2014 | 4 | 2014 |
| Full FY15 Proposal Review by DSBDP Technical Advisory Board (TAB) | 4 | 2014 | 4 | 2014 |
| TAB Meets to Prioritize DSBDP FY15 Proposals | 4 | 2014 | 4 | 2014 |
| Brief Sponsor on TAB Prioritized DSBDP FY15 R&D Program | 4 | 2014 | 4 | 2014 |
| Forward FY15 Proposal Approval Letters, Navy Lab Guidance Letters | 4 | 2014 | 4 | 2014 |
| FY15 DSBDP R&D Execution | 1 | 2015 | 4 | 2015 |
| FY16 Broad Agency Announcement Published (DSBDP R&D Priorities) | 3 | 2015 | 3 | 2015 |
| Invitation for FY16 Pre-Proposals | 3 | 2015 | 3 | 2015 |
| Submission of FY16 Pre-Proposals | 3 | 2015 | 3 | 2015 |
| Request for Full Proposals from Approved FY16 Pre-Proposals | 3 | 2015 | 4 | 2015 |
| Submission of FY16 Full Proposals | 3 | 2015 | 4 | 2015 |
| Full FY16 Proposal Review by DSBDP Technical Advisory Board (TAB) | 4 | 2015 | 4 | 2015 |
| TAB Meets to Prioritize DSBDP FY16 Proposals | 4 | 2015 | 4 | 2015 |
| Brief Sponsor on TAB Prioritized DSBDP FY16 R&D Program | 4 | 2015 | 4 | 2015 |
| Forward FY16 Proposal Approval Letters, Navy Lab Guidance Letters | 4 | 2015 | 4 | 2015 |
| FY16 DSBDP R&D Execution | 1 | 2016 | 4 | 2016 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603713N / *Ocean Engineering Tech Dev* | Project (Number/Name)<br>0394 / *Shallow Depth Diving EQ* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0394: *Shallow Depth Diving EQ* | 82.441 | 4.452 | 4.091 | 0.520 | - | 0.520 | 1.564 | 1.469 | 1.252 | 1.277 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Submarine Rescue manned under PMS 391. Efforts through FY15 focus on the Submarine Rescue Diving and Recompression System (SRDRS) to provide a new rapidly deployed emergency submarine rescue capability. SRDRS provides a new capability of pressurized transportation of rescuees from a stricken submarine directly to the decompression system replacing the Deep Submergence Rescue Vehicles and Mother Submarines. SRDRS includes an air transportable rapid Assessment/ Underwater Work System (AUWS), a Pressurized Rescue Module (PRM) or Rescue Capable System (RCS), and a Submarine Decompression System (SDS). The AUWS is a manned system that provides intervention system capability. To reduce operational risk, an initiative is in process to transition from AUWS to an unmanned Remote Operated Vehicle (ROV). Intervention assets support clearing disabled submarine seating surfaces, delivery of emergency life support stores, and disabled submarine assessment. The Submarine Rescue System-Rescue Capable System (SRS-RCS) completed OPEVAL in FY08 and is rescue ready. The Submarine Rescue System-Submarine Decompression System (SRS-SDS) Initial Operational Capability (IOC) and SRDRS Full Operational Capability (FOC) have been delayed due to efforts associated with Pressurized Rescue Module (PRM) restoration to service. The SRDRS will provide a global rapid response capability to support submarine rescue missions with an increase in capability at a fraction of the cost of the currently available systems.

Shallow Depth Diving Equipment managed under SEA00C - This project develops systems to support submarine escape and rescue missions, and conventional diver operations. Diver operations include ship husbandry, salvage/recovery, and submarine rescue operations to support national, as well as Navy, needs around the world. Modern certifiable diving systems that ensure diver safety and allow maximum work efficiency will replace currently antiquated systems. R&D will be performed in the areas of contaminated water diving, diver thermal protection, and diver sound protection.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Shallow Depth Diving EQ - SRDRS | 3.430 | 2.733 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Continue acceptance testing of the prototype Submarine Decompression System and support equipment. Continue integration and testing of all SRDRS components. | | | | | |
| ***FY 2014 Accomplishments:***<br>Plan to continue design/development/fabrication of Pressurized Rescue Module System 6 atmospheres absolute (ata) efforts. Plan to complete material audit for Vital System Monitoring Network. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0394 / *Shallow Depth Diving EQ* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Plan to complete Submarine Decompression System Element Integration Testing at Oceaneering and Deliver Submarine Decompression System to Undersea Rescue Command to begin integration with the Submarine Rescue System. Begin Post Delivery Element Shakedown efforts.<br>***FY 2015 Plans:***<br>Plan to continue design/development/fabrication of Pressurized Rescue Module System 6 atmospheres absolute (ata) efforts.<br><br>Plan to continue development of Operating Procedures, Emergency Procedures, and Test Procedures in support of future evolutions including Unmanned Testing, Manned Testing and Sea Trials. Continue Post Delivery Element Shakedown efforts.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Shallow Depth Diving EQ - Diving | 1.022 | 1.358 | 0.520 | - | 0.520 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Continued research on contaminated water diving and research on diver thermal protection, CO2 monitors, and diver sound protection.<br>***FY 2014 Accomplishments:***<br>Continue improvements to a free diver heating system (FDHS). Complete development of a prototype Underwater Breathing Apparatus (UBA)/CO2 monitor and qualification testing of quick disconnects for use in high pressure oxygen environments. Cold water testing of various diving equipment.<br>***FY 2015 Plans:***<br>Start development of a double-lock flexible recompression chamber. Complete testing of production models of the free diver heating system (FDHS). Conduct testing of portable air monitor devices.<br>***FY 2016 Base Plans:***<br>Continue development work on a double lock flexible recompression chamber.<br>***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0394 / *Shallow Depth Diving EQ* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.452 | 4.091 | 0.520 | - | 0.520 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

The Submarine Rescue system (SRS) segment of the SRDRS is largely based on the use of Commercial-Off-the-Shelf (COTS) technology and maximum use of Non-Developmental Items (NDI). The SRS segment is being procured using performance based specifications. Many of the SRS contracts were awarded competitively and were based on technical capability and cost considerations (best value). Program management of SRDRS is accomplished through the use of Program Executive Officer, Submarines (PEO SUB) leadership. This change was enacted in February 2003 realigning the responsibility from SEA00C to PEOSUB. The Prototype system provides full operational capability and no additional procurement is planned. The system is designed to be Government Owned/Commercially Operated/Commercially Maintained (GO/CO/CM).

**E. Performance Metrics**

Quarterly Program Reviews and Critical Design Reviews.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0394 / *Shallow Depth Diving EQ* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pressurized Rescue Module System (PRMS) | C/CPIF | Oceanworks : Ontario, Canada | 23.824 | - | | - | | - | | - | | - | - | 23.824 | - |
| PRMS | C/FFP | Oceanworks : Ontario, Canada | 4.150 | - | | - | | - | | - | | - | - | 4.150 | - |
| Systems Engineering - Design, Integration | C/CPAF | Oceaneering : Hanover, MD | 21.579 | 0.722 | Dec 2013 | 1.271 | Feb 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Systems Engineering - Technical | Various | Various : Various | 0.537 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Systems Engineering - Design, Integration | C/CPAF | Oceaneering : Hanover, MD | 5.101 | 1.290 | Mar 2014 | 0.442 | May 2015 | - | | - | | - | - | 6.833 | - |
| Systems Engineering - Design, Integration | C/CPAF | Oceaneering : Hanover, MD | 2.873 | - | Apr 2014 | 0.125 | Aug 2015 | - | | - | | - | - | 2.998 | - |
| Systems Engineering - Design & Integration | C/CPAF | Oceaneering : Hanover, MD | 1.380 | 0.517 | Aug 2014 | - | | - | | - | | - | - | 1.897 | - |
| Diving Equipment Product Development (00C) | Various | Various : Various | 1.556 | 0.497 | Sep 2014 | 0.586 | Jun 2015 | - | | - | | - | - | 2.639 | - |
| Diving Equipment Product Development (00C) | C/CPFF | GPC : Irvine, CA | 0.477 | 0.525 | Apr 2014 | 0.363 | Aug 2015 | - | | - | | - | - | 1.365 | - |
| Diving Equipment Product Development (00C) | C/CPFF | PCCI : Alexandria, VA | 0.000 | - | | 0.329 | Dec 2014 | 0.452 | Jan 2016 | - | | 0.452 | - | 0.781 | - |
| Diving Equipment Product Development (00C) | C/CPFF | RINI TECHOLOGIES : Oviedo, FL | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 61.477 | 3.551 | | 3.116 | | 0.452 | | - | | 0.452 | - | - | - |

**Remarks**

1. Oceaneering is the prime for SRDRS Transfer Under Pressure (TUP) capability. SRDRS Full Operational Capability (FOC) has been delayed due to efforts associated with Pressurized Rescue Module (PRM) restoration to service; FY15 funding decrease is due to program delays.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0394 / *Shallow Depth Diving EQ* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support (00C) | Various | Various : Various | 4.806 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Integrated Logistics Support | Various | Various : Various | 0.841 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Configuration Management | C/CPAF | Oceaneering : Hanover, MD | 0.489 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 6.136 | - | | - | | - | | - | | - | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | Various | Various : Various | 3.187 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Operational Test & Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 0.655 | 0.244 | Jan 2014 | 0.050 | Mar 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Test Baseline Documentation | WR | NUWC Keyport : Keyport, WA | 0.000 | 0.032 | Feb 2014 | 0.075 | Oct 2014 | - | | - | | - | - | 0.107 | - |
| | | **Subtotal** | 3.842 | 0.276 | | 0.125 | | - | | - | | - | - | - | - |

**Remarks**

FY14-FY15 funding supports Operational Evaluation Testing requirements.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | Various | QBS/Various : Richmond BC, Canada/Various | 0.074 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | NFESC : Port Hueneme, CA | 0.197 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603713N / *Ocean Engineering Tech Dev* | Project (Number/Name)<br>0394 / *Shallow Depth Diving EQ* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | PSNSY/ Various : Bremerton, WA/ Various | 2.197 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Government Engineering Support | Various | Various : Various | 1.859 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Program Management Support | Various | Perot : Washington, DC | 2.110 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Travel (Submarine Rescue) | Various | NAVSEA : Washington, DC | 0.759 | 0.025 | Oct 2013 | 0.050 | Oct 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Travel (00C) | Various | NAVSEA : Washington, DC | 0.100 | - | Oct 2013 | 0.050 | Oct 2014 | 0.037 | Oct 2015 | - | | 0.037 | - | 0.187 | - |
| SBIR Assessment | Various | Various : Various | 0.443 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Acquisition Workforce | Various | Various : Various | 0.021 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Program Management Support | C/CPIF | Dell Federal : Washington, DC | 0.674 | - | | 0.200 | Nov 2014 | - | | - | | - | - | 0.874 | - |
| Program Management Support | C/CPIF | Dell Federal : Washington, DC | 0.993 | - | | 0.189 | Jan 2015 | - | | - | | - | - | 1.182 | - |
| Program Management Support | C/CPIF | Dell Federal : Washington, DC | 1.072 | 0.600 | Jun 2014 | 0.306 | Jun 2015 | - | | - | | - | - | 1.978 | - |
| Government Engineering Support | WR | PNSY : Portsmouth, NH | 0.427 | - | Oct 2013 | 0.025 | Feb 2015 | - | | - | | - | - | 0.452 | - |
| Program Management Support (00C) | WR | NEDU : Panama City, FL | 0.060 | - | | - | | - | | - | | - | - | 0.060 | - |
| Program Management Support (00C) | C/CPFF | Unknown : Not Specified | 0.000 | - | | 0.030 | Mar 2015 | 0.031 | Nov 2015 | - | | 0.031 | - | 0.061 | - |
| | | **Subtotal** | 10.986 | 0.625 | | 0.850 | | 0.068 | | - | | 0.068 | - | - | - |

**Remarks**

Submarine Rescue travel increase in FY15 is related to Transfer Under Pressure integration efforts scheduled at Undersea Rescue Command, San Diego during FY15.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603713N / *Ocean Engineering Tech Dev* | Project (Number/Name)<br>0394 / *Shallow Depth Diving EQ* | |

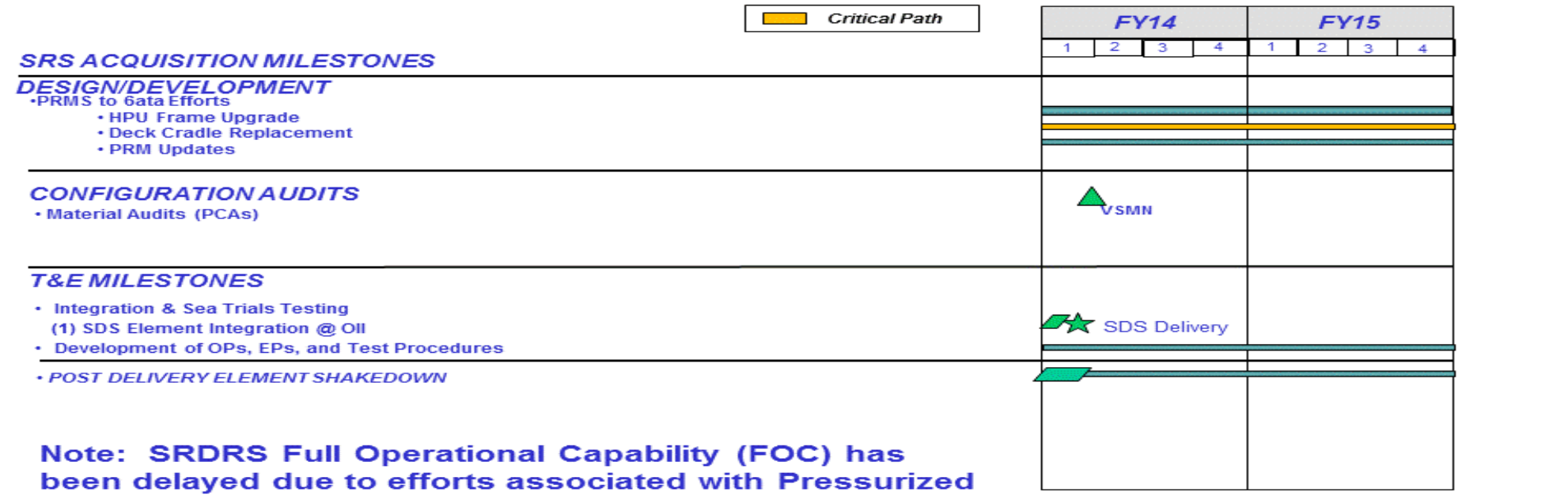
| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 82.441 | 4.452 | | 4.091 | | 0.520 | | - | | 0.520 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0394 / *Shallow Depth Diving EQ* |

# SRDRS Acquisition
## Transfer Under Pressure

Update 8 Jan 2015




**Note: SRDRS Full Operational Capability (FOC) has been delayed due to efforts associated with Pressurized Rescue Module (PRM) restoration to service; FY15 funding decrease is due to program delays.**

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603713N / *Ocean Engineering Tech Dev* | **Project (Number/Name)**<br>0394 / *Shallow Depth Diving EQ* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0394*** | | | | |
| *Design and Development* | 1 | 2014 | 4 | 2015 |
| HPU Frame Upgrade | 1 | 2014 | 4 | 2015 |
| Deck Cradle Replacement | 1 | 2014 | 4 | 2015 |
| PRM Updates | 1 | 2014 | 4 | 2015 |
| *Configuration Audits* | 1 | 2014 | 1 | 2014 |
| VSMN Material Audit | 1 | 2014 | 1 | 2014 |
| *T&E Milestones* | 1 | 2014 | 4 | 2015 |
| SDS Element Integration at OII and SDS Delivery | 1 | 2014 | 1 | 2014 |
| Development of OPs, EPS, and Test Procedures | 1 | 2014 | 4 | 2015 |
| Post Delivery Element Shakedown | 1 | 2014 | 4 | 2015 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603721N *I Environmental Protection* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 399.840 | 18.812 | 13.200 | 20.711 | - | 20.711 | 20.541 | 19.844 | 19.932 | 20.224 | Continuing | Continuing |
| 0401: *Shipboard Waste Mgmt* | 329.465 | 7.698 | 5.612 | 8.393 | - | 8.393 | 8.629 | 8.723 | 8.800 | 8.867 | Continuing | Continuing |
| 0817: *Environmental Sustainability Development (NESDI)* | 30.520 | 4.516 | 3.712 | 7.026 | - | 7.026 | 6.543 | 6.076 | 6.159 | 6.384 | Continuing | Continuing |
| 9204: *Marine Mammal Research* | 39.855 | 6.598 | 3.876 | 5.292 | - | 5.292 | 5.369 | 5.045 | 4.973 | 4.973 | Continuing | Continuing |

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

Many environmental laws, regulations, and policies impose restrictions on Navy vessels, aircraft, and facilities that interfere with operations and/or increase the cost of operations. The Navy must be able to conduct its national security mission in compliance with applicable environmental requirements in the U.S. and abroad without compromising
performance, safety, or health, while simultaneously minimizing the cost of compliance. This program develops and evaluates processes, hardware, systems, and operational procedures that will allow the Navy to operate in U.S., foreign, and international waters, air, space, and land areas while complying with environmental laws, regulations,
Executive Orders, policies and international agreements. The projects for this program element support the Navy's compliance with the (a) Clean Water Act, (b) Act to Prevent Pollution from Ships, (c) International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), (d) DoD 4715.6 R1, Regulations on Vessels Owned or Operated by the
Department of Defense, (e) OPNAVINST 5090.1C, Environmental and Natural Resources Program Manual,(f) 40 CFR Part 9 and Chapter VII (Uniform National Discharge Standards [UNDS] Phase I Standard), (g) Executive Order (EO) 13148, Greening the Government Through Leadership in Environmental Management, (h) Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, (i) National Invasive Species Act of 1996, (j) 33 CFR 151 Subpart D-Ballast Water Management for Control of Nonindigenous Species in Waters of the United States, (k) Clean Air Act, (l) Federal Insecticide, Fungicide, and Rodenticide Act, (m) Executive Order (EO) 13423 Strengthening Federal Environmental, Energy, and Transportation Management of 24 January, 2007. References (a) through (m) establish Level I environmental protection requirements for Navy shipboard systems, operations, and discharges in the areas of liquid wastes, hazardous materials, solid wastes, and other significant afloat environmental concerns. Project 0401 supports RDT&E efforts that enable Navy ships and submarines to comply with laws, regulations, and policies in six major areas: (1) Liquid Wastes, (2) UNDS Rulemaking, (3) Hazardous Materials and Pollution Prevention, (4) Hull Antifouling Paints, (5) Technical Authority, and (6) Ballast Water Exchange Improvements. Project 0817 supports RDT&E to develop and validate technologies to enable Navy facilities to comply with environmental laws, regulations, and policies in a cost-effective manner. Project 9204 supports RDT&E to develop planning and monitoring tools for minimizing Fleet contacts with and potential harassment (physiological and behavior) of marine animals including threatened and endangered species in response to Federal laws and regulations and public scrutiny.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | R-1 Program Element (Number/Name)<br>PE 0603721N *I Environmental Protection* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | 18.850 | 13.200 | 22.231 | - | 22.231 |
| Current President's Budget | 18.812 | 13.200 | 20.711 | - | 20.711 |
| Total Adjustments | -0.038 | - | -1.520 | - | -1.520 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.018 | - | | | |
| • SBIR/STTR Transfer | -0.020 | - | | | |
| • Program Adjustments | - | - | -0.962 | - | -0.962 |
| • Rate/Misc Adjustments | - | - | -0.558 | - | -0.558 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $0.5 million to account for the availability of prior year execution balances.

Technical: Not applicable.
Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603721N / *Environmental Protection* | | | | Project (Number/Name)<br>0401 / *Shipboard Waste Mgmt* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 0401: *Shipboard Waste Mgmt* | 329.465 | 7.698 | 5.612 | 8.393 | - | 8.393 | 8.629 | 8.723 | 8.800 | 8.867 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Navy ships and submarines must routinely operate in U.S., international, and foreign waters, and visit numerous U.S. and foreign ports. No body of water is without environmental restrictions that impact the movements and operations of Navy vessels. Environmental requirements tend to be most restrictive in port and in coastal waters, where the Navy's increasing littoral presence places ships and submarines in discharge-restricted waters for longer periods of time. Growing international cooperation in addressing global environmental concerns is resulting in expanding areas of ocean considered environmentally susceptible, where special prohibitions on ship discharges and operations are imposed. Navy vessels must comply with applicable environmental legal requirements while maintaining continued access to all waters for operations, exercises, training, and port access. The large crews and limited on-board space of Navy ships and submarines severely constrain their ability to hold wastes for return to port for shore side disposal.

The Shipboard Waste Management RDT&E project evaluates and develops shipboard environmental equipment, systems, technologies, processes, and practices to comply with environmental laws, regulations, Executive Orders, international agreements, foreign-country requirements, and DoD and Navy policies. The project focuses on providing engineering criteria, design guidance, and performance specifications for selecting, procuring, installing, integrating, and operating environmental equipment and systems on Navy ships and submarines, and on defining and developing processes, procedures and logistics support requirements. Environmental equipment, systems, processes and practices must meet legal and environmental requirements and be reliable, maintainable and achievable at sea, and impose no or low manning burden. Environmental equipment and systems must meet Navy-unique shipboard requirements (performance, space, weight, shock, vibration, electromagnetic compatibility, manning, automation, etc.), incorporate integrated logistics support, minimize life-cycle cost, and include validated acquisition, design, installation, and operating documentation. Shipboard processes and practices must be feasible and must be compatible with ship and submarine operational, maintenance, manning, habitability, health, and safety requirements. It also addresses afloat environmental issues other than shipboard wastes, e.g., access to environmental data for planning Fleet operations and exercises.

The Shipboard Environmental Protection Branch (SEA 05P5) is the designated Technical Warrant Holder for Environmental Systems & Materials Engineering, with responsibility and accountability for ensuring that ships and submarines are designed and upgraded, and can be operated, in compliance with existing and anticipated environmental requirements while minimizing total ownership cost and manning. This responsibility encompasses legacy platforms and new vessel designs, as well as Fleet operations exercises, and training.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Technical Authority | 2.223 | 1.200 | 3.087 | - | 3.087 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0401 / *Shipboard Waste Mgmt* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Conducted Technology Identification and Assessment Program (TIAP) and analysis of alternatives resulting in the submission of procurement packages for shipboard solid waste management equipment, including a solid waste incinerator and a waste converter. Additionally, submitted procurement packages for a compactor, baler, and densifier to conduct shipboard suitability testing.<br>***FY 2015 Plans:***<br>Develop environmental equipment/system requirements documentation, design criteria and guidance, specifications,<br>standards and certification protocols. Perform limited test and evaluation to facilitate execution of technical authority for legacy and new-design ship and submarine environmental capabilities. Conduct laboratory installation of shipboard solid waste management equipment procured in FY14 in preparation for FY16 laboratory testing. Develop test plans for equipment evaluation planned for FY16.<br>***FY 2016 Base Plans:***<br>Perform extensive full scale laboratory long term endurance testing of shipboard solid waste management equipment<br>(incinerator, waste converter, compactor, baler, and densifier) evaulating effectiveness and reliability of equipment to<br>facilitate execution of technical authority for ship and submarine environmental capabilities.<br><br>Develop waste stream management plans for tested equipment in support of the Act to Prevent Pollution from Ships (APPS)which invokes the requirements of MARPOL, Annex V.<br><br>Continue development of environmental equipment/system requirements documentation, design criteria/ guidance, specification standards, and certification protocols.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Integrated Liquid Wastes | 3.135 | 2.000 | 2.157 | - | 2.157 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Issued Notice of Proposed rulemaking for 11 discharge standards. Completed Armed Forces Work Group review of standards for 14 discharge Standards. Integrated data logger into Oil Content Monitor to support Oil Pollution | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0401 / *Shipboard Waste Mgmt* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Abatement improvements. Performed lab evaluation of Marine Sanitation Device systems for Army forward operating base.<br>***FY 2015 Plans:***<br>Will support rulemaking process in development of Uniform National Discharge Standards (UNDS) "Batch Two." Will continue development of Marine Pollution Control Device (MPCD) treatment systems, technologies and procedures, and evaluation of Commercial off the Shelf (COTS) wastewater systems.<br>***FY 2016 Base Plans:***<br>Will continue development of MPCD treatment systems, technologies and procedures, and evaluation of COTS wastewater systems. Will initiate implementation of UNDS into the Fleet.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Hazardous and Other Major Ship Wastes | 1.307 | 1.200 | 1.057 | - | 1.057 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Conducted shipboard hazardous material substitution and elimination by minimizing hexavalent chromium containing primers and sealants from shipboard systems. Developed the NAVSEA Hazardous Material (HM) Avoidance Engineering Technical Authority Procedure (ETAP). Documented testing procedures and acceptance criteria for Mercury Ion Exchange cartridges and developed an alternate paint mixing and dispensing system.<br>***FY 2015 Plans:***<br>Will conduct shipboard hazardous material substitution and elimination process by minimizing chemicals on the NAVSEA HM ETAP from shipboard systems. Will continue test and evaluation of pollution-prevention equipment aboard surface ships and submarines. Will investigate and develop deep sink usage guidelines for machinery spaces<br>***FY 2016 Base Plans:***<br>Will continue shipboard hazardous materials substitution and elimination process. Will continue test and evaluation of pollution-prevention equipment aboard surface ships and submarines.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Ballast Water Management | 1.033 | 1.212 | 2.092 | - | 2.092 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0401 / *Shipboard Waste Mgmt* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Worked towards determining feasible options for Ballast Water Treatment integration into LHA(R) and LX(R) designs and investigated rapid ballast tank treatment options in addition to survivability, damage control, and stability impacts.<br>***FY 2015 Plans:***<br>Will perform ballast water double exchange surveys and procedural product developmental test and evaluation on Expeditionary Warfare ships. Will identify and compare International Maritime Organization requirements for ballast water treatment system type approval, US Coast Guard Ballast Water Treatment (BWT) system type approval process, and testing facility protocols to develop recommendations for NAVSEA system approval requirements. Will update NSTM 593 to incorporate requirements of 5090.1D for shipboard use.<br>***FY 2016 Base Plans:***<br>Initiate new efforts to conduct research evaluating ballast water treatment hardware/systems in preparation for anticipated ballast water standards in joint EPA/DoD negotiated Uniform National Discharge Standards (UNDS) Batch 2. These efforts will evaluate the procurement of a ballast water treatment system to determine suitability for shipboard use. In addition building on FY15 efforts, will continue ballast water double exchange surveys and procedural product developmental test and evaluation on Expeditionary Warfare ships in addition to the development of NAVSEA requirements.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.698 | 5.612 | 8.393 | - | 8.393 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

RDT&E Contracts are Competitive Procurements.

**E. Performance Metrics**

Quarterly Program Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603721N / *Environmental Protection* | Project (Number/Name)<br>0401 / *Shipboard Waste Mgmt* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ancillary Hardware Development | Various | Misc. Contracts : Not Specified | 19.149 | - | | - | | - | | - | | - | - | 19.149 | Continuing |
| Primary Hardware Development | C/CPFF | Oceaneering : Not Specified | 1.000 | - | | - | | - | | - | | - | - | 1.000 | Continuing |
| Systems Engineering | C/CPFF | John J. McMullen & Son : Not Specified | 4.487 | - | | - | | - | | - | | - | - | 4.487 | Continuing |
| | | **Subtotal** | 24.636 | - | | - | | - | | - | | - | - | 24.636 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | WR | SPAWAR : Charleston, SC | 10.838 | - | | - | | - | | - | | - | - | 10.838 | Continuing |
| | | **Subtotal** | 10.838 | - | | - | | - | | - | | - | - | 10.838 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | MIPR | US Army Corps of Engineers : Norfolk, VA | 0.687 | - | | - | | - | | - | | - | - | 0.687 | - |
| Developmental Test & Evaluation | C/CPFF | NSWCCD, Bethesda, MD : Bethesda, MD | 187.562 | 7.333 | Nov 2013 | 5.392 | Nov 2014 | 8.145 | Nov 2015 | - | | 8.145 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | NSWCIHD : Indian Head, MD | 1.086 | - | | - | | - | | - | | - | - | 1.086 | - |
| Developmental Test & Evaluation | WR | NRL,Wash,DC : Wash,DC | 30.661 | 0.215 | Mar 2014 | 0.220 | Nov 2014 | 0.248 | Nov 2015 | - | | 0.248 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | SPAWARSYSCEN : SD,CA | 12.178 | 0.130 | Mar 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603721N / *Environmental Protection* | Project (Number/Name)<br>0401 / *Shipboard Waste Mgmt* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | Misc. Govt Labs : TBD | 22.975 | - | | - | | - | | - | | - | - | 22.975 | - |
| Developmental Test & Evaluation | C/CPFF | SAIC : San Diego, CA | 15.570 | - | | - | | - | | - | | - | - | 15.570 | - |
| Developmental Test & Evaluation | C/CPFF | Misc. Contracts : TBD | 13.103 | - | | - | | - | | - | | - | - | 13.103 | - |
| Process Control Engineering | C/CPFF | M. Rosenblatt & Sons : Arlington, VA | 6.547 | - | | - | | - | | - | | - | - | 6.547 | Continuing |
| Developmental Test & Evaluation | C/CPFF | ONR : Arlington, VA | 0.400 | - | | - | | - | | - | | - | - | 0.400 | Continuing |
| Developmental Test & Evaluation | WR | Naval Postgraduate School : Monterey, CA | 1.800 | - | | - | | - | | - | | - | - | 1.800 | Continuing |
| Process Control Engineering | MIPR | EPA, Hdqtrs : Washington, DC | 0.840 | - | | - | | - | | - | | - | - | 0.840 | Continuing |
| | | **Subtotal** | 293.409 | 7.678 | | 5.612 | | 8.393 | | - | | 8.393 | - | - | - |

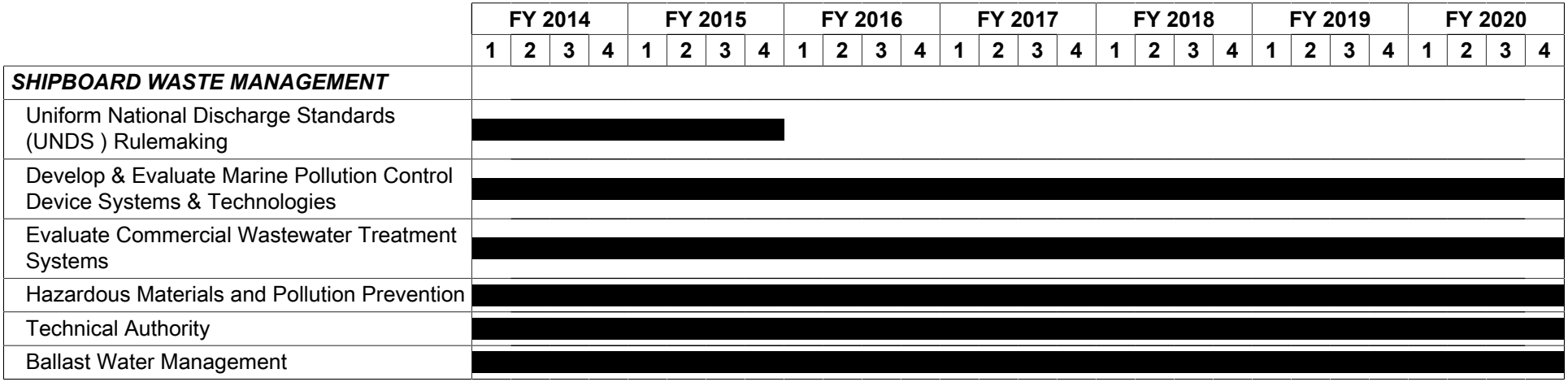
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | NAVSEA HQ : Washington, DC | 0.355 | 0.020 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| SBIR Assessment | TBD | Not Specified : Not Specified | 0.227 | - | | - | | - | | - | | - | - | 0.227 | Continuing |
| | | **Subtotal** | 0.582 | 0.020 | | - | | - | | - | | - | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 329.465 | 7.698 | | 5.612 | | 8.393 | | - | | 8.393 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0401 / *Shipboard Waste Mgmt* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0401 / *Shipboard Waste Mgmt* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***SHIPBOARD WASTE MANAGEMENT*** | | | | |
| Uniform National Discharge Standards (UNDS ) Rulemaking | 1 | 2014 | 4 | 2015 |
| Develop & Evaluate Marine Pollution Control Device Systems & Technologies | 1 | 2014 | 4 | 2020 |
| Evaluate Commercial Wastewater Treatment Systems | 1 | 2014 | 4 | 2020 |
| Hazardous Materials and Pollution Prevention | 1 | 2014 | 4 | 2020 |
| Technical Authority | 1 | 2014 | 4 | 2020 |
| Ballast Water Management | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603721N / *Environmental Protection* | Project (Number/Name)<br>0817 / *Environmental Sustainability Development (NESDI)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0817: *Environmental Sustainability Development (NESDI)* | 30.520 | 4.516 | 3.712 | 7.026 | - | 7.026 | 6.543 | 6.076 | 6.159 | 6.384 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Inherent to the realization of the vision outlined in Sea Power 21 are certain environmental consequences that will, to a lesser or greater degree, be an impact on the Navy's ability to fully achieve the strategy outlined in the Navy Capability Pillars (NCP) SEA SHIELD, SEA STRIKE, SEA BASING and FORCEnet and the supporting initiatives of SEA WARRIOR, SEA TRIAL and SEA ENTERPRISE. Readiness and training are primary considerations for determining whether any fighting force is at its peak proficiency. The ability to train our forces in a realistic environment is paramount. Today's reality requires training and operating within environmental constraints (national and international laws and agreements), and searching for alternatives to comply with and alleviate those constraints. Moreover, as we develop new systems and technologies in support of Sea Power 21, the Navy must anticipate potential environmental regulations which, while not currently an issue, could in the future adversely impact our ability to protect and sustain our forces at home and abroad.

This program identifies pervasive Navy shore side environmental requirements and develops and validates information, new processes, and technologies that address requirements that pose significant impact on Naval shore activities in complying with environmental laws, regulations, orders, and policies. The goal of the program is to maximize opportunities for significant cost savings while minimizing personnel liabilities, operational costs, and regulatory oversight and preserving or enhancing the ability of Naval shore activities to accomplish their required missions and functions in support of the Navy's transformational strategy.

EEC-2 MAXIMIZE TRAINING AND TESTING RANGE REQUIREMENTS WITHIN ENVIRONMENTAL CONSTRAINTS: This capability addresses environmental impacts and restrictions at Navy land and sea ranges, including munitions testing and manufacturing, to ensure Navy ranges are available to conduct required training and testing operations for the Fleet. Investments in EEC-2 provide validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs at Navy training and test ranges to maximize the availability and utilization of the ranges. The results support operational readiness by providing the tools and technologies necessary for sustaining and managing Navy land and sea ranges related to unexploded ordnance (UXO) and munitions, encroachment, air quality, airborne noise, water quality, and wetlands. Capabilities gained include the ability to assess and determine the risks from underwater UXO, the evaluation and prioritization of ordnance contaminated sites for evaluation in environmental programs, and the implementation of range specific best management practices by evaluating and modeling available process, procedures, and technologies.

EEC-3 PLATFORM MAINTENANCE AND REPAIR WITH MINIMAL ENVIRONMENTAL FOOTPRINT: This capability focuses on minimizing or eliminating environmental impact related to Navy and Marine Corps weapon system repair and maintenance operations. Investments in EEC-3 provide valid knowledge, models, processes, and technologies to minimize regulated emissions, discharges and hazardous material usage during the repair and maintenance of ships, submarines, and surface/ sub-surface vehicles and aircraft and air vehicles. The program supports Fleet operational readiness and Navy acquisition communities by investing in information to understand emerging environmental requirements and to develop innovative processes and technologies that result in savings while reducing the fleet environmental

constraints related to platform maintenance. Capabilities and benefits gained include, but are not limited to, the reduction in the usage of heavy metals used in metal finishing (chromium and cadmium), reduced hazardous air pollutant (HAP) emissions, and the development of best management practices and tools to minimize the use of hazardous materials and the generation of hazardous wastes associated with maintaining and repairing ships, submarines and aircraft and unmanned vehicles. Results of program investments will be leveraged across weapon system and platform acquisition to ensure continued reduction in lifecycle costs and long-term environmental compliance burdens to the Fleet.

EEC-4. SUPPORT SHORE READINESS WITHIN ENVIRONMENTAL CONSTRAINTS: Naval shore establishment requires the capability to operate and maintain facilities and provide waterfront and airfield services to the fleet while complying with applicable environmental regulations and minimizing environmental impacts and costs. The program invests in knowledge and innovative processes and technologies that minimize infrastructure and operational costs, regulated emissions, while minimizing discharges and hazardous material usage from ship (waterfront) and aviation operations. Capabilities and benefits gained under EEC-4 include reduced costs associated with wastewater treatment, elimination/reduction in the use of HAPs, ozone depleting substances (ODSs), and volatile organic compounds (VOCs), and the associated reporting requirements, reduced hazardous waste and disposal costs, and improved storm water management.

EEC-5. COST-EFFECTIVE MANAGEMENT OF ENVIRONMENTAL REGULATORY REQUIREMENTS: The environmental compliance regulations require base managers to permit, monitor and report on many processes associated with weapon system and platform operations. Naval shore environmental managers require the capability to efficiently and cost effectively manage these compliance requirements. Under EEC-5, the program invests in improved data collection, methods, and models to assess environmental impacts and ecological risk assessments of Naval Operations on harbors, U.S. waterways, and surrounding communities. Benefits include gaining standardized technical environmental management improvements/techniques related to source control, assessment, and monitoring. EEC-5 also provides validated knowledge, models, processes and technologies to improve environmental monitoring and reporting, and to reduce the cost of compliance with regulations applicable to coastal contamination and contaminated sediments.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Maximize Training & Testing Requirements Within Environmental Constraints | 0.764 | 0.590 | 1.240 | - | 1.240 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued providing validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs at Navy training and test ranges to maximize the availability and utilization of the ranges. Completed risk assessment associated with military expendable material used in underwater ranges. Technology integration of process to determine background perchlorate sources at Navy ranges ongoing. Continued two-year post survey for cable pull field study to determine long term effects and site recovery of a cable removal in the near-shore environment. Continued demonstration of passive samplers for assessing environmentally realistic concentrations of munitions constituents at underwater unexploded ordnance sites and the detection and classification of munitions and explosives of concern in shallow highly dynamic underwater | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0817 / *Environmental Sustainability Development (NESDI)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| environments. Completed demonstration of transportable field melter for recycling of bombing range MPPEH, and innovative cutting process to vent full scale non-explosive practice munitions.<br>***FY 2015 Plans:***<br>FY15 funding will be used to continue providing validated knowledge, models, and processes to mitigate environmental impacts restrictions, and costs of Navy training and test ranges to maximize the availability and utilization of the ranges.<br>***FY 2016 Base Plans:***<br>FY16 funding will be applied to the backlog of:<br>- Continue providing validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs of Navy training and test ranges to maximize the availability and utilization of the ranges.<br>- Start new tasks for multi-spectral weapon impact detection system and underwater low environmental impact munitions breaching technology to better characterize environmental impacts of munitions on training ranges and munitions response sites.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Platform Maintenance and Repair With Minimal Environmental Footprint | 0.860 | 0.725 | 1.613 | - | 1.613 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued all aviation sustainment related projects related to chrome alternatives and cadmium reductions. Continued projects that address the elimination of overspray in shipbuilding and facilities maintenance operations. Completed cyanide waste reduction of electroplating and stripping process, low-VOC and HAP wipe solvent and paint thinner DEM/VAL and a study on replacements for Cadmium electrical connectors. Continue portable treatment for ship material removal processes, and demonstration of advanced non-chromate primers and coatings.<br>***FY 2015 Plans:***<br>FY15 funding will be used to:<br>- Continue aviation sustainment projects related to chrome alternatives and cadmium reductions, continue the elimination of overspray in shipbuilding and facilities maintenance operations. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0817 / *Environmental Sustainability Development (NESDI)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Start investigation of improved epi-seal materials for use in general purpose bombs, and trivalent chromium conversion coating enhanced coloration of aluminum substrates.<br>***FY 2016 Base Plans:***<br>FY16 funding will be applied to the substantial backlog to:<br>- Continue all aviation sustainment projects related to chrome alternatives and cadmium reductions, continue the elimination of overspray in shipbuilding and facilities maintenance operations and continue projects on trivalent chromium conversion coating-enhanced coloration of aluminum substrates.<br>- Start new tasks for the projects mobile pier facility waste water treatment system and advanced nonchromate primers and coatings.<br>- Initiate cadmium and chromium elimination and aqueous cleaning projects.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Support Shore Readiness within Environmental Constraints | 1.169 | 0.995 | 1.793 | - | 1.793 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued providing new systems and processes to minimize regulated emissions, discharges and hazardous material usage resulting specifically from waterfront support, aviation support, and other base operations. Continued to address surface cleaning of dry dock floors, oil boom biofouling control, and dry dock sediment management.<br>***FY 2015 Plans:***<br>FY15 funds will be used to continue providing systems and processes to minimize regulated emissions, discharges and hazardous material usage resulting specifically from waterfront support, aviation support, and other base operations. Continue oil boom fouling control.<br>***FY 2016 Base Plans:***<br>- Continue providing systems and processes to minimize regulated emissions, discharges and hazardous material usage resulting specifically from waterfront support, aviation support, and other base operations. Continue oil boom fouling control.<br>- Start dry dock sediment management, treatment of ship heavy metal contaminated oily waste and the evaluation of compliance options for NPDES permits for cooling water intake structures.<br>***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0817 / *Environmental Sustainability Development (NESDI)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Cost-Effective Management of Environmental Regulatory Requirements | 1.723 | 1.402 | 2.380 | - | 2.380 |
| ***Articles:*** | - | - | - | - | - |

***FY 2014 Accomplishments:***
Continue providing validated knowledge, models, processes and systems to improve environmental monitoring and reporting, and reduce the cost of compliance with regulations applicable to coastal contamination and contaminated sediments. Continued projects on emissions capture technology for oxy-fuel hull cutting operations. Completed projects on aerobic bioaugmentation for remediation of RDX-contaminated groundwater.

***FY 2015 Plans:***
FY15 funds will be used to:
- continue providing validated knowledge, models, processes and systems to improve environmental monitoring and reporting, and reduce the cost of compliance with regulations applicable to coastal contamination and contaminated sediments.
- Continue projects on emissions capture technology for oxy-fuel hull cutting operations. Start low impact development (LID) demonstration/validation and enterprise hazardous waste application, and pier side in situ discharge monitoring for CHT contaminants.

***FY 2016 Base Plans:***
FY16 funding will be applied to:
- Continue providing validated knowledge, models, processes and systems to improve environmental monitoring and reporting, and reduce the cost of compliance with regulations applicable to coastal contamination and contaminated sediments.
- Start new tasks for sustainable remediation of low pH aquifers and aquifers with a continuing contaminant source using proton reduction technology, aerobic bio-augmentation for remediation of RDX contaminated groundwater, reduce the cost of compliance with coastal contamination and contaminated sediment and demonstration of improved method for quantifying algae biomass to meet nutrient numeric endpoint permit compliance.
- Initiate projects for coral reef assessment technology, vapor intrusion prevention and improved treatment of contaminated stormwater.

***FY 2016 OCO Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0817 / *Environmental Sustainability Development (NESDI)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.516 | 3.712 | 7.026 | - | 7.026 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

This project is categorized as Non-ACAT (Non Acquisition). The project delivers a broad spectrum of products that require a variety of acquisition processes to implement. Equipment products for naval stations and other mission funded activities are often procured directly through the base operating budget. Equipment products for Shipyards and other Navy Working Capital Fund (NWCF) activities costing over $250K are procured through their Capital Investment Program (CIP). For both types of activities, equipment products costing less than $250K, and process changes not requiring the purchase of new equipment such as consumable material or product substitutions, are funded through the activity's operating budgets. Occasionally there is a technology that must be implemented as a specialized facility. These are acquired through the Military Construction (MCON) Program. All these acquisition processes are pursued using a common strategy that satisfies the needs of all the critical stakeholders: 1) Fleet end user; 2) Funding sponsor for the Navy end user; 3) Other stakeholders with cognizance over the Navy process or operation being changed, 4) Cognizant environmental federal, state, and local regulators; and 5) The private or government organization that will produce the product.

**E. Performance Metrics**

Quarterly Budget Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0817 / *Environmental Sustainability Development (NESDI)* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EEC 2 | Various | EXWC : PT HUENEME, CA | 4.087 | 0.613 | Oct 2013 | 0.490 | Oct 2014 | 0.765 | Feb 2016 | - | | 0.765 | Continuing | Continuing | Continuing |
| EEC 2 | Various | SSC : SAN DIEGO, CA | 4.700 | 0.425 | Mar 2014 | 0.100 | Oct 2014 | 0.475 | Jul 2016 | - | | 0.475 | Continuing | Continuing | Continuing |
| EEC 3 | Various | NAWC : PATUXENT RIVER, MD | 1.321 | 0.260 | Mar 2014 | 0.100 | Oct 2014 | 0.295 | Aug 2016 | - | | 0.295 | Continuing | Continuing | Continuing |
| EEC 3 | Various | NSWC : BETHESDA, MD | 3.034 | 0.300 | Feb 2014 | 0.100 | Oct 2014 | 0.185 | Feb 2016 | - | | 0.185 | Continuing | Continuing | Continuing |
| EEC 3b | Various | EXWC : PT HUENEME, CA | 0.990 | 0.267 | May 2014 | - | | 0.050 | Jul 2016 | - | | 0.050 | Continuing | Continuing | Continuing |
| EEC 4 | Various | EXWC : PT HUENEME, CA | 5.694 | 0.537 | Jun 2014 | 0.400 | Dec 2014 | 0.715 | Oct 2015 | - | | 0.715 | Continuing | Continuing | Continuing |
| EEC 4 | Various | NSWC : BETHESDA, MD | 2.290 | 0.418 | Oct 2013 | 0.500 | Dec 2014 | 0.690 | Mar 2016 | - | | 0.690 | Continuing | Continuing | Continuing |
| EEC 4a | Various | SSC : SAN DIEGO, CA | 2.541 | 0.409 | Apr 2014 | 0.100 | Dec 2014 | 0.269 | Apr 2016 | - | | 0.269 | Continuing | Continuing | Continuing |
| EEC 5 | Various | EXWC : PT HUENEME, CA | 1.929 | 0.100 | Jun 2014 | 0.450 | Nov 2014 | 1.079 | Jul 2016 | - | | 1.079 | Continuing | Continuing | Continuing |
| EEC 5 | Various | SSC : SAN DIEGO, CA | 0.705 | - | | 0.425 | Nov 2014 | 0.331 | Oct 2015 | - | | 0.331 | Continuing | Continuing | Continuing |
| EEC 5 | Various | NAWC : PATUXENT RIVER, MD | 0.842 | 0.200 | Jun 2014 | - | | 0.175 | Aug 2016 | - | | 0.175 | Continuing | Continuing | Continuing |
| EEC 5 | Various | NSWC : BETHESDA, MD | 0.607 | 0.326 | Feb 2014 | 0.322 | Feb 2015 | 0.730 | Oct 2015 | - | | 0.730 | Continuing | Continuing | Continuing |
| EEC 5 | Various | NAWCWD : CHINA LAKE, CA | 0.707 | 0.287 | Feb 2014 | 0.075 | Nov 2014 | 0.095 | Feb 2016 | - | | 0.095 | Continuing | Continuing | Continuing |
| EEC 5 | Various | NAWC : LAKE HURST, NJ | 0.442 | 0.174 | Feb 2014 | 0.050 | Nov 2014 | 0.089 | Jul 2016 | - | | 0.089 | Continuing | Continuing | Continuing |
| EEC 3 | Various | FRC - SE : JACKSONVILLE, FL | 0.270 | 0.200 | Oct 2013 | 0.400 | Oct 2014 | 0.550 | Oct 2015 | - | | 0.550 | Continuing | Continuing | Continuing |
| EEC 3 | Various | FRC - SW : San Diego, CA | 0.000 | - | | - | | 0.383 | Mar 2016 | - | | 0.383 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0817 / *Environmental Sustainability Development (NESDI)* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EEC 3 | Various | FRC - CE : Cherry Point, NC | 0.145 | - | | 0.100 | Nov 2014 | 0.075 | Mar 2016 | - | | 0.075 | Continuing | Continuing | Continuing |
| EEC 3 | Various | NSWC : San Diego, CA | 0.216 | - | | 0.100 | Oct 2014 | 0.075 | Feb 2016 | - | | 0.075 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 30.520 | 4.516 | | 3.712 | | 7.026 | | - | | 7.026 | - | - | - |

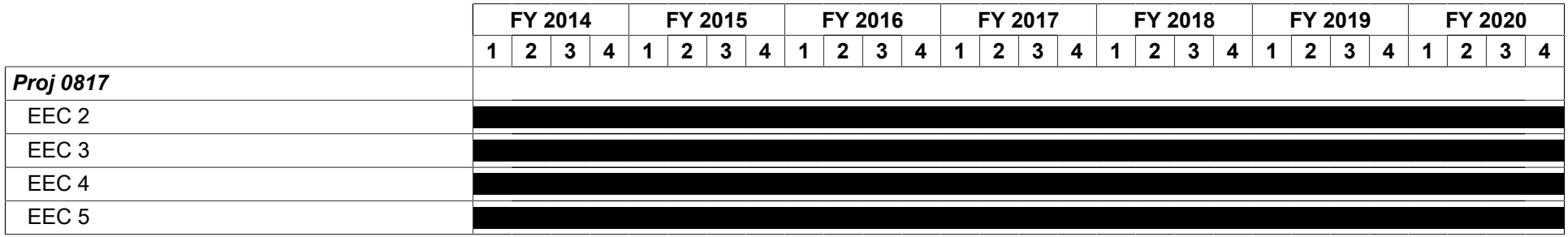
**Remarks**

Performing Activities: Naval Surface Warfare Center, Carderock Division (NSWC/CD); Engineering and Expeditionary Warfare Center (EXWC), Port Hueneme, CA; Naval Surface Warfare Center, Indian Head Division (NSWC/IH); Space and Warfare Systems Center, San Diego (SSC/SD); Naval Air Warfare Center Aircraft Division Patuxent River (NAWCAD/PAX); Naval Air Warfare Center (NAWCWD/China Lake); Naval Air Warfare Center Aircraft Division Lakehurst (NAWCAD/Lakehurst); Fleet Readiness Center Southeast, Jacksonville FL (FRC-SE); Fleet Readiness Center Southwest, San Diego (FRC-SW), Fleet Readiness Center East, Cherry Point (FRC-CE). Total Prior Years Cost: Subtotal does not include performing activities from prior years that are no longer performing activities. Award Dates: About 55% of the project is executed via contracts awarded by the performing activities.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 30.520 | 4.516 | | 3.712 | | 7.026 | | - | | 7.026 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0817 / *Environmental Sustainability Development (NESDI)* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>0817 / *Environmental Sustainability Development (NESDI)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0817*** | | | | |
| EEC 2 | 1 | 2014 | 4 | 2020 |
| EEC 3 | 1 | 2014 | 4 | 2020 |
| EEC 4 | 1 | 2014 | 4 | 2020 |
| EEC 5 | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | Date: February 2015 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603721N / *Environmental Protection* | | | | Project (Number/Name)<br>9204 / *Marine Mammal Research* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 9204: *Marine Mammal Research* | 39.855 | 6.598 | 3.876 | 5.292 | - | 5.292 | 5.369 | 5.045 | 4.973 | 4.973 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Navy has been and will continue to be subject to litigation with regard to the potential injuring, killing or biologically significant disturbance of marine animals by the use of intense underwater sound. Since Fleet operation and training areas coincide with known or probable habitats, migration routes, or breeding areas of marine mammals and other protected marine species, the possibility exists that such incidents are likely to continue in the future. The increasing public interest and pressure has resulted in escalating Fleet costs. For example, Fleet and SYSCOM development activities have been interrupted; modified, or altogether cancelled and environmental regulations have, among other things, required new ship construction shock trials to obtain Federal permits and conduct extensive environmental planning that can take several years to complete. The incorporation of mitigation measures in Fleet training operations to minimize the potential adverse effects on protected marine animals can significantly reduce the realism of these operations. In addition, the testing, evaluation, and deployment of new sonar detection and monitoring systems that use active acoustics are under intense public scrutiny for their potential adverse effects on whales and other marine mammals. Navy needs scientific evidence to substantiate its claims of limited or inconsequential adverse effects to marine life from operations.

This project primarily focuses on the development of planning, monitoring, and mitigating tools to aid the Fleet in minimizing contact with and the potential harassment of protected marine animals during operations, exercises, training, and undersea surveillance and weapons testing. These new capabilities will encompass historical and newly acquired data and analytical models that together can predict marine animal habitats (where they are likely to be), and their natural and expected behavior (diving patterns, prey localization, calling activity, etc.). This project consists of three major areas that will help ensure Navy compliance with the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA).
These areas are (1) Marine Ecology and Population Dynamics - Determine the likelihood of the presence of marine mammals or other protected species by developing habitat and ecological models. Refine marine animal survey techniques to optimize the accuracy of abundance estimates in small ocean regions of Navy interest.
(2) Criteria, Thresholds, and Mitigation - Establish criteria and thresholds from which to measure potential impact on marine mammals and other marine species from Navy training operations. Determine the effectiveness and usefulness of various mitigation measures in relation to the potential impact of Navy operations on marine mammals; and (3) Mitigation Methodologies - Determine the observation, detection and classification measures required to develop effective monitoring and mitigation procedures for Fleet and SYSCOM use. Focus on improving marine animal monitoring capabilities over current methods by developing new technologies or improving existing technologies that improve monitoring and mitigation effectiveness, reduce cost, and minimize impacts on readiness activities.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
|---|---|---|---|---|---|
| ***Title:*** Marine Ecology and Population Dynamics | 1.467 | 0.735 | 0.707 | - | 0.707 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>9204 / *Marine Mammal Research* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue research on ecosystems status and habitat use by marine species of Navy interest; sensor and tag development; with a priority emphasis on the population structure of beaked whales in the vicinity of Navy training ranges. Work with the Navy Marine Species Density data program to develop data standards and data management standards consistent with the best standards of the expert community.<br>***FY 2015 Plans:***<br>Continue research on ecosystems status and habitat use by marine species of Navy interest; sensor and tag development; with a priority emphasis on the population structure of beaked whales in the vicinity of Navy training ranges. A few projects related to integrating data into the Navy Marine Species Density data program were completed in FY14. This included the development of data standards for line transect surveys in coordination with the USGS, and a demonstration-validation project for improving density estimates from line transect surveys with passive acoustic data.<br>***FY 2016 Base Plans:***<br>Continue research on ecosystems status and habitat use by marine species of Navy interest; sensor and tag development; with a priority emphasis on the population structure of beaked whales in the vicinity of Navy training ranges. Work with the Navy Marine Species Density data program to develop tools and methods to improve the abundance estimates and density distribution data, consistent with the best standards of the expert community.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Criteria and Thresholds, Physiology and Behavior, and Effects of Sound | 3.654 | 1.113 | 1.760 | - | 1.760 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Research regarding low frequency weighting functions for dolphins and pinnipeds was completed by the Navy's marine mammal program. Research by the University of Hawaii to obtain TTS data for low frequency sounds in bottlenose dolphins was also ended.<br><br>Continue research to determine what constitutes biologically significant behavioral response to Navy-generated sound on individuals with respect to disruption of natural behavior patterns, ascertaining the short and long-term effects of such disruptions and documenting avoidance behaviors, with reduced effort due to budget constraints. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>9204 / *Marine Mammal Research* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue research on selected topics related to hearing-based criteria, such as hearing weighting functions and anatomically derived hearing properties for species that cannot be tested directly.<br>***FY 2015 Plans:***<br>The program will continue research to determine what constitutes biologically significant behavioral response to Navy-generated sound on individuals with respect to disruption of natural behavior patterns, ascertaining the short and long-term effects of such disruptions and documenting avoidance behaviors. Research related to anatomically derived hearing properties for large whales will also continue since this is a priority of the regulator. One project in this topic area closed out in FY14, but another is ongoing and the execution timeline has been delayed due changes principal investigator's availability.<br>***FY 2016 Base Plans:***<br>Funding will be applied to the required focus area to support the refinement of criteria and thresholds for our at-sea training and testing permits which are required in FY18. Projects are often 1-2 year efforts and must be initiated in FY16 or they would jeopardize the ability to obtain authorization from regulatory agencies to conduct training and testing activities. Additional funding is required for the Navy's Southern California Behavioral Response project to support the close out and final analysis of field data collected over the past five years.<br><br>Overall, the program will continue research to determine what constitutes biologically significant behavioral response to Navy-generated sound on individuals with respect to disruption of natural behavior patterns, ascertaining the short and long-term effects of such disruptions and documenting avoidance behaviors. Research regarding anatomically derived hearing properties for large whales will also continue since this is a priority of the regulator. Funding in these focus areas allows the Navy to meet environmental compliance requirements for impacts analysis and avoid costly litigation.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Mitigation Methodologies: Monitoring, New Technology, and Risk Assess | 1.477 | 2.028 | 2.825 | - | 2.825 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continue research to determine the observation, detection and classification measures required to develop effective monitoring and mitigation procedures. Focus to improve marine mammal monitoring capabilities over current methods by developing new and adapting existing technology for improved performance, reduced cost and reduced impacts on the realism and effectiveness of readiness training. In FY 15 and beyond an increased | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>9204 / *Marine Mammal Research* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| effort in assessing the potential of unmanned air and underwater platforms, to reduce the cost of monitoring, expand coverage and reduce impacts on readiness training.<br>***FY 2015 Plans:***<br>The Navy recently obtained new permits for at-sea training and testing activities across our Navy ranges. The new permits have specific requirements that must be answered by our monitoring efforts, however, they also allow the Navy more flexibility in terms of the monitoring methods we employ. As a result, the LMR program requires increased investment in the development and demonstration of new or improved monitoring methodologies to transition these capabilities to the Fleets and SYSCOMs to meet our permit requirements. Research in the following areas will continue or increase: 1) evaluating the use of underwater gliders to expand our coverage and reduce our costs; 2) improvements to current passive acoustic recording devices (i.e. HARPs) to improve their longevity, accuracy, and reduce lifecycle costs; and 3) integrating a real time passive acoustic monitoring system for Navy operational use. LMR is increasing investment to fund the deployment and refinement of the M3R system to transition aspects of the program to the Fleets and SYSCOMs, and eventually reducing the RDT&E burden associated with this project.<br>***FY 2016 Base Plans:***<br>To support our ongoing permit requirements to monitor the effects of at-sea training and testing activities, increased investment is required in this focus area to remain in compliance. Overall, the LMR program will continue to fund monitoring capabilities of marine animals to include; the development of new technologies and improvements to existing technologies. In particular, investment in the use of UUV and AAVs will increase as these platforms have recently become more mature and are able to be leveraged to meet monitoring requirements with some modifications to their hardware. The Navy is also working to refine the High-Frequency Recording Package (HARP), which is our most common passive acoustic recording system in Navy-wide use for acoustic monitoring. Improvements to this system will increase the duration of deployments, increase the bandwidth and accuracy of recordings, and reduce lifecycle maintenance costs. Increased funding in FY16 will be used to accelerate the transition of new or improved lower cost monitoring technologies to the Fleets and SYCOMs to reduce the impacts on readiness activities that current monitoring and mitigation technologies have.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 6.598 | 3.876 | 5.292 | - | 5.292 |

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

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>9204 / *Marine Mammal Research* |

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

**Remarks**

**D. Acquisition Strategy**

(U) RDTEN Contracts are Competitive Procurements.

**E. Performance Metrics**

Quarterly Program Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603721N / *Environmental Protection* | Project (Number/Name)<br>9204 / *Marine Mammal Research* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Criteri & Thresholds | SS/CPFF | University of Hawaii : Hawaii | 0.630 | 0.200 | Dec 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Mgmt (Mar Ecol & Pop Dynamics) | WR | EXWC : Port Hueneme, CA | 0.400 | 0.622 | Nov 2013 | 0.300 | Dec 2014 | 0.550 | Oct 2015 | - | | 0.550 | Continuing | Continuing | Continuing |
| Mitigation Methods | WR | OASIS Technologies, Inc. : Lexington, MA | 0.427 | - | | 0.329 | Dec 2014 | 0.354 | Jan 2016 | - | | 0.354 | Continuing | Continuing | Continuing |
| Mitigation Methods | WR | Bahamas Maine Mammal Research Organization (BMMRO) : Bahamas | 0.043 | 0.131 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Mitigation Methods | WR | SPAWAR : San Diego, CA | 0.000 | - | | 0.169 | Dec 2014 | 0.692 | Jan 2016 | - | | 0.692 | Continuing | Continuing | Continuing |
| Mitigation Methods | SS/CPFF | Scripps Institute : San Diego, CA | 0.000 | - | | 0.250 | Jan 2015 | 0.250 | Oct 2015 | - | | 0.250 | Continuing | Continuing | Continuing |
| Mitigation Methods | SS/CPFF | Oregon State Univ : OR & HI | 0.000 | - | | 0.285 | Jan 2015 | 0.321 | Jan 2016 | - | | 0.321 | Continuing | Continuing | Continuing |
| Mar Ecol & Pop Dynamics | WR | NAVAIR : Lakehurst, NJ | 0.000 | - | | 0.220 | Jan 2015 | 0.082 | Oct 2015 | - | | 0.082 | Continuing | Continuing | Continuing |
| Mar Ecol & Pop Dynamics | SS/CPFF | BMC Inc. : Chicago, IL | 0.000 | - | | 0.215 | Jan 2015 | 0.075 | Jan 2016 | - | | 0.075 | Continuing | Continuing | Continuing |
| Mitigation Methods | WR | NUWC : Newport, RI | 7.363 | 1.000 | Nov 2013 | 0.560 | Nov 2014 | 1.120 | Jan 2016 | - | | 1.120 | Continuing | Continuing | Continuing |
| Criteria & Thresholds | SS/CPFF | SEA Inc : Aptos, CA | 1.545 | 0.236 | Feb 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Mar Ecol & Pop Dynamics | WR | NPGS : Monterey, CA | 3.219 | 0.300 | Dec 2013 | - | | 0.030 | Oct 2015 | - | | 0.030 | Continuing | Continuing | Continuing |
| Mar Ecol & Pop Dynamics | MIPR | NOAA SWFSC : La Jolla, CA | 2.779 | 0.632 | Dec 2013 | - | | 0.035 | Oct 2015 | - | | 0.035 | Continuing | Continuing | Continuing |
| Mitigation Methods | SS/CPFF | Scripps Institute : La Jolla, CA | 8.835 | 0.600 | Jan 2014 | 0.280 | Dec 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Mitigation Methods | SS/CPFF | Oregon State Univ. : Corvallis, OR | 1.631 | 0.222 | Jan 2014 | 0.155 | Nov 2014 | 0.058 | Jan 2016 | - | | 0.058 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603721N / *Environmental Protection* | Project (Number/Name)<br>9204 / *Marine Mammal Research* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Criteria & Thresholds | SS/CPFF | Woods Hole Oceanographic Inst : Woods Hole, MA | 2.726 | 0.403 | Jan 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Criteria & Thresholds | WR | SPAWAR : San Diego, CA | 2.733 | 0.400 | Nov 2013 | - | | 0.642 | Jan 2016 | - | | 0.642 | Continuing | Continuing | Continuing |
| Criteria & Thresholds | WR | Cascadia Research Collective : Olympia, WA | 3.244 | 0.950 | Jan 2014 | 1.113 | Nov 2014 | 1.083 | Oct 2015 | - | | 1.083 | Continuing | Continuing | Continuing |
| Mar Ecol & Pop Dynamics | MIPR | NOAA NEFSC : Woods Hole, MA | 0.816 | 0.312 | Dec 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Criteria & Thresholds | SS/CPFF | San Diego State Univ : San Diego, CA | 1.787 | 0.457 | Feb 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Criteria & Thresholds | WR | CNAF : San Diego, CA | 1.677 | 0.133 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 39.855 | 6.598 | | 3.876 | | 5.292 | | - | | 5.292 | - | - | - |

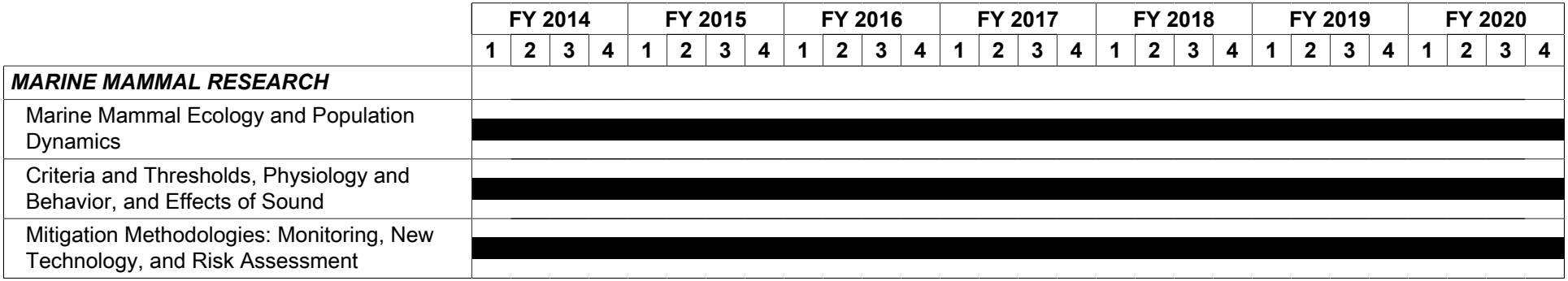
**Remarks**

Major performers in the Marine Mammal Monitoring on Ranges (M3R) project will develops techniques for passive acoustic monitoring in the Southern California Offshore Range (SCOR) and other Navy Range Complexes, including the Hawaii Range Complex, and others, including the planned Undersea Warfare Training Range (USWTR) on the US Atlantic coast. Visual survey, tagged animal data, and other survey methods will be used with M3R to calibrate the derived data products from each, while producing information on the relative cost, strengths and weaknesses that will allow Navy environmental managers to optimize the allocation of compliance funding. These methods also serve to provide animal density estimation and predictive modeling. Other major projects include data standards development, signal processing technology development to accelerate analysis of large monitoring data sets and reduce cost, and data development to support next-generation risk criteria based on improved and expanded hearing and behavioral response data.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 39.855 | 6.598 | | 3.876 | | 5.292 | | - | | 5.292 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>9204 / *Marine Mammal Research* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603721N / *Environmental Protection* | **Project (Number/Name)**<br>9204 / *Marine Mammal Research* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***MARINE MAMMAL RESEARCH*** | | | | |
| Marine Mammal Ecology and Population Dynamics | 1 | 2014 | 4 | 2020 |
| Criteria and Thresholds, Physiology and Behavior, and Effects of Sound | 1 | 2014 | 4 | 2020 |
| Mitigation Methodologies: Monitoring, New Technology, and Risk Assessment | 1 | 2014 | 4 | 2020 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603724N *I Navy Energy Program* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 164.621 | 43.851 | 63.804 | 47.761 | - | 47.761 | 62.919 | 59.123 | 55.061 | 55.770 | Continuing | Continuing |
| 0829: *ENERGY CONSERVATION (ADV)* | 35.868 | 7.505 | 16.320 | 9.278 | - | 9.278 | 20.225 | 19.086 | 16.442 | 16.723 | Continuing | Continuing |
| 0838: *Mobility Fuels (ADV)* | 47.334 | 8.958 | 10.745 | 12.509 | - | 12.509 | 12.952 | 12.705 | 12.159 | 12.304 | Continuing | Continuing |
| 0928: *Directed Energy Research* | 40.630 | 1.420 | 6.703 | 2.019 | - | 2.019 | 1.883 | 1.830 | 1.734 | 1.769 | Continuing | Continuing |
| 0996: *Aircraft Energy Conservation* | 40.789 | 25.968 | 30.036 | 23.955 | - | 23.955 | 27.859 | 25.502 | 24.726 | 24.974 | Continuing | Continuing |

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

This program supports projects to evaluate, adapt, and demonstrate energy related technologies for Navy aircraft and ship operations to: (a) increase fuel-related weapons systems capabilities such as range and time on station; (b) reduce energy costs; (c) apply energy technologies that improve environmental compliance; (d) examine restrictive fuel specification requirements to reduce cost and increase availability worldwide; (e) provide guidance to fleet operators for the safe use of commercial grade or off-specification fuels; and (f) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems. This program supports the achievement of legislated, White House, Department of Defense, and Navy Energy Management Goals.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 45.618 | 69.415 | 57.021 | - | 57.021 |
| Current President's Budget | 43.851 | 63.804 | 47.761 | - | 47.761 |
| Total Adjustments | -1.767 | -5.611 | -9.260 | - | -9.260 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -5.611 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.767 | - | | | |
| • Program Adjustments | - | - | 3.600 | - | 3.600 |
| • Rate/Misc Adjustments | - | - | -12.860 | - | -12.860 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603724N *I Navy Energy Program* |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $12.5 million to account for the availability of prior year execution balances.

Technical: Not applicable.

Schedule:

0838 - Continue Advanced BioFuel Lab/Rig Testing thru 4Qtr 2020. Lab and rig testing is the prerequisite of the qualification program and should continue through 2020. Multiple new production processes have been identified and are in early development; if these processes are successful, they will require initial Navy evaluation in out-years.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | | | | Project (Number/Name)<br>0829 / *ENERGY CONSERVATION (ADV)* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 0829: *ENERGY CONSERVATION (ADV)* | 35.868 | 7.505 | 16.320 | 9.278 | - | 9.278 | 20.225 | 19.086 | 16.442 | 16.723 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Energy Conversation Advanced Project is designed to develop and implement energy and maintenance saving improvements into existing Fleet assets. This energy conservation project, managed through NAVSEA 05T, will identify mature potential energy saving areas, by involvement with Fleet representatives, Life-Cycle Managers (LCMs), NAVSEA Technical Warrant Holders, In-Service Engineering Agents (ISEAs), PEOs, TMA/TMI, Industry, and Academia. The project directly supports SECNAV and CNO goals to reduce energy consumption. Potential technology target areas will include: Power Generation and Storage systems, Hull Hydrodynamics, Underwater Hull Husbandry, Heating, Ventilation & Air Conditioning (HVAC) Systems, Thermal Management, Man Propulsion Systems, Electrical Systems, Auxiliary Systems, and Energy Monitoring & Assessment. Potential energy saving proposals, Energy Conservation Concepts (ECC), are developed each FY for evaluation by functional category. Based on review of a business case and a technical community review projects are selected for development. Not all proposed ECCs are pursued and changes to planned funding between functional categories or fiscal years can occur based on the technology maturity level, ship schedule changes, or other factors affecting the projected development or testing timeline.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
|---|---|---|---|---|---|
| ***Title:*** Power Generation and Storage Project | 0.925 | 1.229 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Power Generation & Storage System Sub Project - This project area will accomplish prototype development, laboratory and Fleet testing to determine overall mission and cost effectiveness of energy conservation technologies these improvements. | | | | | |
| ***FY 2014 Accomplishments:***<br>Delivered final report of ESM land based testing. Prepared energy conservation proposals and business case analyses for Electronic Unit Injection of LPD 17 Ship Service Diesel Generators and Improvements to Bleed Air Operations designed to save fuel. Continuing to identify new fuel saving technologies in Power Generation & Storage for Gas Turbine, Diesel and Steam ships. | | | | | |
| ***FY 2015 Plans:***<br>Examine potential Prime Mover (gas turbines an diesel engines) fuel saving initiatives for evaluation. Evaluate Gas Turbine Generator (GTG) Bleed Air proposal and actual ship operational scenarios for possible funding. Continue to identify new fuel saving technologies in Power Generation & Storage for Gas Turbine, Diesel and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Steam ships. Prepare proposals and business case analyses (BCA) for promising technologies with potential to reduce fossil fuel consumption.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Hull Hydrodynamic Sub Project | 1.725 | 1.357 | 0.879 | - | 0.879 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** (U) Hull Hydrodynamic Sub Project - This project area will accomplish prototype development, modeling, laboratory and Fleet testing of ship modifications to propellers such as fouling release coatings and/or hull appendages to determine overall mission and cost effectiveness of these improvements.<br>***FY 2014 Accomplishments:***<br>Change in planned installation ship from DDG 91 to DDG 100 impacted schedule. Bow bulb material is under procurement ship installation drawings completed Jul 14 and baseline sea trial was completed 17 Nov 14. Conducted post installation sea trial of improved steering modifications to LHD 2 and completed preliminary report of performance. Continue to identify additional fuel saving technologies in Hull Hydrodynamic systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel consumption.<br>***FY 2015 Plans:***<br>Install bow bulb on selected DDG 100 ship for test and evaluation and install strain gages for long term monitoring of performance. Continue to identify additional fuel saving technologies in Hull Hydrodynamic systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel consumption.<br>***FY 2016 Base Plans:***<br>Conduct sea trial to capture bow bulb post installation performance and acoustic data. Prepare preliminary and final report of Bow Bulb installation on DDG 100 ship and post installation business case analysis to evaluate plan to implement on entire DDG 51 Class. Continue to identify additional fuel saving technologies in Hull Hydrodynamic systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel consumption.<br>***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Hull Husbandry Sub Project | 0.994 | 0.300 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** (U) Hull Husbandry Sub Project - Project funds will be utilized to identify and evaluate new underwater hull coating systems and underwater hull cleaning and maintenance techniques to reduce hydrodynamic drag on the hull and thereby increase fuel efficiency. | | | | | |
| ***FY 2014 Accomplishments:***<br>Complete modeling of propeller fouling conditions for use as tool to assess required periodicity of propeller cleaning and quantification of fouled propeller fuel penalty. Prepare final report of findings including recommended propeller monitoring approaches with objective to avoid ships operating in fuel penalty condition due to fouled propellers. Prepared proposal for evaluating coating of DDG51 and CG 47 class propellers using two different types of silicone fouling release coatings. Continue to identify new fuel saving initiatives in Hull Husbandry and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel consumption. | | | | | |
| ***FY 2015 Plans:***<br>Evaluate proposal for coating a DDG 51 or CG 47 set of propellers. Initiate review with all affected stakeholders including NAVSEA, PEO SHIPS and Fleet personnel, prepare appropriate documents supporting paint application and select test ship. Continue to identify new fuel saving initiatives in Hull Husbandry and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel consumption. | | | | | |
| ***FY 2016 Base Plans:***<br>N/A | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Heating , Ventilation and Air Conditioning (HVAC) Sub Project | 0.791 | 2.675 | 2.360 | - | 2.360 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** (U) HVAC Sub Project - Project funds will be utilized to accomplish prototype development, land and shipboard testing to determine cost effectiveness of improvements aimed at more efficient climate control of shipboard spaces. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Conducted technical community review on the merits of installing a prototype Thermal Management Control System (TMCS) on an LHD class ship for test and evaluation. TMCS installs digital thermostats which permits centralized control of space temperatures throughout the ship. Evaluated proposals for improved air conditioning plant performance on DDG 51 Class ships. Continued to identify additional fuel saving technologies in HVAC Systems and prepare proposals and Business case analyses for promising technologies with potential to reduce fossil fuel.<br>***FY 2015 Plans:***<br>Initiate phase I development of Ship Change Document (SCD) for LHD class TMCS installation, work with Fleet to select appropriate test ship for installation, develop Ship Installation Drawings (SIDs), prepare test documentation and initiate Long Lead Time Material (LLTM) procurement. Initiate tasking for test and evaluation of Air Conditioning (AC) Plant improvements on DDG 51 Class ships. Conduct engineering design, material procurement and laboratory testing of prototype system for ship installations in FY16. Continue to identify additional fuel saving technologies in HVAC Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel.<br>***FY 2016 Base Plans:***<br>Continue phase II LHD TMCS development for laboratory testing of system and installation on board selected ship for test and evaluation. Prepare SCD for installation of AC plant improvement on selected test ship (s), install improvements, conduct evaluation and provide report. Continue to identify additional fuel saving technologies in HVAC Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Thermal Management Sub Project | 0.100 | 0.100 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** (U) Thermal Management Sub Project - Project funds will be utilized to identify and evaluate potential uses for Thermal Management techniques designed to reduce overall shipboard heat generation and reduce the shipboard electrical demand on HVAC systems. | | | | | |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Reviewed industry approaches to energy recovery that may be applicable for navy use. Continue to identify additional fuel saving technologies in Thermal Management that may be applicable to navy ships. Prepare proposals and Business case analyses for promising technologies with potential to reduce fossil fuel consumption.<br>***FY 2015 Plans:***<br>Continue to seek out energy recovery devices that are approaching Technology Readiness Level 6 and may be ready for shipboard application. Continue to identify additional fuel saving technologies in Thermal Management that may be applicable to navy ships. Prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel consumption.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Propulsion Systems Sub Project | 1.210 | 0.885 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** (U) Propulsion Systems Sub Project - Project funds will be utilized to identify requirements and perform land based and shipboard testing of ship propulsion system improvements on Gas Turbine, Steam, and Diesel Engine systems to reduce overall fuel consumption and lower maintenance costs.<br>***FY 2014 Accomplishments:***<br>A ship check was completed on LPD 22 in Jan 14 and an Authorized Work Item (AWI) and Ship Change Document for installation of a Shipboard Energy Dashboard SED on LPD 25 is complete. Ship installation drawings have been completed and material has been procured and delivered. Installation is scheduled to commence in Jan 15 vice Nov 14 due to ship schedule change. Development of a TRITON hull fouling assessment tool to detect when a ship is operating in a fuel penalty mode is in progress. Both these projects will move to Energy Monitoring and Assessment functional area in FY15. Continue to identify additional fuel saving technologies in Propulsion Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel.<br>***FY 2015 Plans:***<br>Evaluate Business Case developed for installing variable speed drives for lube oil and fuel oil pumps in LHD class ships. Based on review, develop test plan, perform ship check, create system design and requirements | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| document, procure material and perform preliminary testing. Continue to identify additional fuel saving technologies in Propulsion Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Electrical Systems SubProject | 1.760 | 2.201 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Electrical Systems Sub Project - Project funds will be utilized to identify and perform land based and shipboard testing of ship electrical system improvements to reduce energy consumption.<br>***FY 2014 Accomplishments:***<br>Draft final report for Collective Protection System Variable Speed Drive (CPS/VSD) ECC was issued in Sep 14 and final testing of Port Use Fan (PUF) was delayed due to change in schedule for USS Wasp and material condition of critical motor. Comments are being incorporated into the CPS/VSD report and interim report on PUF is due Jan 15. Ship check to install SED on DDG 60 is completed and data analysis modeling is in progress. Design, material procurement and SCD development is in process for an advanced Reverse Osmosis (RO) prototype Energy Recovery Device (ERD) installation on USS COMSTOCK in FY15. Electrical Shipboard Energy Dashboard efforts will move to Energy Monitoring and Assessment functional area in FY15 and beyond and RO will move to Auxiliary Systems in FY 15 and beyond. Tasking for installation of hangar bay solid state lighting was initiated for a DDG 51 class ship and material procurement and First Article Testing is in process. ECC proposals for installation of VSDs for the Collective Protection System as well as Main Space Ventilation were prepared and are reviewed. Continue to identify additional fuel saving technologies in Electrical Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel.<br>***FY 2015 Plans:***<br>Based on review of Business case analysis Proposals initiate tasking to design test and evaluate fuel saving initiatives for electrical systems such as Collective Protection System and Main Space Ventilation Fans for LHD 1 class ships. Tasking will include SCD and SIDs development as well as preparation of test plans and material procurement to support installation in FY16. Investigate additional uses of VSD technology, high efficiency motors and Solid State Lighting for shipboard use. Continue to identify additional fuel saving technologies in | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Electrical Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Auxiliary Systems Sub Project | - | 1.134 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Auxiliary Systems Sub Project -- Project funds will be utilized to identify, test and evaluate new technologies for shipboard auxiliary systems aimed at reducing fuel consumption.<br>***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>Conduct qualification and endurance testing of RO plant ERD, install upgrade kit on USS COMSTOCK, provide on-board-training for ship's force, monitor system performance and provide final report. Based on successful business case analyses of ECCS such as high and low pressure compressed air and other potential ECCs developed tasking will be initiated. Continue to identify additional fuel saving technologies in auxiliary systems and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel.<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Energy Monitoring & Assessment | - | 6.439 | 6.039 | - | 6.039 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This project area will focus on methods of capturing and displaying energy related data to shipboard personnel as actionable information for ships force to employ energy conservation measures underway and in port as mission requirements permit. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>Perform overall planning and execution functions related to energy initiatives including monitoring performance of Phase III SED on LPD 25 to monitor performance, develop energy summary report format, and provide monthly energy summary report. Determine requirements for Phase II SED installation on DDG 60 and prepare SCD, procure required material, develop test plan and monitor performance. Investigate steps required to provide bridge display of energy information. Expand Phase I SED efforts to additional ship systems identified by Fleet and other ship classes, LSD, LCS, etc as applicable based on gap analysis data. Initiate Phase I identification of requirements, initial Configuration Data Set (CDS) update, identification of test ship and building general ship knowledge base. Investigate web-enabled capability for capturing and displaying energy data. Investigate methods to capture and display fuel penalty conditions relating to hull and propeller fouling and feed information to SED and other reporting systems to measure ship energy performance. Continue to identify additional fuel saving technologies and monitoring methodologies and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel.<br>***FY 2016 Base Plans:***<br>Perform overall planning and execution functions related to energy initiatives. Conduct Phase III SED on DDG 60 or other DDG 51 class ship selected, monitor performance, develop energy summary report format, and provide monthly energy summary report to monitor and prepare final report. Initiate Phase II efforts for new ship classes identified in FY15 and initiate Phase I SED efforts for DDG 51 Flt II and IIA classes. Working with Fleet, develop requirements for a Global Energy Information System (GENYSIS). Monitor performance of hull fouling assessment tool, analyze data, provide quarterly quick look and final report.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.505 | 16.320 | 9.278 | - | 9.278 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

RDT&E Contracts are Competitive Procurements.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |

**E. Performance Metrics**

Quarterly Program Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | Project (Number/Name)<br>0829 / *ENERGY CONSERVATION (ADV)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | NSWC Carderock : Bethesda, MD | 5.394 | 0.600 | Nov 2013 | 3.650 | Nov 2014 | - | | - | | - | - | 9.644 | - |
| Systems Engineering | WR | NSWC Carderock : Bethesda, MD | 4.045 | 0.896 | Nov 2013 | 1.259 | Feb 2015 | - | | - | | - | - | 6.200 | - |
| Engineering Development | WR | NSWC Carderock : Bethesda, MD | 5.498 | 0.600 | Nov 2013 | 1.750 | Feb 2015 | - | | - | | - | - | 7.848 | - |
| Demonstration & Evaluation | WR | NSWC Carderock : Bethesda, MD | 5.673 | 0.510 | May 2014 | 1.200 | May 2015 | - | | - | | - | - | 7.383 | - |
| | | **Subtotal** | 20.610 | 2.606 | | 7.859 | | - | | - | | - | - | 31.075 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | WR | NSWC Carderock : Bethesda, MD | 0.400 | 0.300 | Nov 2013 | 2.000 | Dec 2014 | 3.178 | Sep 2016 | - | | 3.178 | Continuing | Continuing | Continuing |
| Software Support | WR | NSWC Carderock : Bethesda, MD | 0.300 | 0.150 | Dec 2013 | - | | 0.500 | Jan 2016 | - | | 0.500 | Continuing | Continuing | Continuing |
| Integrated Logistics Support | WR | NSWC Carderock : Bethesda, MD | 0.500 | 0.200 | May 2014 | 0.500 | May 2015 | 0.500 | Jan 2016 | - | | 0.500 | Continuing | Continuing | Continuing |
| Study Anaylsis | WR | NSWC Carderock : Bethesda, MD | 0.400 | 0.300 | Dec 2013 | 0.474 | Dec 2014 | 0.300 | Jan 2016 | - | | 0.300 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.600 | 0.950 | | 2.974 | | 4.478 | | - | | 4.478 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NSWC Carderock : Bethesda, MD | 5.876 | 1.950 | Dec 2013 | 2.135 | Jun 2015 | 0.890 | Feb 2016 | - | | 0.890 | Continuing | Continuing | Continuing |
| Operational Test & Evaluation | WR | NSWC Carderock : Bethesda, MD | 3.978 | 0.800 | Mar 2014 | 1.900 | Jun 2015 | 2.100 | Feb 2016 | - | | 2.100 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | Project (Number/Name)<br>0829 / *ENERGY CONSERVATION (ADV)* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Live Fire Test & Evaluation | WR | NSWC Carderock : Bethesda, MD | 0.382 | - | | - | | - | | - | | - | - | 0.382 | - |
| | | **Subtotal** | 10.236 | 2.750 | | 4.035 | | 2.990 | | - | | 2.990 | - | - | - |

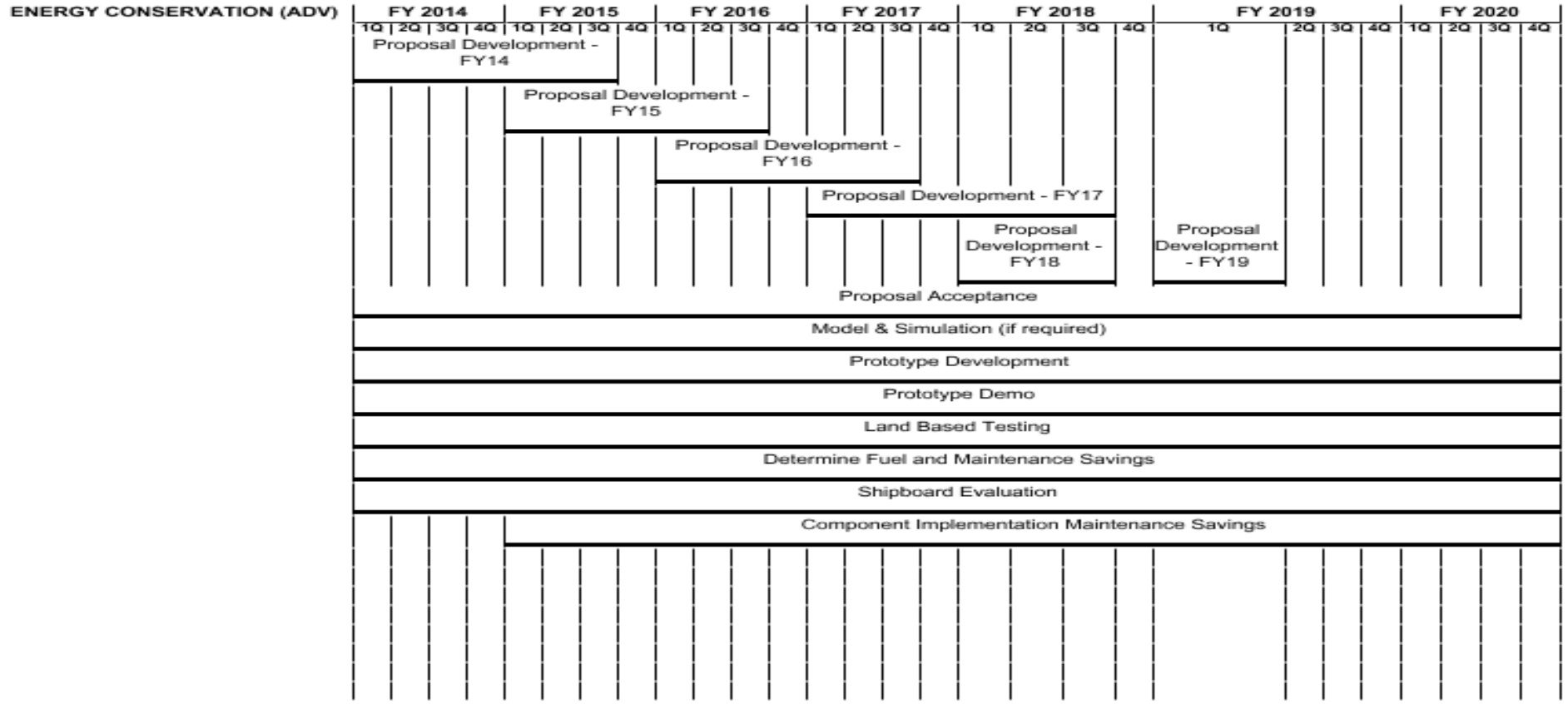
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NSWC Carderock : Bethesda, MD | 2.916 | 1.194 | Oct 2013 | 1.442 | Oct 2014 | 0.700 | Sep 2016 | - | | 0.700 | Continuing | Continuing | Continuing |
| Travel | Allot | NAVSEA HQ : Washington, DC | 0.154 | 0.005 | Oct 2013 | 0.010 | Oct 2014 | 0.010 | Sep 2016 | - | | 0.010 | Continuing | Continuing | Continuing |
| Total Assets | WR | NSWC Carderock : Bethesda, MD | 0.352 | - | | - | | - | | - | | - | - | 0.352 | - |
| Program Management Support | C/CPAF | NAVSEA HQ : Washington, DC | 0.000 | - | | - | | 1.100 | Sep 2016 | - | | 1.100 | - | 1.100 | - |
| | | **Subtotal** | 3.422 | 1.199 | | 1.452 | | 1.810 | | - | | 1.810 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 35.868 | 7.505 | | 16.320 | | 9.278 | | - | | 9.278 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |




*2016PB - 0603724N - 0829*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0829 / *ENERGY CONSERVATION (ADV)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***ENERGY CONSERVATION (ADV)*** | | | | |
| Proposal Development - FY14 | 1 | 2014 | 3 | 2015 |
| Proposal Development - FY15 | 1 | 2015 | 3 | 2016 |
| Proposal Development - FY16 | 1 | 2016 | 3 | 2017 |
| Proposal Development - FY17 | 1 | 2017 | 3 | 2018 |
| Proposal Development - FY18 | 1 | 2018 | 3 | 2018 |
| Proposal Development - FY19 | 1 | 2019 | 1 | 2019 |
| Proposal Acceptance | 1 | 2014 | 3 | 2020 |
| Model & Simulation (if required) | 1 | 2014 | 4 | 2020 |
| Prototype Development | 1 | 2014 | 4 | 2020 |
| Prototype Demo | 1 | 2014 | 4 | 2020 |
| Land Based Testing | 1 | 2014 | 4 | 2020 |
| Determine Fuel and Maintenance Savings | 1 | 2014 | 4 | 2020 |
| Shipboard Evaluation | 1 | 2014 | 4 | 2020 |
| Component Implementation Maintenance Savings | 1 | 2015 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | Project (Number/Name)<br>0838 / *Mobility Fuels (ADV)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0838: *Mobility Fuels (ADV)* | 47.334 | 8.958 | 10.745 | 12.509 | - | 12.509 | 12.952 | 12.705 | 12.159 | 12.304 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project provides data through laboratory, component, engine, fuel system, and weapon system tests, which relate the effects of changes in the Navy fuel procurement specification properties and chemistries to the performance and reliability of Naval ship, aircraft, and fuel distribution systems. The information is required to: (a) develop, validate, and execute the test protocols necessary to approve fuels from non-petroleum feedstocks, (b) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide, (c) provide guidance to fleet operators for the safe use of off-specification or commercial grade fuels when military specifications are unavailable or in short supply, (d) technically justify changes to fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in fuel supply, and (e) improve capability to provide fuel quality surveillance in the field. Continued volatility and rapid escalation of the cost of fuel have placed additional pressures on Navy budgets responsible for maintaining and sustaining the Navy tactical fleet both now and in the future. These pressures have placed an added emphasis on the potential use of lower cost commercial fuels and/or fuels derived from non-petroleum sources as a potential means of stabilizing the current and anticipated price volatility. Recent problems with petroleum-based fuel quality have demonstrated the adverse effects that fuel-related problems can have on ship and aircraft system performance, reliability, and readiness. The program addresses readiness, additional maintenance costs, and the cost of lost equipment. The potential risk of fuel-related problems over the next decade, given the unknown supply, feedstocks, and the introduction of new theaters of operation, will continue to increase.

This project represents the Navy's only investment designed to maintain its capability to operate as a "smart" customer for fuels that cost over $4.0 billion per year for procurement, transport, storage, and consumption, and are essential to fleet operations. Additionally, it is the Navy's only investment in the approval of alternative fuels for tactical applications and directly supports the Navy's energy goals of increased energy security and environmental stewardship.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Naval Tactical Fuels | 8.958 | 10.745 | 12.509 | - | 12.509 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Perform development, test and evaluation work on Naval tactical fuels to: a) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide; b) provide guidance and approval to fleet operators for the safe use of military aircraft that include new additives or are derived from non-petroleum sources; c) make needed periodic changes to the fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry and d) improve fleet methods to ensure fuel quality. | | | | | |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0838 / *Mobility Fuels (ADV)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Expand the list of qualified renewable sources/production pathways for inclusion into the JP-5 and F-76 specifications. Complete hardware testing on direct sugar-to-hydrocarbon and biomass-to-alcohol-to-jet production pathways. Continue laboratory and rig testing, and begin component testing on advanced biofuel production pathway. Evaluate impact of increased use of commercial shipboard propulsion fuel. Evaluate impact on Navy operations of government regulations requiring mandatory addition of fatty acid methyl ester into commercial diesel fuel.<br>***FY 2015 Plans:***<br>Continue to expand list of qualified renewable sources/production pathways for inclusion into JP-5 and F-76 specifications. Conduct hardware testing on hydroprocessed depolymerized cellulosic. Continue testing on advanced production pathways.<br>***FY 2016 Base Plans:***<br>Continue to expand the list of qualified renewable sources and production pathways for inclusion into the JP-5 and F-76 specifications. Conduct hardware testing on 100% fully synthetic aviation and shipboard fuels. Continue testing on advanced production pathways.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 8.958 | 10.745 | 12.509 | - | 12.509 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Alternative Fuel Efforts including testing and fuel procurement efforts will be competitively contracted, and performed under Cost Plus Fixed Fee and Firm Fixed Price contracts.

**E. Performance Metrics**

Program will develop Alternate Fuel test and certification protocols for 100% of all Naval aircraft and ships. Program will evaluate biofuels, biofuel chemistry and components tests as defined in test and certification protocols.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | Project (Number/Name)<br>0838 / *Mobility Fuels (ADV)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NRL : Washington, D.C. | 2.380 | 0.487 | Nov 2013 | 0.500 | Oct 2014 | 0.500 | Dec 2015 | - | | 0.500 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 8.682 | 1.731 | Nov 2013 | 1.344 | Nov 2014 | 1.800 | Nov 2015 | - | | 1.800 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | DLA-Energy : Ft. Belvoir, VA | 0.010 | 0.150 | Mar 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC : Philadelphia, PA | 1.501 | 0.588 | Nov 2013 | 0.510 | Nov 2014 | 0.450 | Nov 2015 | - | | 0.450 | Continuing | Continuing | Continuing |
| Prior year Prod Dev no longer funded in the FYDP | Various | Various : Various | 0.001 | - | | - | | - | | - | | - | - | 0.001 | 0.001 |
| | | **Subtotal** | 12.574 | 2.956 | | 2.354 | | 2.750 | | - | | 2.750 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Fuel | C/FFP | Various : Various | 0.500 | 1.500 | Oct 2014 | 2.045 | Jan 2015 | 3.812 | Jan 2016 | - | | 3.812 | - | 7.857 | 7.857 |
| Hardware Testing | WR | NAWCAD : Patuxent River, MD | 1.749 | 1.250 | Nov 2013 | 1.993 | Dec 2014 | 0.700 | Feb 2016 | - | | 0.700 | Continuing | Continuing | Continuing |
| Hardware Testing | C/CPFF | Life Cycle Engineering : Charleston, SC | 2.957 | 1.342 | Mar 2014 | - | | 3.000 | Jan 2016 | - | | 3.000 | - | 7.299 | 7.299 |
| Hardware Testing | WR | NSWC : Philadelphia, PA | 0.080 | - | | 0.750 | Mar 2015 | 0.750 | Feb 2016 | - | | 0.750 | Continuing | Continuing | Continuing |
| Hardware Testing | WR | Naval Postgraduate School : Monterey, CA | 0.200 | - | | 0.100 | Dec 2014 | - | | - | | - | - | 0.300 | - |
| Hardware Testing | C/FFP | Various : Various | 0.000 | 0.756 | Jul 2014 | 3.000 | Mar 2015 | 0.161 | Jun 2016 | - | | 0.161 | - | 3.917 | 3.917 |
| Hardware Testing | C/FFP | General Electric : Cincinnati, OH | 0.000 | 0.551 | Sep 2014 | - | | - | | - | | - | - | 0.551 | 0.551 |
| Hardware Testing | WR | NSWC : Little Creek, VA | 0.000 | 0.042 | Apr 2014 | - | | - | | - | | - | - | 0.042 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | Project (Number/Name)<br>0838 / *Mobility Fuels (ADV)* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Testing | WR | US Naval Academy : Annapolis, MD | 0.000 | 0.046 | Apr 2014 | - | | - | | - | | - | - | 0.046 | - |
| Hardware Testing | C/CPFF | Univ of Dayton Research Inst : Dayton, OH | 0.000 | 0.152 | May 2014 | - | | 0.150 | Mar 2016 | - | | 0.150 | - | 0.302 | 0.302 |
| Hardware Testing | WR | TBD : TBD | 0.000 | - | | - | | 0.200 | Jan 2016 | - | | 0.200 | - | 0.200 | - |
| Hardware Testing | SS/CPFF | Rolls Royce : Indianapolis, IN | 1.850 | - | | - | | 0.500 | May 2016 | - | | 0.500 | - | 2.350 | 2.350 |
| Prior year T & E no longer funded in the FYDP | Various | Various : Various | 20.419 | - | | - | | - | | - | | - | - | 20.419 | - |
| | | **Subtotal** | 27.755 | 5.639 | | 7.888 | | 9.273 | | - | | 9.273 | - | - | - |

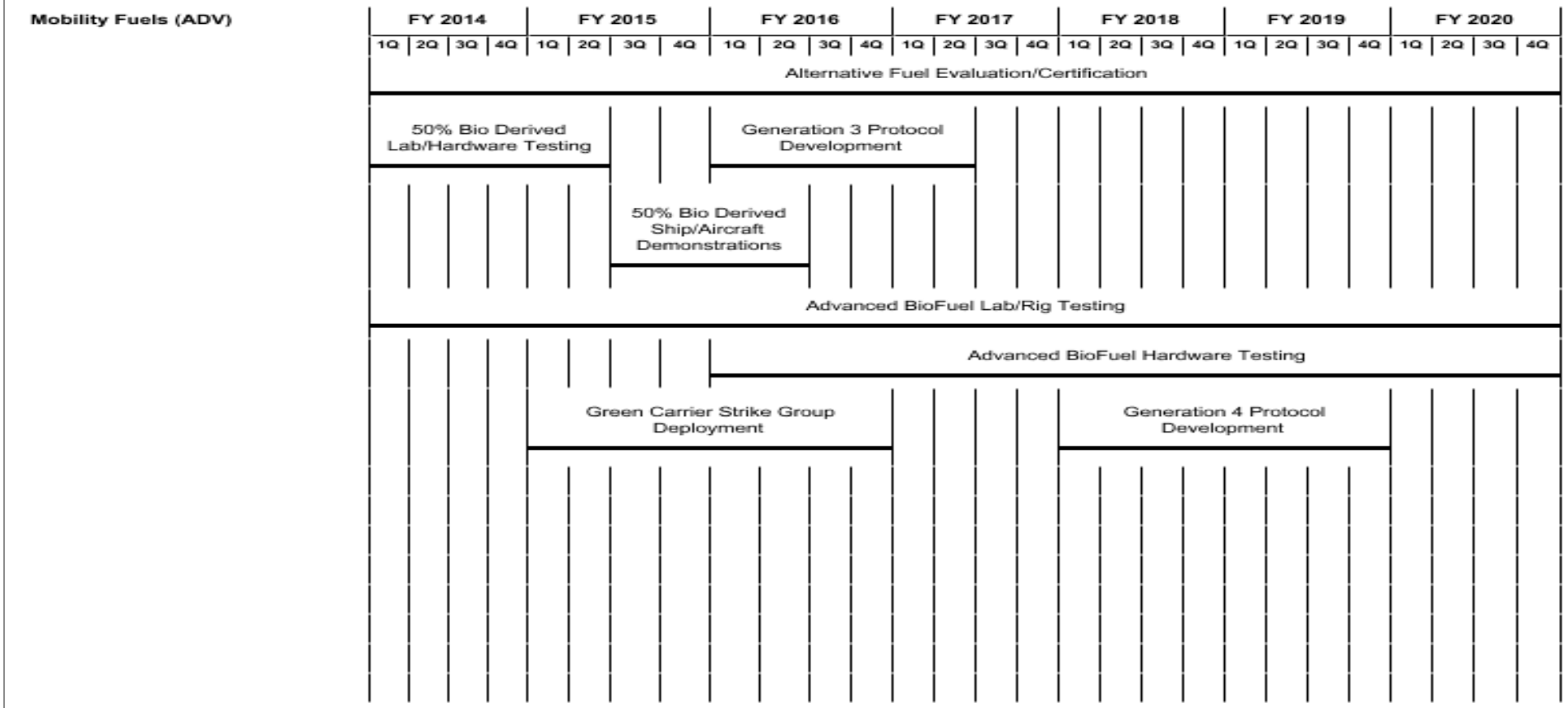
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Patuxent River, MD | 0.403 | 0.350 | Nov 2013 | 0.483 | Dec 2014 | 0.481 | Nov 2015 | - | | 0.481 | Continuing | Continuing | Continuing |
| Program Management Support | WR | NAVSUP : San Diego, CA | 0.009 | 0.003 | Nov 2013 | 0.010 | Nov 2014 | 0.005 | Nov 2015 | - | | 0.005 | Continuing | Continuing | Continuing |
| Program Management Support | C/FFP | Coord Research Council : Alpharetta, GA | 0.010 | 0.010 | Jan 2014 | 0.010 | Dec 2014 | - | | - | | - | - | 0.030 | 0.030 |
| Prior year Mgmt Supp no longer funded in the FYDP | Various | Various : Various | 6.583 | - | | - | | - | | - | | - | - | 6.583 | 6.583 |
| | | **Subtotal** | 7.005 | 0.363 | | 0.503 | | 0.486 | | - | | 0.486 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 47.334 | 8.958 | | 10.745 | | 12.509 | | - | | 12.509 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0838 / *Mobility Fuels (ADV)* |




*2016PB - 0603724N - 0838*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0838 / *Mobility Fuels (ADV)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Mobility Fuels (ADV)*** | | | | |
| Alternative Fuel Evaluation/Certification | 1 | 2014 | 4 | 2020 |
| Generation 3 Protocol Development | 1 | 2016 | 2 | 2017 |
| 50% Bio Derived Lab/Hardware Testing | 1 | 2014 | 2 | 2015 |
| 50% Bio Derived Ship/Aircraft Demonstrations | 3 | 2015 | 2 | 2016 |
| Advanced BioFuel Lab/Rig Testing | 1 | 2014 | 4 | 2020 |
| Advanced BioFuel Hardware Testing | 1 | 2016 | 4 | 2020 |
| Green Carrier Strike Group Deployment | 1 | 2015 | 4 | 2016 |
| Generation 4 Protocol Development | 1 | 2018 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | | | | Project (Number/Name)<br>0928 / *Directed Energy Research* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 0928: *Directed Energy Research* | 40.630 | 1.420 | 6.703 | 2.019 | - | 2.019 | 1.883 | 1.830 | 1.734 | 1.769 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Legislation, Executive Orders (EO), and SECNAV Guidance direct DoN to reduce fossil fuel use and increase renewable energy use. This guidance includes the Energy Policy Act of 2005, which directs agencies to reduce energy intensity 30% by 2015, the National Defense Authorization Act of 2010, which directs DOD to source 25% of its energy from renewable sources by 2025, EO13514, which directs DOD to reduce greenhouse gas emissions by 2020, and SECNAV energy goals, which direct that 50% of DoN's energy come from alternative sources by 2020. Further, studies by the Defense Science Board and others have stressed the dangerous reliance of DOD on vulnerable grid power and unreliable imported oil. Currently, the Navy has limited options for producing energy from renewable sources. Private industry and other federal agencies are developing and testing new technologies. Renewable energy from the ocean such as wave, sea water air conditioning, tidal energy, outer continental shelf wind development, ammonia production and utilization, vortex induced vibration marine hydrokinetic, and compressed air storage for ocean energy, among other technologies have potential to alleviate current Navy island installation dependence on fossil fuel, at comparable costs to projected fossil energy sources. Also, advanced energy management systems have potential to increase installation energy security and enable broader use of renewable energy sources.

This Energy RDT&E Project will test, evaluate, and validate components as well as demonstrate cost-effective and technical viability of energy efficiency and renewable energy, energy storage and Alternative Fuel Vehicle prototypes. All efforts will be coordinated across DOD and with other agencies as appropriate. Specifically, this project aims to pursue three areas of development, testing and evaluation: (A) Renewable Energy to support feasibility evaluation, modeling and possible prototype testing of new energy sources for use at Naval installations with potential for widespread applicability to energy security and renewable energy requirements. Other renewable sources for evaluation, modeling and possible prototype testing may include energy storage (dead-ended fuel cell, zinc air battery, etc.), facility level concentrating solar power, next generation solar heat reflective film, plasma lighting for high wattage applications, micro-inverters for photo-voltaic storage, building level micro-grid, new generation waste heat capture, and other technologies; (B) It will support demonstration and validation of advanced electric grid management systems, known as "Smart Grid" and "Micro Grid" technology, for use at Naval installations to enable improved energy security; (C) Demonstration and Validation of Alternative Energy, Energy Efficiency, Sustainable Building Features, Alternative Fuel Vehicles, and Smart Energy Management Technology: This project will support the testing, demonstration, validation, and application of innovative facility energy efficiency and alternative energy technology.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
|---|---|---|---|---|---|
| ***Title:*** Directed Energy Research | 1.420 | 6.703 | 2.019 | - | 2.019 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Performed planning, installation prototype development, and component testing deployment for alternative energy, advanced lighting, and grid<br>Smart/micro grid management, and energy efficient technologies at Naval installations as follows: | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0928 / *Directed Energy Research* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Initiated evaluation of environmental impacts of ocean renewable energy generation systems<br>- Completed environmental planning efforts and received approval to begin installation of testing facility/ infrastructure equipment. Began application process for permits to install wave energy devices into the testbed.<br>- Further analysis and implementation of Sea Water Air Conditioning (SWAC) systems at several Naval Bases. Results are being utilized to support future design efforts of potential SWAC systems in Guam.<br>- Demonstration, testing, deployment, and evaluation of advanced lighting, alternative fuel vehicles, and improved energy storage systems at Naval installations. Prototypes are now ready to be tested and evaluated in FY15 and FY16 to determine system capabilities and integration opportunities across the Navy. | | | | | |
| ***FY 2015 Plans:***<br>Perform component testing, prototype development and deployment for alternative energy, advanced lighting, facility cooling, and grid management technology at Naval installations as follows:<br>- Continue evaluation of environmental impacts of ocean renewable energy generation systems.<br>- Evaluate and test Wave Energy Systems - Assess and document performance of multiple wave energy devices at the Wave Energy Test Site.<br>- Evaluation, and planning for multiple energy storage technologies, Sea Water Air Conditioning system optimization, and other promising technologies.<br>- Demonstration, testing, deployment, and evaluation of smart and micro grid energy management technology, and begin development of technical specifications.<br>- Demonstration and validation of mature technologies to be transitioned such as advanced lighting, sustainable building technologies, solar PV collection technologies, alternative fuel vehicles, and improved energy storage systems at Naval installations.<br><br>The FY15 plan includes:<br>- Continue and expand demonstration, testing, deployment, and evaluation of smart energy and micro-grid management technology; and continue development of technical specifications.<br>- Continue and expand demonstration and validation of mature technologies to be transitioned such as sustainable building technologies, alternative fuel vehicles, and improved energy storage systems and integration at Naval installations.<br>- Initiate planning and development of prototypes for the next set of energy storage, grid management, renewable/alternative energy, and efficiency technologies. This includes innovative technology development and site planning to prepare for FY16/17 testing and evaluation. | | | | | |
| ***FY 2016 Base Plans:***<br>FY16 will focus on completing or continuing projects initiated in FY14 and FY15. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0928 / *Directed Energy Research* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Continue evaluation of environmental impacts of ocean renewable energy generation systems.<br>- Continue evaluating and testing Wave Energy Systems.<br>- Complete evaluation for ocean compressed air storage technologies and SWAC optimization.<br>- Initiate demonstration, testing, and evaluation of improved and low cost smart and micro grid energy management technologies.<br>- Demonstration and validation of mature low-cost technologies to be transitioned such as advanced lighting, sustainable building technologies, solar PV collection technologies, alternative fuel vehicles, and improved energy storage systems at Naval installations.<br><br>The FY16 plan includes:<br>- Continue demonstration, testing, deployment, and evaluation of smart energy and micro-grid management technology; and begin development of technical specifications.<br>- Continue demonstration and validation of mature technologies to be transitioned such as sustainable building technologies, alternative fuel vehicles, and improved energy storage systems and integration at Naval installations.<br>- The FY16 plan will reduce the number of new technologies evaluated for alternative energy, grid management, efficiency and sustainable building technologies. In addition, the validation will delay development of procurement specifications impacting deployment of these technologies beyond 2020.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.420 | 6.703 | 2.019 | - | 2.019 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Demonstration and validation are conducted for maximum transfer and interaction with industry such as to influence the industry COTS with the results of this demonstration and prototype validation. Acquisition is based on performance specifications enabled by this project.

**E. Performance Metrics**

The program will be coordinated across DOD and with other agencies as appropriate to achieve 30% Energy Intensity Reduction by FY2015 and 25% Renewable Energy Increase by 2025.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | Project (Number/Name)<br>0928 / *Directed Energy Research* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Renewable Energy | Various | EXWC : Port Hueneme, CA | 36.530 | 0.950 | Mar 2014 | 3.928 | Mar 2015 | 0.890 | Jan 2016 | - | | 0.890 | Continuing | Continuing | Continuing |
| Smart Energy | Various | EXWC : Port Hueneme, CA | 1.100 | 0.400 | Apr 2014 | 1.982 | May 2015 | 0.890 | Jan 2016 | - | | 0.890 | Continuing | Continuing | Continuing |
| Demonstration/Validation | Various | EXWC : Port Hueneme, CA | 3.000 | 0.070 | Apr 2014 | 0.793 | Jun 2015 | 0.239 | Jan 2016 | - | | 0.239 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 40.630 | 1.420 | | 6.703 | | 2.019 | | - | | 2.019 | - | - | - |

**Remarks**

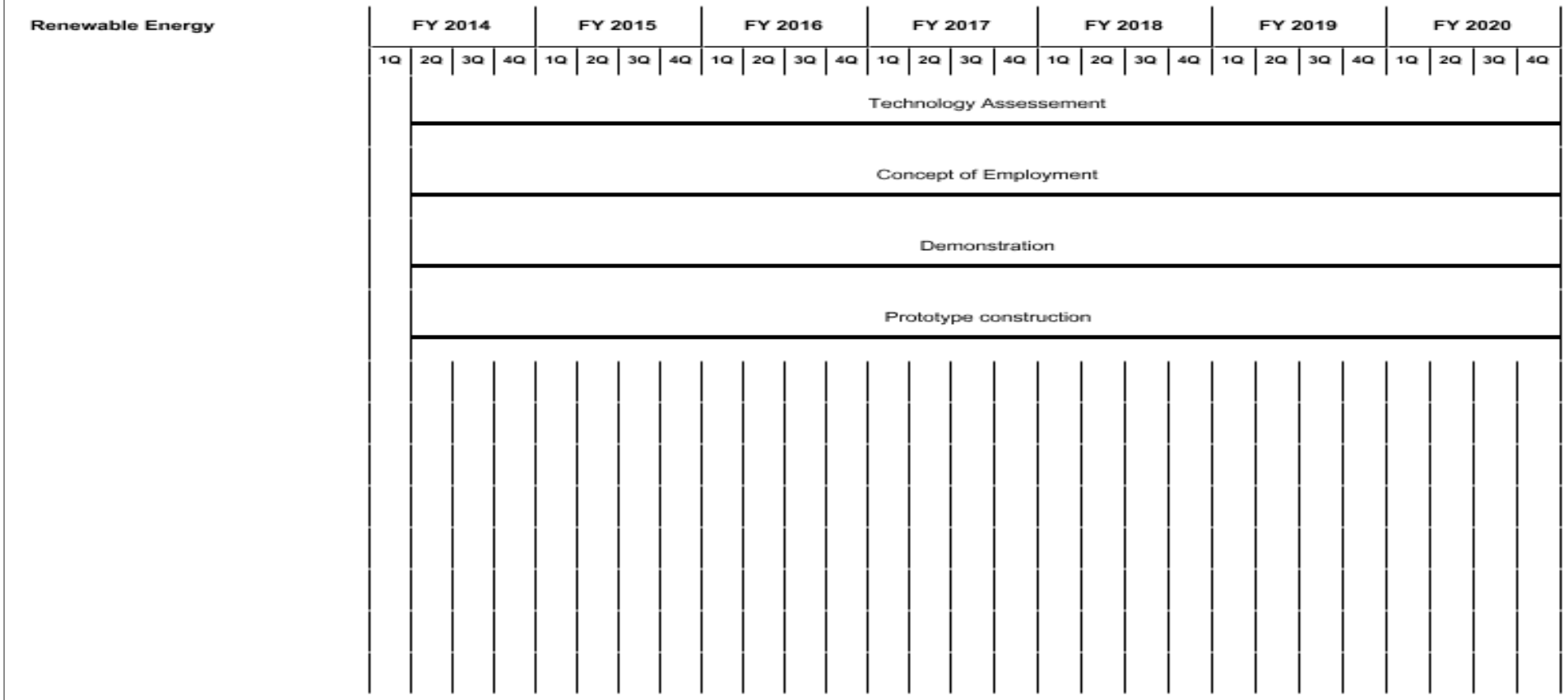
In FY16 the Directed Energy Program will be limited to assessing technologies for renewable energy, energy efficiency and energy reduction.

This technology assessment continues throughout the program life. As these technologies are assessed, they will be incorporated individually into the shore installation by a variety of acquisition strategies including Energy Savings Performance Contract vehicles, Purchase Power Agreements, and globally by changes to design and construction criteria. These, too, will continue throughout the program life. For Smart Energy, and select other technologies, there will be a requirement for component testing and validation. The wave energy systems will include operation and demonstration throughout the FYDP, resulting in development of test and evaluation results and lessons learned. This will be followed by criteria development to transition the technical aspects required to acquire a full scale system targeted to support one of several Naval Bases throughout the testing and evaluation period, deliverables will be required at the end of each Fiscal Year for component test results, validated components, and pilot prototype design and testing.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 40.630 | 1.420 | | 6.703 | | 2.019 | | - | | 2.019 | - | - | - |

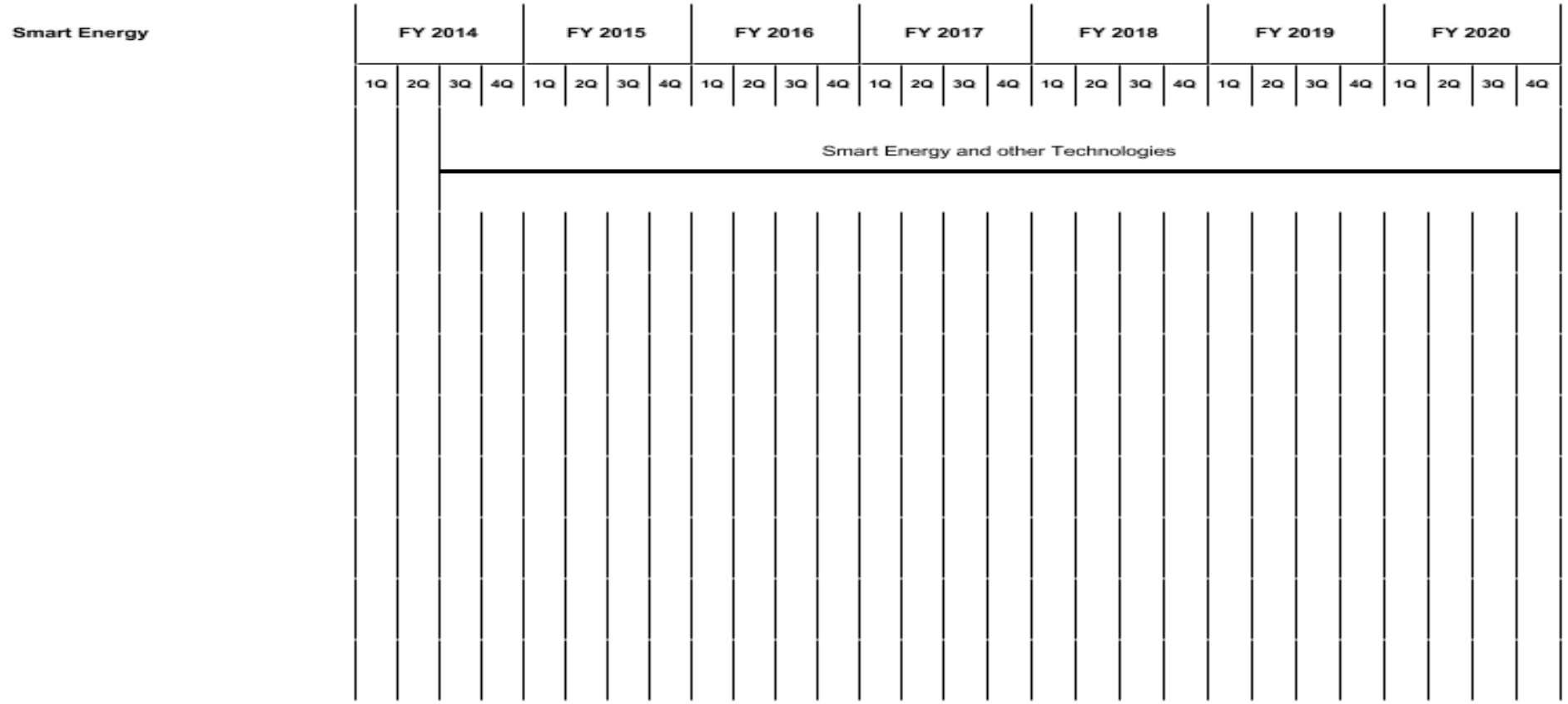
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0928 / *Directed Energy Research* |



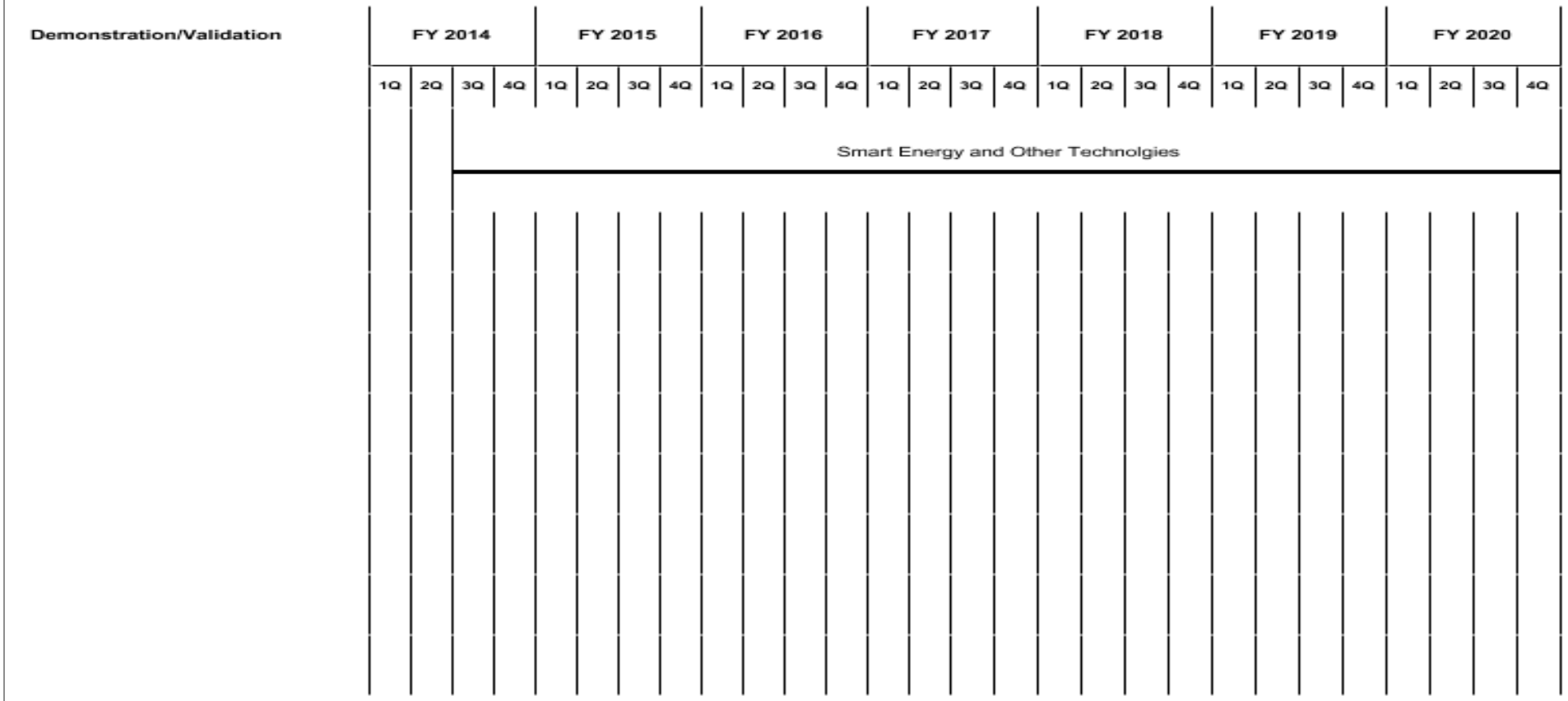

*2016PB - 0603724N - 0928*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0928 / *Directed Energy Research* |




*2016PB - 0603724N - 0928*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0928 / *Directed Energy Research* |




*2016PB - 0603724N - 0928*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0928 / *Directed Energy Research* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Renewable Energy*** | | | | |
| Technology Assessement | 2 | 2014 | 4 | 2020 |
| Concept of Employment | 2 | 2014 | 4 | 2020 |
| Prototype Construction | 2 | 2014 | 4 | 2020 |
| Demonstration | 2 | 2014 | 4 | 2020 |
| ***Smart Energy*** | | | | |
| Technology Evaluation | 3 | 2014 | 4 | 2020 |
| ***Demonstration/Validation*** | | | | |
| Smart Energy and Other Technologies | 3 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | | | | Project (Number/Name)<br>0996 / *Aircraft Energy Conservation* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 0996: *Aircraft Energy Conservation* | 40.789 | 25.968 | 30.036 | 23.955 | - | 23.955 | 27.859 | 25.502 | 24.726 | 24.974 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Aircraft Energy Conservation (AIR-ENCON) program is designed to develop and implement energy and maintenance saving improvements into existing fleet assets. The program identifies, evaluates, and implements energy savings initiatives for potential implementation into Naval aircraft. The objective of the program is to engage technical experts from across Naval aviation, industry, and academia to identify mature potential energy saving opportunities and determine the technical and fiscal viability of implementing them in existing aircraft platforms.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Aircraft Energy Conservation | 25.968 | 30.036 | 23.955 | - | 23.955 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Conduct preliminary design for F135 engine fuel burn reduction demonstration. Implement AIR-ENCON full program launch. Conduct evaluation/assessment of advanced mission planning and navigation technologies. Conduct assessment of aircraft subsystem energy efficiency technologies. | | | | | |
| ***FY 2015 Plans:***<br>Complete F135 compressor rig test and conduct Critical Design Review in support of F135 engine fuel burn reduction demonstration. Continue to identify, validate, and institutionalize energy conservation/efficiency concepts into the fleet. Continue validation of aircraft subsystem technologies and advance mission planning and navigation technologies for incorporation into legacy and emerging platforms. | | | | | |
| ***FY 2016 Base Plans:***<br>Conduct F135 fuel burn reduction engine demonstration. Continue identification, validation, and implementation of energy conservation/efficiency concepts into the fleet. Conduct validation of energy efficiency aircraft subsystem technologies and advanced planning and mission/navigation technologies. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 25.968 | 30.036 | 23.955 | - | 23.955 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0996 / *Aircraft Energy Conservation* |

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

N/A

**Remarks**

**D. Acquisition Strategy**

This is a non-acquisition program that develops, evaluates, and validates mature technologies in support of fleet fuel and maintenance savings.

**E. Performance Metrics**

Actual performance of energy conservation initiatives are measured against initially projected fuel savings measured in barrels of fuel saved based on aircraft demonstration testing.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | Project (Number/Name)<br>0996 / *Aircraft Energy Conservation* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 1.799 | 0.950 | Nov 2013 | 1.530 | Dec 2014 | 1.040 | Nov 2015 | - | | 1.040 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | Lockheed Martin : Fort Worth, TX | 0.000 | 0.505 | Apr 2014 | 3.250 | Feb 2015 | - | | - | | - | - | 3.755 | 3.755 |
| Systems Engineering | C/CPFF | General Electric : Evendale, OH | 0.475 | 1.661 | Jul 2014 | - | | - | | - | | - | - | 2.136 | 2.136 |
| Systems Engineering | C/CPFF | TBD : TBD | 0.000 | 0.064 | Oct 2014 | - | | 1.975 | Mar 2016 | - | | 1.975 | - | 2.039 | 2.039 |
| Prior year Sys Eng no longer funded in the FYDP | Various | Various : Various | 0.328 | - | | - | | - | | - | | - | - | 0.328 | - |
| | | **Subtotal** | 2.602 | 3.180 | | 4.780 | | 3.015 | | - | | 3.015 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Testing | C/CPFF | PWA : Hartford, CT | 35.132 | 19.373 | Feb 2014 | 18.058 | Dec 2014 | 15.400 | Oct 2015 | - | | 15.400 | - | 87.963 | 87.963 |
| Hardware Testing | WR | NAWCAD : Patuxent River, MD | 0.507 | 0.700 | Nov 2013 | 0.400 | Dec 2014 | 0.600 | Nov 2015 | - | | 0.600 | Continuing | Continuing | Continuing |
| Hardware Testing | C/CPFF | Various : Various | 0.000 | - | | 2.800 | Jun 2015 | - | | - | | - | - | 2.800 | 2.800 |
| Hardware Testing | C/CPFF | Lockheed : Fort Worth, TX | 0.000 | 1.300 | Jul 2014 | 2.800 | Jun 2015 | 4.554 | May 2016 | - | | 4.554 | - | 8.654 | 8.654 |
| Prior year T&E no longer funded in the FYDP | Various | Various : Various | 0.100 | - | | - | | - | | - | | - | - | 0.100 | - |
| | | **Subtotal** | 35.739 | 21.373 | | 24.058 | | 20.554 | | - | | 20.554 | - | - | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Patuxent River, MD | 0.361 | 0.500 | Nov 2013 | 0.234 | Dec 2014 | 0.386 | Nov 2015 | - | | 0.386 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603724N / *Navy Energy Program* | Project (Number/Name)<br>0996 / *Aircraft Energy Conservation* | |

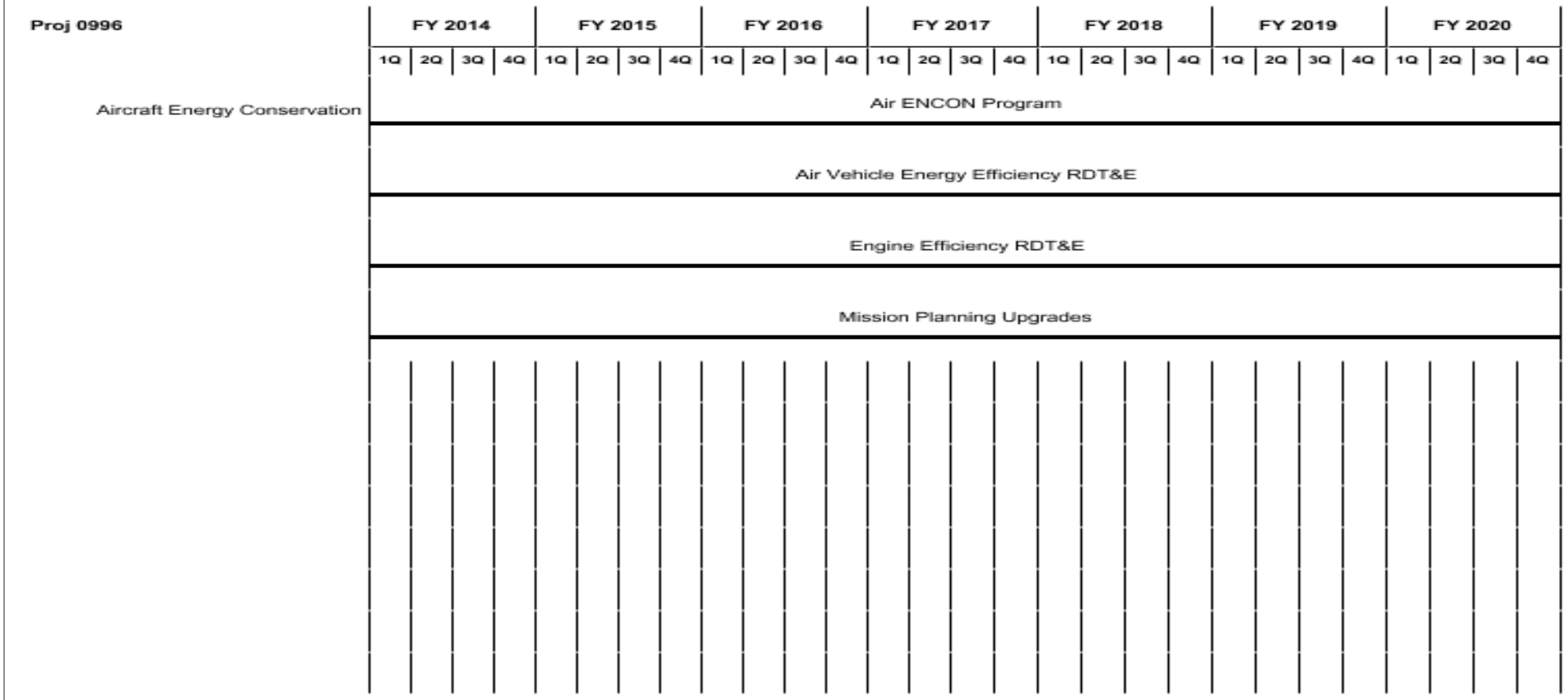
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/FFP | Deloitte Consulting : Alexandria, VA | 0.000 | 0.915 | Feb 2014 | 0.964 | Apr 2015 | - | | - | | - | - | 1.879 | 1.879 |
| Prog Mgnt no longer funded in the FYDP | Various | Various : Various | 2.087 | - | | - | | - | | - | | - | - | 2.087 | - |
| | | **Subtotal** | 2.448 | 1.415 | | 1.198 | | 0.386 | | - | | 0.386 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 40.789 | 25.968 | | 30.036 | | 23.955 | | - | | 23.955 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0996 / *Aircraft Energy Conservation* |




*2016PB - 0603724N - 0996*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603724N / *Navy Energy Program* | **Project (Number/Name)**<br>0996 / *Aircraft Energy Conservation* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0996*** | | | | |
| Aircraft Energy Conservation: Air ENCON Program | 1 | 2014 | 4 | 2020 |
| Aircraft Energy Conservation: Air Vehicle Energy Efficiency RDT&E | 1 | 2014 | 4 | 2020 |
| Aircraft Energy Conservation: Engine Efficiency RDT&E | 1 | 2014 | 4 | 2020 |
| Aircraft Energy Conservation: Mission Planning Upgrades | 1 | 2014 | 4 | 2020 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | | Date: February 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603725N *I Facilities Improvement* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 11.569 | 2.893 | 2.588 | 5.226 | - | 5.226 | 5.171 | 3.403 | 3.270 | 3.335 | Continuing | Continuing |
| 0995: *Naval Facilities System* | 9.949 | 1.328 | 0.816 | 1.154 | - | 1.154 | 1.992 | 1.969 | 1.913 | 1.951 | Continuing | Continuing |
| 3155: *Force Protection Ashore* | 1.620 | 1.565 | 1.286 | 0.575 | - | 0.575 | 1.183 | 1.434 | 1.357 | 1.384 | Continuing | Continuing |
| 3347: *Navy Expeditionary Energy Development* | 0.000 | - | 0.486 | 3.497 | - | 3.497 | 1.996 | - | - | - | - | 5.979 |

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

Mission Description and Budget Item Justification:
This program provides for capabilities to: a) overcome performance limitations and reduce the life cycle cost of shore facilities and, b) provide protection against terrorist attacks for shore installations and their operations. The program focuses on technical and operational issues of specific Navy interest, where there are no unbiased test validated Commercial Off the Shelf (COTS) solutions available, and where timely capabilities may not materialize without specific demonstration or validation by the Navy. Additionally, the program completes the development of technologies originating from Navy, DOD and other sources of Science and Technology programs, including the National Science Foundation (NSF), the National Institute of Standards and Technology (NIST) and Department of Energy (DOE). Validated technologies are implemented in the Navy's Military Construction (MILCON) and Facilities, Sustainment Restoration and Modernization (FSRM) program, and Antiterrorism and Force Protection (ATFP) Other Procurement, Navy (OP,N) program.

Project 0995 addresses the following Navy facilities requirements during FY 2014 through FY 2020: Advance Technology for Waterfront Facilities Repair and Enhancements, Facilities Technologies to Reduce the Cost of Facilities Sustainment, Restoration and Modernization for reducing the total ownership cost (TOC) of future and existing Facilities and addressing natural and catastrophic risk of critical Naval Waterfront Facilities. This project is consistent with recommendations of two National Academy of Sciences Reports: "The Role of Federal Agencies in Fostering New Technology and Innovation in Building" and "Federal Policies to Foster Innovation and Improvement in Constructed Facilities."

Started in FY2006 the Force Protection Ashore Project 3155 addresses selective topics in modeling, and material technologies to reduce the vulnerability of installations; and reduce the acquisition and operating costs of protective technologies. The demonstrations and validations provide the independent, technical and operational test data for the development of competitive performance specifications to acquire the required capabilities. The ATFP project is coordinated with other DOD programs.

Project 3347: The Development of advanced Environmental Control Unit (ECU) for expeditionary force camp shelters project is a transition of a DOE FY12-14 funded project and is a continuation in technology development, and was transitioned to NAVFAC starting FY 2015.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | R-1 Program Element (Number/Name)<br>PE 0603725N *I Facilities Improvement* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | 3.019 | 2.588 | 5.754 | - | 5.754 |
| Current President's Budget | 2.893 | 2.588 | 5.226 | - | 5.226 |
| Total Adjustments | -0.126 | - | -0.528 | - | -0.528 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.126 | - | | | |
| • Rate/Misc Adjustments | - | - | -0.528 | - | -0.528 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $0.5 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603725N / *Facilities Improvement* | | | | Project (Number/Name)<br>0995 / *Naval Facilities System* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 0995: *Naval Facilities System* | 9.949 | 1.328 | 0.816 | 1.154 | - | 1.154 | 1.992 | 1.969 | 1.913 | 1.951 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This program provides the Navy with new engineering capabilities that are required to overcome specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastructure. The program focuses available RDT&E resources on satisfying facility requirements where the Navy is a major stakeholder or where there are no tested validated Commercial Off the Shelf (COTS) solutions available, and a timely solution will not emerge without a Navy sponsored demonstration and validation. The program completes the development and validation of facility technologies originating in Navy science and technology programs, plus a variety of other sources which includes the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). Validated technologies are implemented in the Navy's Military Construction (MILCON) and Facilities Sustainment Restoration and Modernization Programs (FSRM). The Duncan Hunter National Defense Authorization Act of 2009 laid down very specific guidelines for the correction of corrosion deficiencies in DoD shore facilities which is estimated to be $1.9B (DOD Annual Cost of Corrosion for the Department of Defense Facilities and Infrastructure July 2010).

Project 0995 addresses two Navy facilities requirements: 1) waterfront facilities repair, upgrade and service life extension; and, 2) validation testing/performance monitoring of critical facilities (such as dry docks, piers, runways, magazines, etc.), testing and evaluation of the performance of alternative materials, and surfacing concepts, and, methods and corrosion technologies to reduce the cost of Sustainment, Restoration and Modernization (SRM).

Waterfront facilities, repair, upgrade and service life extension:
An urgent requirement exists for early identification of strategies and solution recommendations for seismic risk at Naval Facilities, and especially nuclear capable waterfront facilities. Recent Pacific Rim earthquakes have heightened anxiety levels on perceived huge risks to Navy waterfront facilities in the region. The sub-project will provide analysis and solution recommendations for facilities impacted by seismic risk. Waterfront facilities repair and upgrade: About 75% of the Navy's waterfront facilities are over 45 years old. They were designed for a service life of 25 years which was to satisfy the mission requirements existing at that time. The over aged reinforced concrete requires costly and repetitive repairs. Besides providing more pier side ship maintenance and thus reduce dry dock costs, these piers must be strengthened to support concentrated crane loads up to 140 tons when piers were originally not designed for concentrated loads. Piers were previously designed to service one or possibly two particular ship classes. Berthing flexibility is now limited by mooring and utility arrangements. This sub-project addresses new material design methods, and retrofit methods which extends the service life of existing waterfront facilities by an additional 15 or more years. The project also addresses updating the mission based service, environmental, and protection loading requirements imposed by changes in platforms, operations and threats. Other initiatives include: leveraging Building Information Modeling (BIM) technology to provide for enhanced facilities management processes and waterfront utilities service enhancements using models to achieve flexible berthing arrangements consistent with current and future platform mooring configurations and hotel service requirements including Facilities and Infrastructure Integrated Product Support for Acquisition Category (ACAT) Programs.

Technologies to reduce the cost of Sustainment, Restoration and Modernization (SRM):
Technologies to reduce the cost of SRM issues of high operational significance are addressed on a priority basis. The Navy portion of corrosion deficiencies at DoD shore facilities is estimated to be $433M (DOD Annual Cost of Corrosion for the Department of Defense Facilities and Infrastructure July 2010). This effort will

demonstrate and validate the cost and reliability of advanced corrosion technologies in order to assure their acceptance and implementation in traditionally conservative public works and construction industries. These facility corrosion technologies will accelerate the validation commercialization, and wide-spread implementation required to reduce the cost of correcting, the deficiencies in the Navy SRM backlog. The sub-projects include the continuing effort to validate, test and conduct performance monitoring of enhanced facility designs and coatings for facilities and equipment.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Waterfront facilities, repair, upgrade and service life extension: | 0.224 | 0.270 | 0.300 | - | 0.300 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Waterfront facilities, repair, upgrade and service life extension: Continued analysis and solution of CVN capable dry-dock and waterfront seismic analysis and standard seismic risk mitigation procedures. Continued synthetic line evaluation for ship fendering. Continued development of durable concrete repairs to waterfront structures. Continued development, validation and preparation of specifications for durable green concrete. Completed development of spot treatment protocol and transitioned via training and guidance. Completed assessment of corrosion for the floating double deck pier.<br>***FY 2015 Plans:***<br>Continue waterfront seismic analysis and standard seismic risk mitigation procedures for other dry docks and critical waterfront structures. Continue synthetic line evaluation for ship fendering. Complete development of durable green concrete and initiate transition criteria for integration into unified facilities criteria. Initiate identification and validation of operational and maintenance issues of waterfront facilities associated with supporting the Navy's new class of ships and submarines, including the Ohio Class Replacement Submarine.<br>***FY 2016 Base Plans:***<br>Plans are to complete waterfront seismic analysis and standard seismic risk mitigation procedures for a CVN/Ship in dry-dock. Continue to identify and validate operational and maintenance issues of waterfront facilities associated with supporting the Navy's new class of ships and submarines, including the Ohio Class Replacement Submarine.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Sustainment, Restoration & Modernization: | 1.104 | 0.546 | 0.854 | - | 0.854 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Sustainment, Restoration & Modernization: Continue Corrosion Prevention & Control projects, emphasizing sustainable design and improved lifecycle cost reductions. Initiated high temperature pavement design mix | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>0995 / *Naval Facilities System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| optimization to improve, cost, performance, and integration with other new aviation platforms such as the MV-22. Initiated seismic analysis of Earth Covered Magazines (ECM). Initiated blast test of reinforced concrete structure. Initiated planning and development for Modular Storage Magazine Locking Device System, Engineered coatings for fasteners, and Blast resistant connections for Magazines.<br>***FY 2015 Plans:***<br>FY15 funds will be used to continue projects from FY14 as follows: Continue Corrosion Prevention & Control projects, emphasizing sustainable design and improved lifecycle cost reductions. Continue high temperature pavement design mix optimization to improve cost, performance, and integration with other new aviation platforms such as the MV-22. Continue seismic analysis of Earth Covered Magazines (ECM). Complete testing of locking device System for Modular Storage Magazine. Continue improved concrete construction and crack repair technologies utilizing affordable and green aggregate constituents.<br>***FY 2016 Base Plans:***<br>The projects continued from FY15 are: Continue Corrosion Prevention & Control projects, emphasizing sustainable design and improved lifecycle cost reductions. Complete high temperature pavement design mix optimization to improve cost, performance, and integration with other new aviation platforms. Complete seismic analysis of Earth Covered Magazines (ECM). Continue Corrosion Prevention & Control projects, emphasizing sustainable design and improved lifecycle cost reductions.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.328 | 0.816 | 1.154 | - | 1.154 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

The Projects identified in this budget have been carefully selected to respond to both the facilities support for new Acquisition Category Programs, to address TOC considerations of an evolving and aging infrastructure, and to facilitate rational risk based decisions and solutions to protect and decrease risk levels for Department of the Navy-critical infrastructure and facilities. Each project has been assessed to ensure that it is addressing legitimate risks and requirements of the shore establishment. The results of these projects will be the development of design and construction criteria and or components that directly impact the shore facilities.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>0995 / *Naval Facilities System* |

**E. Performance Metrics**

Quarterly Program Reviews are conducted with the major performers to include funds status discussion, schedule review, assessment of plan to actual to meet benchmarks at midyear and end-of-year for PY1 and CY, and review of accomplishments and issues to date.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603725N / *Facilities Improvement* | Project (Number/Name)<br>0995 / *Naval Facilities System* | |

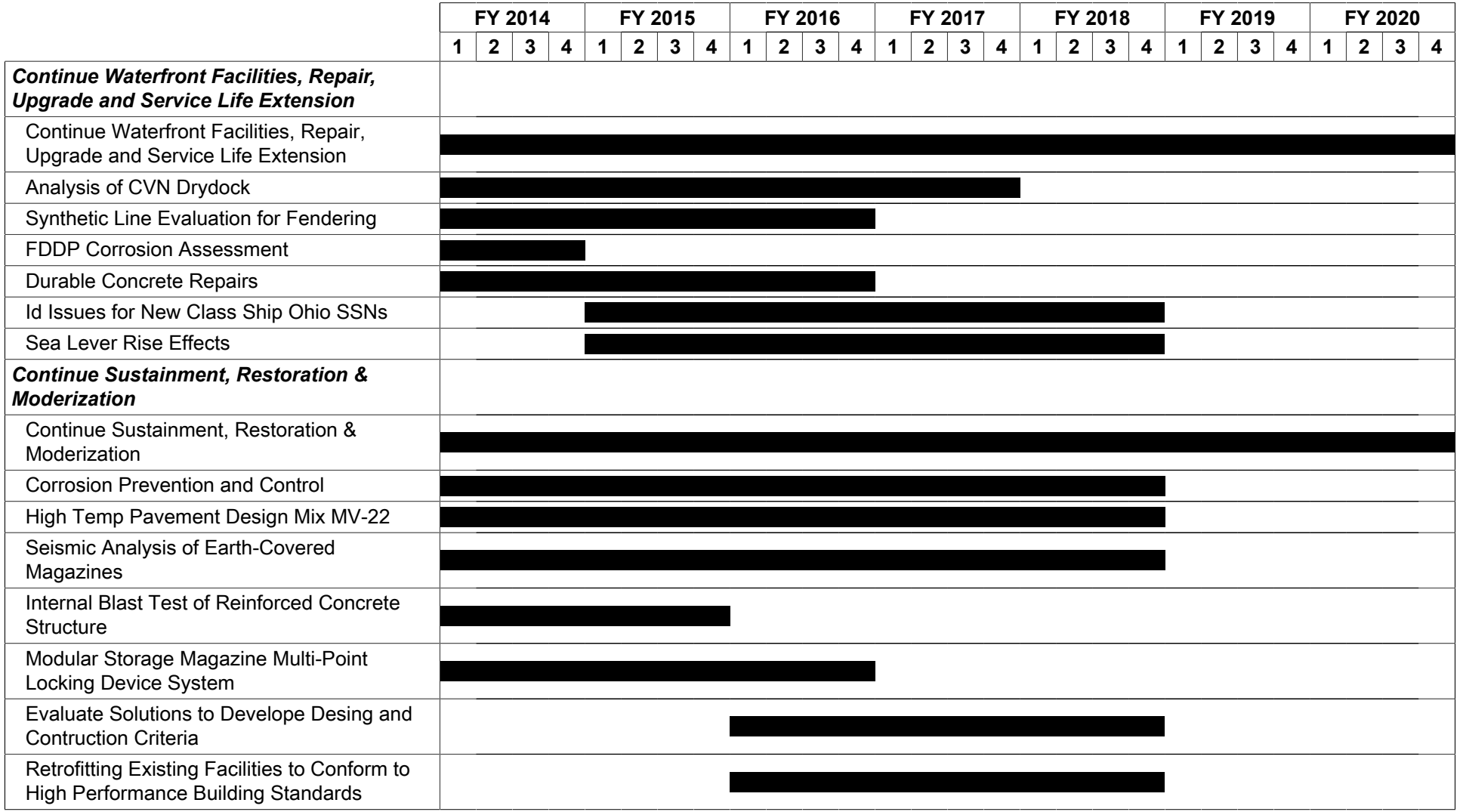
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Continue Waterfront Facilities, Repair, Upgrade and Services Life Extension | Various | NAVFAC EXWC : Pt Hueneme, CA | 1.988 | 0.224 | Dec 2013 | 0.270 | Dec 2014 | 0.300 | Dec 2015 | - | | 0.300 | Continuing | Continuing | Continuing |
| Continue Sustainment, Restoration and Modernization | Various | NAVFAC EXWC : Pt Hueneme, CA | 2.483 | 1.104 | Dec 2013 | 0.546 | Dec 2014 | 0.854 | Dec 2015 | - | | 0.854 | Continuing | Continuing | Continuing |
| Modular Hybrid Pier | WR | NAVFAC EXWC : Pt Hueneme, CA | 5.478 | - | | - | | - | | - | | - | - | 5.478 | - |
| | | **Subtotal** | 9.949 | 1.328 | | 0.816 | | 1.154 | | - | | 1.154 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 9.949 | 1.328 | | 0.816 | | 1.154 | | - | | 1.154 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>0995 / *Naval Facilities System* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>0995 / *Naval Facilities System* |

| | FY 2014 | | | | FY 2015 | | | | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 |
| Develope Design Criteria for Closed Piers and Wharves | | | | | | | | | [redacted] | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>0995 / *Naval Facilities System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Continue Waterfront Facilities, Repair, Upgrade and Service Life Extension*** | | | | |
| Continue Waterfront Facilities, Repair, Upgrade and Service Life Extension | 1 | 2014 | 4 | 2020 |
| Analysis of CVN Drydock | 1 | 2014 | 4 | 2017 |
| Synthetic Line Evaluation for Fendering | 1 | 2014 | 4 | 2016 |
| FDDP Corrosion Assessment | 1 | 2014 | 4 | 2014 |
| Durable Concrete Repairs | 1 | 2014 | 4 | 2016 |
| Id Issues for New Class Ship Ohio SSNs | 1 | 2015 | 4 | 2018 |
| Sea Lever Rise Effects | 1 | 2015 | 4 | 2018 |
| ***Continue Sustainment, Restoration & Moderization*** | | | | |
| Continue Sustainment, Restoration & Moderization | 1 | 2014 | 4 | 2020 |
| Corrosion Prevention and Control | 1 | 2014 | 4 | 2018 |
| High Temp Pavement Design Mix MV-22 | 1 | 2014 | 4 | 2018 |
| Seismic Analysis of Earth-Covered Magazines | 1 | 2014 | 4 | 2018 |
| Internal Blast Test of Reinforced Concrete Structure | 1 | 2014 | 4 | 2015 |
| Modular Storage Magazine Multi-Point Locking Device System | 1 | 2014 | 4 | 2016 |
| Evaluate Solutions to Develope Desing and Contruction Criteria | 1 | 2016 | 4 | 2018 |
| Retrofitting Existing Facilities to Conform to High Performance Building Standards | 1 | 2016 | 4 | 2018 |
| Develope Design Criteria for Closed Piers and Wharves | 1 | 2016 | 4 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603725N / *Facilities Improvement* | Project (Number/Name)<br>3155 / *Force Protection Ashore* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3155: *Force Protection Ashore* | 1.620 | 1.565 | 1.286 | 0.575 | - | 0.575 | 1.183 | 1.434 | 1.357 | 1.384 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Protection of Navy Installations against terrorist activities requires deployment of advanced technology for force protection capabilities. This antiterrorism and force protection (AT/FP) ashore project will develop, demonstrate and validate technologies for the following: access control and integrated perimeter security surveillance sensors and intelligent electronic security systems for automated intruder detection (Installation Protection); perimeter security; waterside protection against craft and swimmer intrusion; secure and efficient operations centers and emergency management centers including human and information support systems (Command and Control). Programs currently being evaluated are standard-based enterprise physical security system integration and automation; Command, Control, and Communications (C3) capabilities for emergency operations; integrated and networked mass notification systems (MNS); Waterside intelligent video security systems; integrated over-the-water sensors and analytics for automated course of action planning; identifying and interdicting malevolent threats - watercraft, swimmers, divers, and unmanned underwater vessels (UUVs) to reduce injury and death to the war fighter and damage to high value units (HVUs). Through demonstration and validation of risk modeling and simulation models, the potential of emerging technologies will be evaluated and installation security strategies that reduce manpower and other costs will be formulated. These demonstrations and validations derive advanced technology from science and technology programs of government academia and industry. The technology evaluation and validation produces data for performance specifications used for competitive procurement. All work will be coordinated with other programs and through industry forums as appropriate.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Force Protection Ashore | 1.565 | 1.286 | 0.575 | - | 0.575 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>- Continued Integrated PS/AC Automation project with the Regional Dispatch Center (RDC) to include developmental test and evaluation (DT)<br>- Continued integration and demonstration of Automated Sensor Assessment and Course of Action Planning (COAP) (OT) with EHSS.<br>- Completed integration and validation of advanced beyond swimmers and diver detection, tracking, and interdiction capabilities into EHSS.<br>- Completed Net-centric Mass Notification System specification development for transition.<br>- Initiated Waterside Protection - Boat Barrier Electronic Infrastructure project to assess impact of next generation boat barriers on existing Electronic Harbor Security System (EHSS) sensors and research, identify, | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3155 / *Force Protection Ashore* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| integrate, implement and evaluate mitigation sensors and sensor infrastructure to augment performance in the presence of shadow zones caused by the new barriers.<br><br>***FY 2015 Plans:***<br>- Complete integration and demonstration of Automated Sensor Assessment and Course of Action Plan (COAP) with EHSS and document baseline specifications. - Developmental Test & Evaluation (DT)<br>- Continue Boat Barrier Electronic Infrastructure project with a particular focus on environmental resilience and sustainability in an operational setting and integrated with existing Port Security Barriers and remote gate operations devices. - Spiral Development<br>- Initiate Waterside Protection - Boat Barrier Electronic Infrastructure project to assess impact of next generation boat barriers on existing Electronic Harbor Security System (EHSS) sensors and research, identify, integrate, implement and evaluate mitigation sensors and sensor infrastructure to augment performance in the presence of shadow zones caused by the new barriers. (Spiral Development)<br>- Initiate ship-to-shore common information exchange project to rapidly share information and communications between shore security forces and docked ships. (Spiral Development)<br>- Initiate versatile access control project to develop, integrate and test an access control system that is open architecture, enables biometrics and handles multiple credentials (driver's license, passport, etc.). (Spiral Development)<br>- Complete PS/AC automation project with an operational evaluation in NSW (OT).<br><br>***FY 2016 Base Plans:***<br>Funds will support continue and initiated projects from FY14 and FY15 as follows:<br>- Continue ship-to-shore common information exchange project, focusing on integration of a prototype system with a representative EHSS installation and testing in a controlled test environment. - [$125K] - Developmental Test & Evaluation (DT); SSC-PAC<br>- Continue versatile access control project to integrate and test an enhanced access control approach, leveraging multiple credential types, biometrics and enhancing the detection of vehicles and personnel in and around an Access Control Point. - [$100K] - Developmental Test & Evaluation (DT); NSWC-Dahlgren<br>- Continue Waterside Protection - Boat Barrier Electronic Infrastructure project to assess EHSS performance, environmental, and operational impact and added benefits of next generation boat barriers. - [$350K] - Operational Test & Evaluation (OT); SSC-PAC<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.565 | 1.286 | 0.575 | - | 0.575 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3155 / *Force Protection Ashore* |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Demonstration and validation is conducted for maximum transfer and interaction with industry such as to influence the industry COTS with the results of this demonstration and prototype validation. Acquisition is based on performance specifications enabled by this project.

**E. Performance Metrics**

Quarterly Program Reviews to include funds status, schedule review and assessment of plan to actual.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603725N / *Facilities Improvement* | Project (Number/Name)<br>3155 / *Force Protection Ashore* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Waterside Protection Capability Development - Martime: OT | Various | SPAWAR : San Diego, CA | 0.055 | 0.200 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Waterside Protection Capability Development - Martime: Procurement Specification | Various | SPAWAR : San Diego, CA | 0.150 | 0.129 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Waterside Protection Capability Development :COAP Spiral Development | Various | SPAWAR : San Diego, CA | 0.423 | 0.110 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Waterside Protection Capability Development : COAP Spiral Develpment (II) | Various | SPAWAR : San Diego, CA | 0.567 | 0.213 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.195 | 0.652 | | - | | - | | - | | - | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Command and Control Capability Development: Government Engineering Support | Various | SPAWAR : San Diego, CA | 0.175 | 0.085 | Nov 2013 | 0.239 | Nov 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Installation Protection Capability Development - Integrated Physical Security and Access Control Automation: Spiral Development | Various | NSWC : Dahlgren, VA | 0.155 | 0.205 | Nov 2013 | 0.237 | Nov 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Installation Protection Capability Development -Integrated Physical Security and Access | Various | NSWC : Dahlgren, VA | 0.095 | 0.165 | Nov 2013 | 0.189 | Nov 2014 | - | | - | | - | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603725N / *Facilities Improvement* | Project (Number/Name)<br>3155 / *Force Protection Ashore* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control Automation:Test & Evaluation (DT) | | | | | | | | | | | | | | | |
| Installation Protection Capability Development - Integrated Physical Security and Access Control Automation:Test & Evaluation (OT) | Various | SPAWAR : San Diego, CA | 0.000 | 0.203 | Nov 2013 | 0.129 | Nov 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Installation Protection Capability Development - Elevated Persistence Surveilance:Technology Assessment | Various | NSWC : PCDET | 0.000 | 0.125 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Installation Protection Capability Development - Elevated Persistence Surveilance: Spiral Development | Various | NSWC : PCDET | 0.000 | 0.130 | Nov 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Water Protection - Common Information Exchange Spiral Development | WR | SSC-PAC : SSC-PAC | 0.000 | - | | 0.119 | Nov 2014 | 0.125 | Feb 2016 | - | | 0.125 | Continuing | Continuing | Continuing |
| Installation Protection - Versatile Access Control Spiral Development | WR | NSWC : Dahlgren, VA | 0.000 | - | | 0.239 | Nov 2014 | 0.100 | Feb 2016 | - | | 0.100 | Continuing | Continuing | Continuing |
| Waterside Protection - Boat Barrier Electronic Infrastructure - Spiral Development | WR | SSC-PAC : SSC-PAC | 0.000 | - | | 0.134 | Nov 2014 | 0.350 | Feb 2016 | - | | 0.350 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.425 | 0.913 | | 1.286 | | 0.575 | | - | | 0.575 | - | - | - |

**Remarks**

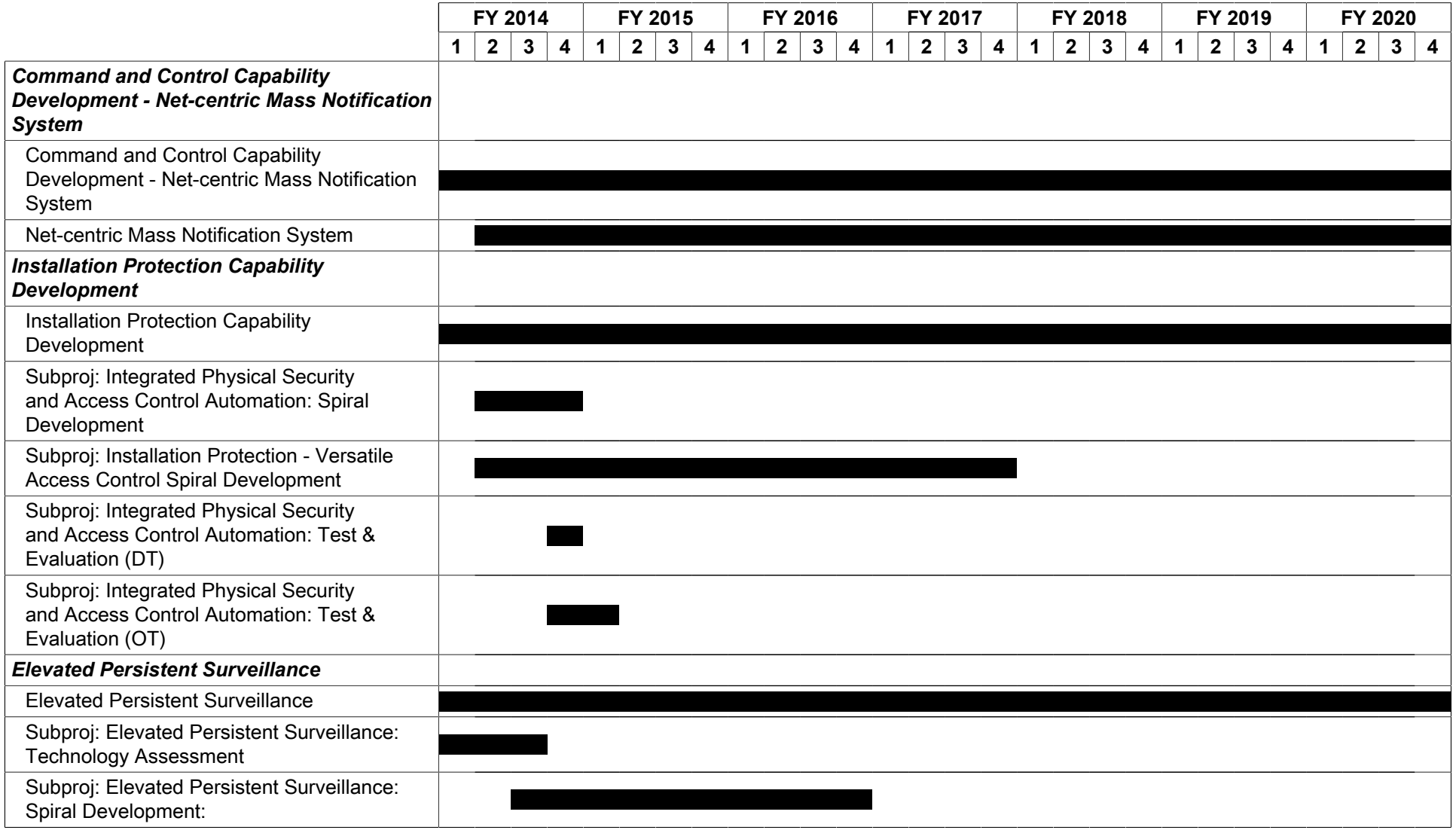
As a result of FY16 decrease in funding levels the Installation Protection Capability Development - Incident Management System (IMS) - Spiral Development project is now rescheduled for FY17 and FY18 restoral funds.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603725N / *Facilities Improvement* | Project (Number/Name)<br>3155 / *Force Protection Ashore* | |

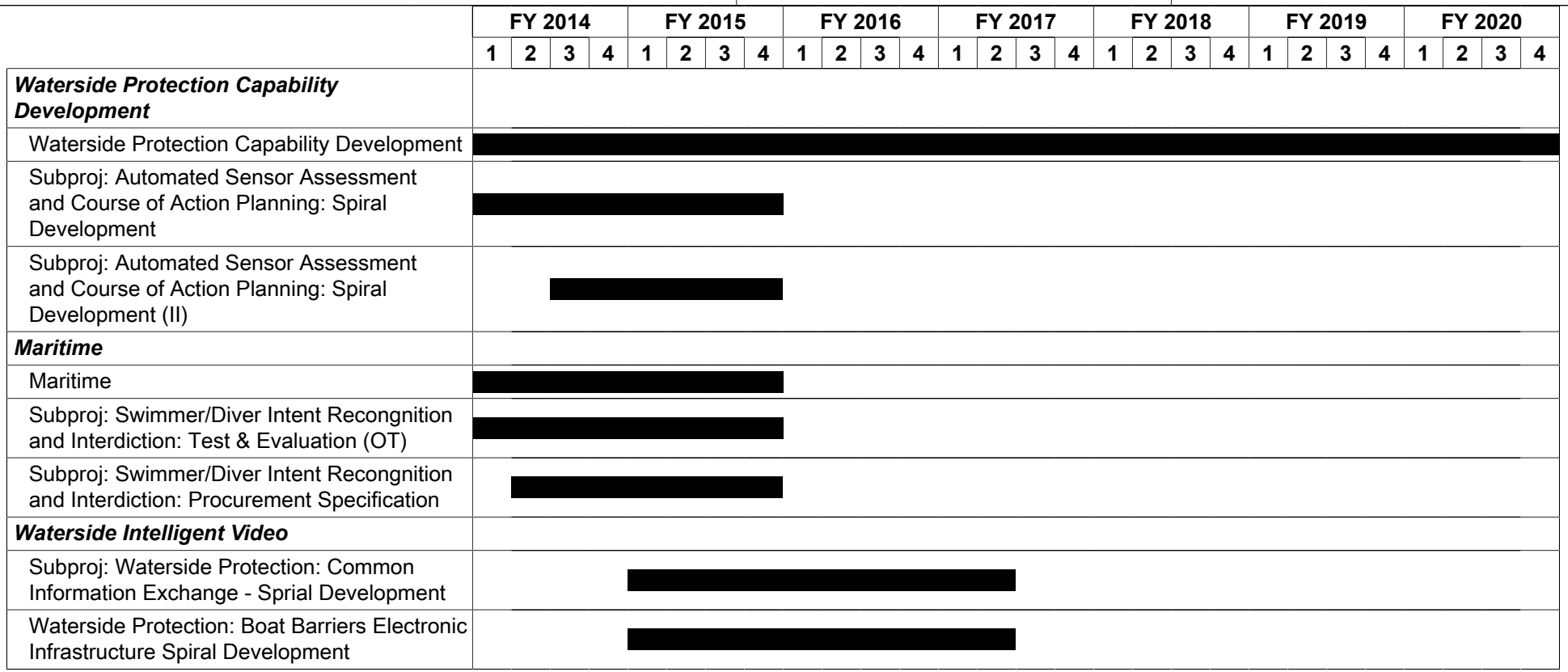
| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1.620 | 1.565 | | 1.286 | | 0.575 | | - | | 0.575 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3155 / *Force Protection Ashore* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3155 / *Force Protection Ashore* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3155 / *Force Protection Ashore* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Command and Control Capability Development - Net-centric Mass Notification System*** | | | | |
| Command and Control Capability Development - Net-centric Mass Notification System | 1 | 2014 | 4 | 2020 |
| Net-centric Mass Notification System | 2 | 2014 | 4 | 2020 |
| ***Installation Protection Capability Development*** | | | | |
| Installation Protection Capability Development | 1 | 2014 | 4 | 2020 |
| Subproj: Integrated Physical Security and Access Control Automation: Spiral Development | 2 | 2014 | 4 | 2014 |
| Subproj: Installation Protection - Versatile Access Control Spiral Development | 2 | 2014 | 4 | 2017 |
| Subproj: Integrated Physical Security and Access Control Automation: Test & Evaluation (DT) | 4 | 2014 | 4 | 2014 |
| Subproj: Integrated Physical Security and Access Control Automation: Test & Evaluation (OT) | 4 | 2014 | 1 | 2015 |
| ***Elevated Persistent Surveillance*** | | | | |
| Elevated Persistent Surveillance | 1 | 2014 | 4 | 2020 |
| Subproj: Elevated Persistent Surveillance: Technology Assessment | 1 | 2014 | 3 | 2014 |
| Subproj: Elevated Persistent Surveillance: Spiral Development: | 3 | 2014 | 4 | 2016 |
| ***Waterside Protection Capability Development*** | | | | |
| Waterside Protection Capability Development | 1 | 2014 | 4 | 2020 |
| Subproj: Automated Sensor Assessment and Course of Action Planning: Spiral Development | 1 | 2014 | 4 | 2015 |
| Subproj: Automated Sensor Assessment and Course of Action Planning: Spiral Development (II) | 3 | 2014 | 4 | 2015 |
| ***Maritime*** | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3155 / *Force Protection Ashore* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Maritime | 1 | 2014 | 4 | 2015 |
| Subproj: Swimmer/Diver Intent Recongnition and Interdiction: Test & Evaluation (OT) | 1 | 2014 | 4 | 2015 |
| Subproj: Swimmer/Diver Intent Recongnition and Interdiction: Procurement Specification | 2 | 2014 | 4 | 2015 |
| ***Waterside Intelligent Video*** | | | | |
| Subproj: Waterside Protection: Common Information Exchange - Sprial Development | 1 | 2015 | 2 | 2017 |
| Waterside Protection: Boat Barriers Electronic Infrastructure Spiral Development | 1 | 2015 | 2 | 2017 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603725N / *Facilities Improvement* | Project (Number/Name)<br>3347 / *Navy Expeditionary Energy Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3347: *Navy Expeditionary Energy Development* | - | - | 0.486 | 3.497 | - | 3.497 | 1.996 | - | - | - | - | 5.979 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Development of advanced Environmental Control Unit (ECU) for expeditionary force camp shelters will reduce the heating and air-conditioning (HVAC) fuel consumption by 50% and also will reduce fuel transport convoys, and attendant manpower casualties and handling labor.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Expeditionary Environmental Control Unit (EECU) | - | 0.486 | 3.497 | - | 3.497 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>Conduct engineering analysis and prepare draft solicitation package for full scale prototypes of technologies delivered by Department of Energy (DOE) Advanced Research Projects Agency - Energy (ARPA-E) at Technology Readiness Level (TRL) 6. FY12-FY14 effort to identify and mature technology was resourced by the Assistant Secretary of Defense Office of Operational Energy Plans and Programs. | | | | | |
| ***FY 2016 Base Plans:***<br>- Develop, design, and fabricate full scale prototypes (TRL 7) for technical and operational testing. One prototype is for an ECU utilizing the exhaust heat from generators which is currently wasted. Second prototype is for a new ECU based on Sterling cycle technology which is projected to reduce energy consumption by 30%. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 0.486 | 3.497 | - | 3.497 |

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

N/A

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3347 / *Navy Expeditionary Energy Development* |

**D. Acquisition Strategy**

Development of this technology will be a competitive award of two complementary technologies in FY16. Once technologies are operationally tested and accepted, solution will be turned over to DoD Program Manager for Mobile Electric Power for Acquisition in support of all DoD.

**E. Performance Metrics**

Quarterly Program Reviews will be conducted with the major performer to include cost, schedule, and performance risks for milestone achievement associated with the full scale prototypes

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3347 / *Navy Expeditionary Energy Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Expeditionary Environmental Control Unit (EECU) | Various | EXWC : Port Hueneme, CA | 0.000 | - | | 0.486 | Oct 2014 | 3.497 | Dec 2015 | - | | 3.497 | - | 3.983 | - |
| | | **Subtotal** | 0.000 | - | | 0.486 | | 3.497 | | - | | 3.497 | - | 3.983 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 0.486 | | 3.497 | | - | | 3.497 | - | 3.983 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3347 / *Navy Expeditionary Energy Development* |

| | FY 2014 | | | | FY 2015 | | | | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 3347*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Expeditionary Environmental Control Unit (ECU) | | | | | [redacted] | | | | | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603725N / *Facilities Improvement* | **Project (Number/Name)**<br>3347 / *Navy Expeditionary Energy Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3347*** | | | | |
| Expeditionary Environmental Control Unit (ECU) | 1 | 2015 | 4 | 2017 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603734N *I (U)CHALK CORAL* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 121.021 | 176.301 | 182.771 | - | 182.771 | 152.184 | 154.659 | 140.430 | 145.027 | Continuing | Continuing |
| 1804: *Chalk Coral* | 0.000 | 121.021 | 176.301 | 182.771 | - | 182.771 | 152.184 | 154.659 | 140.430 | 145.027 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 124.451 | 176.301 | 214.394 | - | 214.394 |
| Current President's Budget | 121.021 | 176.301 | 182.771 | - | 182.771 |
| Total Adjustments | -3.430 | - | -31.623 | - | -31.623 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -1.710 | - | | | |
| • SBIR/STTR Transfer | -1.720 | - | | | |
| • Program Adjustments | - | - | 1.660 | - | 1.660 |
| • Rate/Misc Adjustments | - | - | -33.283 | - | -33.283 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603739N *I Navy Logistic Productivity* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 37.029 | 3.715 | 3.473 | 3.866 | - | 3.866 | 3.276 | 3.274 | 3.092 | 3.125 | Continuing | Continuing |
| 2955: *JEDMICS* | 35.243 | 2.801 | 2.660 | 2.945 | - | 2.945 | 2.340 | 2.319 | 2.118 | 2.130 | Continuing | Continuing |
| 3223: *Logistics R&D* | 1.786 | 0.914 | 0.813 | 0.921 | - | 0.921 | 0.936 | 0.955 | 0.974 | 0.995 | Continuing | Continuing |

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

Includes development and evaluation of incentive systems for improving the productivity of civilian and military personnel. Identifies barriers to increased productivity and evaluates the effect of removing them. Develops techniques for easing the introduction of new technology to the work place. Identifies and evaluates methods for improving the quality of work-life.

Excludes civilian and military manpower and their related costs and military construction costs which are included in appropriate Management and Support elements in this program.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 3.847 | 3.873 | 3.899 | - | 3.899 |
| Current President's Budget | 3.715 | 3.473 | 3.866 | - | 3.866 |
| Total Adjustments | -0.132 | -0.400 | -0.033 | - | -0.033 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -0.400 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.132 | - | | | |
| • Rate/Misc Adjustments | - | - | -0.033 | - | -0.033 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603739N / *Navy Logistic Productivity* | Project (Number/Name)<br>2955 / *JEDMICS* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2955: *JEDMICS* | 35.243 | 2.801 | 2.660 | 2.945 | - | 2.945 | 2.340 | 2.319 | 2.118 | 2.130 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

In FY85 Congress directed the Services and Defense Logistics Agency to permanently capture, manage and control engineering data in digital format so it would be available to support competitive spares re-procurement. The Joint Engineering Data Management Information & Control System (JEDMICS) program manages and controls 100,000,000 engineering images and has 13,000 authorized users responsible for over 77,000 user sessions per month. Over 1.2 million digital images are retrieved each month. New data and new users are added each month as DoD re-engineers its business processes to take advantage of digital data that is managed and controlled for corporate reuse. The JEDMICS system is deployed at 5 interoperable sites that service user locations worldwide. Data stored in JEDMICS is used for Logistics Support, Spares re-procurement, Weapons Systems procurement, Engineering, Maintenance, Distribution, Manufacturing, Air National Guard and Deployed Engineering Technical Services organizations. JEDMICS facilitates work process re-design since it brings the electronic drawings to the desktop, shop floor or flight line in real time eliminating walk, wait and slack time to retrieve drawings. Additionally, Administrative Lead Time, Repair Turn Around Time, Engineering Change Proposal processing time, demilitarization time, and all cycle times dependent on engineering data have decreased with the real time availability of digital engineering data. JEDMICS also facilitates Electronic Commerce since it produces digital technical data packages that can be forwarded along with an electronic order. Funds are for Commercial Off The Shelf (COTS) test, evaluation and integration. JEDMICS development efforts are required to integrate and test COTS upgrades.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** JEDMICS Development | 2.749 | 2.608 | 2.893 | - | 2.893 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** Conduct development efforts associated with JEDMICS software releases. Conduct COTS requirements definition, evaluation, integration and testing of annual baseline releases. Conduct technology insertion of the JEDMICS system that is required to protect the $21B digital data asset managed in JEDMICS.

These annual releases are necessary to incorporate changes that are essential to keeping the system running within the Navy's Enterprise. They include Service mandated Information Technology changes, storage capability increases for emerging engineering data formats, changes to accommodate commercial hardware and software end-of-life product obsolescence, and defenses for newly recognized Information Assurance vulnerabilities affecting the systems various software applications.

***FY 2014 Accomplishments:***
Develop and integrate JEDMICS Software Release 3.0.15.

***FY 2015 Plans:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>2955 / *JEDMICS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Develop and integrate JEDMICS Software Release 3.0.16.<br>***FY 2016 Base Plans:***<br>Develop and integrate JEDMICS Software Release 3.0.17.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** JEDMICS Test | 0.025 | 0.026 | 0.027 | - | 0.027 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Conduct test and readiness reviews and functional performance tests on JEDMICS system.<br>***FY 2014 Accomplishments:***<br>Complete DT of JEDMICS Software Release 3.0.14. Initiate DT of JEDMICS Software Release 3.0.15.<br>***FY 2015 Plans:***<br>Complete DT of JEDMICS Software Release 3.0.15. Initiate DT of JEDMICS Software Release 3.0.16.<br>***FY 2016 Base Plans:***<br>Complete DT of JEDMICS Software Release 3.0.16. Initiate DT of JEDMICS Software Release 3.0.17.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** JEDMICS Evaluation & Review | 0.027 | 0.026 | 0.025 | - | 0.025 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Conduct technical evaluations and configuration control reviews of JEDMICS system.<br>***FY 2014 Accomplishments:***<br>Conduct technical evaluations and reviews for JEDMICS Software Release 3.0.16.<br>***FY 2015 Plans:***<br>Conduct technical evaluations and reviews for JEDMICS Software Release 3.0.17.<br>***FY 2016 Base Plans:***<br>Conduct technical evaluations and reviews for JEDMICS Software Release 3.0.18.<br>***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>2955 / *JEDMICS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.801 | 2.660 | 2.945 | - | 2.945 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Execution of sole-source negotiated requirements type contract for engineering, design, development and test efforts. Performance-based reviews conducted quarterly by the Project Management Office.

**E. Performance Metrics**

1. Complete testing, integration, & upgrade of three major embedded Commercial Off-the-Shelf products.
2. Test & integrate system Information Assurance Vulnerability Management software patch upgrades four times.
3. Complete development, testing, & integration of a minimum twenty corrected high-priority software problem reports.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603739N / *Navy Logistic Productivity* | Project (Number/Name)<br>2955 / *JEDMICS* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | C/IDIQ | Wyle Laboratories, Inc : Huntsville, AL | 0.863 | 0.144 | Oct 2013 | 0.147 | Oct 2014 | 0.144 | Oct 2015 | - | | 0.144 | Continuing | Continuing | Continuing |
| Software Development | SS/T&M | Northrop Grumman Information : McLean, VA | 30.114 | 2.605 | Nov 2013 | 2.461 | Nov 2014 | 2.749 | Nov 2015 | - | | 2.749 | Continuing | Continuing | Continuing |
| Prior Year Support no Longer Funded in Budget Year or Out years | Various | Various : Various | 0.216 | - | | - | | - | | - | | - | - | 0.216 | - |
| | | **Subtotal** | 31.193 | 2.749 | | 2.608 | | 2.893 | | - | | 2.893 | - | - | - |

**Remarks**

Remarks: Funds are for development efforts associated with Commercial Off The Shelf (COTS) obsolescence on the fully deployed COTS Intensive Joint Engineering Data Management Infomation & Control System. Funds are for COTS evaulation, integration, and test and evaluation. The common baseline will be maintained and obsolete COTS software and hardware will be replaced. Baseline releases will protect joint interoperability, upgrade operating systems for security patches and supportable versions, support integration to replace obsolete COTS, and upgrade the Oracle database to supportable versions.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | MIPR | WR-ALC/TILAB : Robins AFB, GA | 2.470 | 0.025 | Oct 2013 | 0.026 | Oct 2014 | 0.027 | Oct 2015 | - | | 0.027 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.470 | 0.025 | | 0.026 | | 0.027 | | - | | 0.027 | - | - | - |

**Remarks**

Supports testing and evaluation of baseline releases in a user environment.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | Naval Air Warfare Center : NAS Patuxent River, MD | 0.253 | 0.013 | Oct 2013 | 0.013 | Oct 2014 | 0.014 | Oct 2015 | - | | 0.014 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603739N / *Navy Logistic Productivity* | Project (Number/Name)<br>2955 / *JEDMICS* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Various | Various : Various | 0.244 | 0.014 | Jul 2014 | 0.013 | Jul 2015 | 0.011 | Jul 2016 | - | | 0.011 | Continuing | Continuing | Continuing |
| Prior Year Mgmt no Longer Funded in Budget Year or Out years | Various | Various : Various | 1.083 | - | | - | | - | | - | | - | - | 1.083 | - |
| | | **Subtotal** | 1.580 | 0.027 | | 0.026 | | 0.025 | | - | | 0.025 | - | - | - |

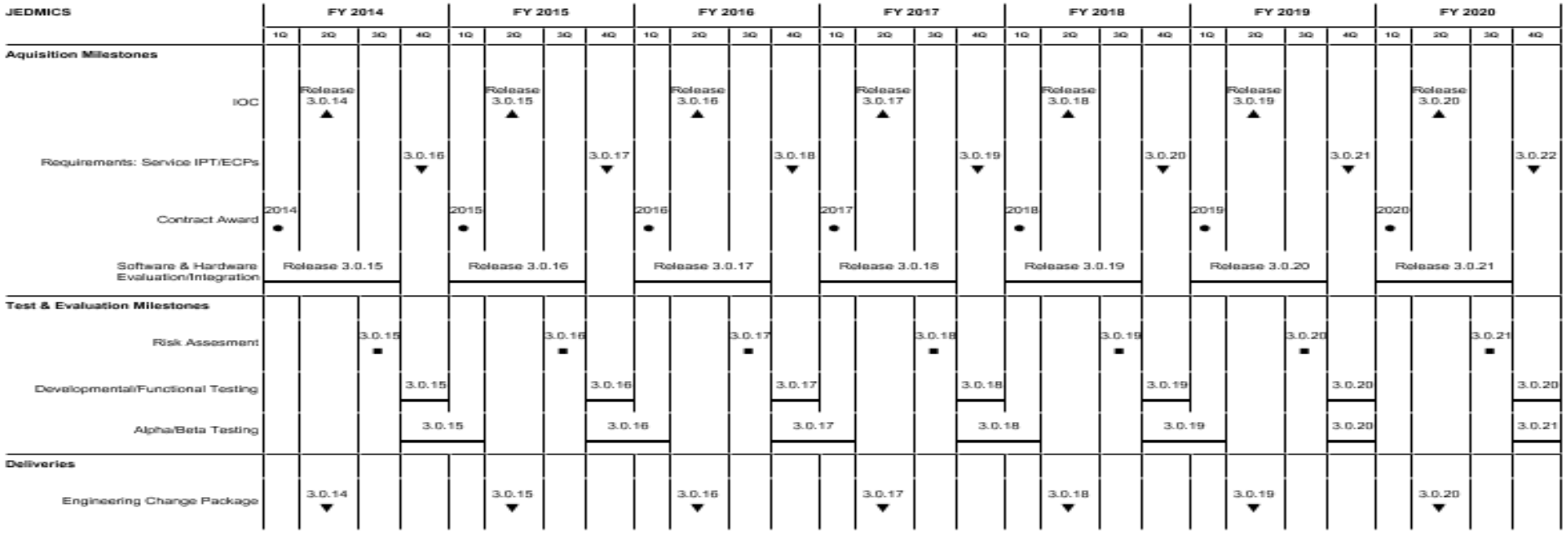
**Remarks**

Supports program compliance reviews and program related travel by government employees.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 35.243 | 2.801 | | 2.660 | | 2.945 | | - | | 2.945 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>2955 / *JEDMICS* |




*2016PB - 0603739N - 2955*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>2955 / *JEDMICS* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***JEDMICS*** | | | | |
| Aquisition Milestones: IOC: IOC Release 3.0.14 | 2 | 2014 | 2 | 2014 |
| Aquisition Milestones: IOC: IOC Release 3.0.15 | 2 | 2015 | 2 | 2015 |
| Aquisition Milestones: IOC: IOC Release 3.0.16 | 2 | 2016 | 2 | 2016 |
| Aquisition Milestones: IOC: IOC Release 3.0.17 | 2 | 2017 | 2 | 2017 |
| Aquisition Milestones: IOC: IOC Release 3.0.18 | 2 | 2018 | 2 | 2018 |
| Aquisition Milestones: IOC: IOC Release 3.0.19 | 2 | 2019 | 2 | 2019 |
| Aquisition Milestones: IOC: IOC Release 3.0.20 | 2 | 2020 | 2 | 2020 |
| Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.16 | 4 | 2014 | 4 | 2014 |
| Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.17 | 4 | 2015 | 4 | 2015 |
| Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.18 | 4 | 2016 | 4 | 2016 |
| Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.19 | 4 | 2017 | 4 | 2017 |
| Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.20 | 4 | 2018 | 4 | 2018 |
| Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.21 | 4 | 2019 | 4 | 2019 |
| Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.22 | 4 | 2020 | 4 | 2020 |
| Aquisition Milestones: Contract Award: 2014 Contract Award | 1 | 2014 | 1 | 2014 |
| Aquisition Milestones: Contract Award: 2015 Contract Award | 1 | 2015 | 1 | 2015 |
| Aquisition Milestones: Contract Award: 2016 Contract Award | 1 | 2016 | 1 | 2016 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>2955 / *JEDMICS* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Aquisition Milestones: Contract Award: 2017 Contract Award | 1 | 2017 | 1 | 2017 |
| Aquisition Milestones: Contract Award: 2018 Contract Award | 1 | 2018 | 1 | 2018 |
| Aquisition Milestones: Contract Award: 2019 Contract Award | 1 | 2019 | 1 | 2019 |
| Aquisition Milestones: Contract Award: 2020 Contract Award | 1 | 2020 | 1 | 2020 |
| Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.15 | 1 | 2014 | 3 | 2014 |
| Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.16 | 1 | 2015 | 3 | 2015 |
| Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.17 | 1 | 2016 | 3 | 2016 |
| Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.18 | 1 | 2017 | 3 | 2017 |
| Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.19 | 1 | 2018 | 3 | 2018 |
| Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.20 | 1 | 2019 | 3 | 2019 |
| Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.21 | 1 | 2020 | 3 | 2020 |
| Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.15 | 3 | 2014 | 3 | 2014 |
| Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.16 | 3 | 2015 | 3 | 2015 |
| Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.17 | 3 | 2016 | 3 | 2016 |
| Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.18 | 3 | 2017 | 3 | 2017 |
| Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.19 | 3 | 2018 | 3 | 2018 |
| Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.20 | 3 | 2019 | 3 | 2019 |
| Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.21 | 3 | 2020 | 3 | 2020 |
| Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/ Functional Testing Release 3.0.15 | 4 | 2014 | 4 | 2014 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>2955 / *JEDMICS* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/ Functional Testing Release 3.0.16 | 4 | 2015 | 4 | 2015 |
| Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/ Functional Testing Release 3.0.17 | 4 | 2016 | 4 | 2016 |
| Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/ Functional Testing Release 3.0.18 | 4 | 2017 | 4 | 2017 |
| Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/ Functional Testing Release 3.0.19 | 4 | 2018 | 4 | 2018 |
| Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/ Functional Testing Release 3.0.20 | 4 | 2019 | 4 | 2019 |
| Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/ Functional Testing Release 3.0.21 | 4 | 2020 | 4 | 2020 |
| Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.15 | 4 | 2014 | 1 | 2015 |
| Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.16 | 4 | 2015 | 1 | 2016 |
| Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.17 | 4 | 2016 | 1 | 2017 |
| Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.18 | 4 | 2017 | 1 | 2018 |
| Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.19 | 4 | 2018 | 1 | 2019 |
| Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.20 | 4 | 2019 | 4 | 2019 |
| Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.21 | 4 | 2020 | 4 | 2020 |
| Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.14 | 2 | 2014 | 2 | 2014 |
| Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.15 | 2 | 2015 | 2 | 2015 |
| Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.16 | 2 | 2016 | 2 | 2016 |
| Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.17 | 2 | 2017 | 2 | 2017 |
| Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.18 | 2 | 2018 | 2 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>2955 / *JEDMICS* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.19 | 2 | 2019 | 2 | 2019 |
| Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.20 | 2 | 2020 | 2 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603739N / *Navy Logistic Productivity* | | | | Project (Number/Name)<br>3223 / *Logistics R&D* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 3223: *Logistics R&D* | 1.786 | 0.914 | 0.813 | 0.921 | - | 0.921 | 0.936 | 0.955 | 0.974 | 0.995 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Stable annual funding is required to facilitate implementation and execution of a robust, flexible Logistics R&D program that will provide the means for Naval Supply Systems Command (NAVSUP) to effectively pursue solutions to mission-related capability and technology gaps. The NAVSUP Logistics R&D program has an established infrastructure and business process for ensuring that R&D funds are applied to projects that address high priority enterprise needs established in accordance with OPNAV goals and the NAVSUP Commander's Guidance.

From a process perspective, Logistics R&D investments are governed by a NAVSUP enterprise-wide Executive Steering Group (ESG) chaired by the NAVSUP Vice Commander, and comprised of SES and Command leadership representatives. The ESG ratifies capability and technology gaps identified by all activities within the enterprise, and then assesses and prioritizes all proposed Logistics R&D initiatives in accordance with their potential for filling the established gap and generating return on investment.

The established Logistics R&D business management process has currently identified capability/technology gaps in the following general areas: 1) the need to develop formalized energy management techniques that focus on energy and resource conservation; increased energy efficiency of new and existing systems and facilities; and increased use of alternative energy products, 2) the need to modernize quality of life (QOL) services to improve overall services, offer additional desired features and reduce total ownership costs, 3) the need to assess clothing protection for the warfighter in areas of thermal/flame threats, protective footwear, and physical (hearing, vibration, etc.) clothing/accessories, 4) the need to develop logistics data access and information sharing through enhanced Graphical User Interfaces (GUI) and web-based data services, 5) the need to develop a capability that allows Integrated Logistics Support (ILS) repair and modernization tools, 6) the need to leverage breakthrough technologies to improve supply chain processing. This modest R&D investment will establish a NAVSUP Logistics R&D Program to explore additional technologies and significantly increase potential cost savings.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
|---|---|---|---|---|---|
| ***Title:*** Energy Management Techniques | - | - | 0.102 | - | 0.102 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Formalized energy management requires two distinct pieces: 1) installation efforts and 2) alternative fuel efforts. Energy generation options and the availability of energy management techniques are required. | | | | | |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>3223 / *Logistics R&D* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>Technologies that will increase recycling, improve electronics stewardship, increase energy usage awareness (e.g. electricity metering), assist in lifetime energy cost evaluations of contracts, promote "green" behavior, improve efficiency and performance of alternative energy sources, analyze and identify personnel and building energy reduction initiatives, and reduce overall petroleum dependency in all aspects of Navy logistics.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Quality of Life Services Modernization & Cost Reduction | - | 0.813 | 0.122 | - | 0.122 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** NAVSUP Quality of Life (QOL) services include subsistence, retail, postal, laundry, vending, barber shop, household goods and disbursing/Navy Cash. In many cases, these services are inefficient, costly to operate, and lack easy access to comprehensive information required to make informed management decisions impacting execution of routine supporting business processes.<br>***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>Enhancing the data integration of subsistence, retail, postal, laundry, vending, barbershop, household goods and disbursing/Navy Cash that will improve services and reduce total ownership costs.<br><br>CACPAY is being developed an innovative cashless payment system being developed to replace the legacy Navy Cash system. CACPAY provides the required onboard functions and leverages commercially available capabilities to eliminate the use of Government contracted bank support, Stored Value Cards, and an onboard near full-time bank agent and system administrator (Disbursing Officer). CACPAY allows utilization of shore support (provided by NAVSUP Global Logistics Support) to facilitate fiduciary responsibilities with DFAS through the applicable Personnel Support Detachment.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>3223 / *Logistics R&D* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Enhancing data integration of subsistence, retail, postal, laundry, vending, barbershop, household goods and disbursing/Navy Cash to offer additional desired features (such as those which would improve supporting information systems, security, health, etc.) and reduce total ownership costs.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Readiness through Logistics Solutions | 0.475 | - | 0.153 | - | 0.153 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Supply chain improvements are required to support logistics efficiency and Fleet readiness through logistics solution technological improvements.<br>***FY 2014 Accomplishments:***<br>Enhance the Cross Domain Service (CDS) project that will develop, test, and field a cross domain service to support the transfer of unclassified transportation planning information to and from the TET prototype.<br><br>The LifeCycle-ONE project is continuing the expansion of the current systems algorithms and data table sets to support O&S cost calculations for more Navy systems.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>Develop technological capabilities that improve naval logistics in part or in its entirety (throughout its life-cycle, from concept to completion "cradle to grave") of a DoD/ DON acquisition program of record (from manufacture, storage, delivery, use, maintenance, and disposal).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Logistics Data Access and Information Sharing | 0.060 | - | 0.062 | - | 0.062 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Numerous electronic information technology (IT) systems exist that contain logistics data and information. Very often that data/information can be difficult to: 1) access by individual users, and 2) share between other IT systems. The lack of access and sharing results in inefficient processes and manual work-arounds which impede performance and increase cost. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>3223 / *Logistics R&D* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>The Electronic Tooling Management System (eTIMS) application provides specific upgrade to a graphical user interface (GUI) that will provide new efficiencies in the way the application processes data and presents it to the user. Specific deliverables will be "single-window" presentation GUI, background processing improvements, and compatibility with new operating systems and browsers used by a variety of customers, both governmental and commercial.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>Capabilities to facilitate improved access and use of logistics data by both individual users and between IT systems. Capabilities include, but are not limited to, enhanced Graphical User Interfaces (GUI) and web-based data services and other community-based software tools and technologies that can enable broader exposure and sharing of logistics data based on customer requirements for data representation, metadata, format and delivery.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Breakthrough Technologies to Improve Supply Chain Processing | 0.157 | - | 0.208 | - | 0.208 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** There is a distinct need within the DoN to enhance operational fleet readiness, reduce energy consumption, and reduce total ownership costs. Identify opportunities for using breakthrough technologies that will enhance operational fleet readiness, reduce energy consumption, and enable parts on demand manufacturing by defining the Warfighter Payoff and enhanced naval capabilities. Additive Manufacturing (AM) is a technology that is capable of helping the DoN achieve these goals through tighter integration of the maintenance/supply order fulfillment process. The term "additive manufacturing" describes processes that build three dimensional objects layer by layer from a variety of materials including plastics and structural metals.<br>***FY 2014 Accomplishments:***<br>Forward Deployed Additive Manufacturing Hub: Build a scope of effort to advance NAVSUP interests in Additive Manufacturing related to intellectual property rules and sharing of proprietary data as well as developing a strategy for shared database storage.<br>***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>3223 / *Logistics R&D* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2016 Base Plans:***<br>Efforts of interest will continue to focus on assessing opportunities for use of AM technology in Order Fulfillment through timely insertion of AM technology into naval platforms and installations.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Clothing Protection for the Warfighter | 0.222 | - | 0.274 | - | 0.274 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Uniforms/protective clothing do not provide adequate protection for the Warfighter in the areas of 1) thermal/flame threats, 2) protective footwear as well as environmental (hot/cold weather, rain, etc.) and 3) physical (hearing, vibration, blunt force, etc.) clothing/accessories. A capability to assess commercial off-the-shelf (COTS) items, identify/develop laboratory test methods to determine applicability of COTS items and address quality assurance measures to allow upgrades to uniform/protective clothing capabilities in a cost effective manner. Enhanced capabilities are required in these areas to make the workforce more efficient.<br>***FY 2014 Accomplishments:***<br>The Arc Flash Test Method Development is crucial since the Navy does not have the capability. Due to the complex non-linear response of materials when exposed to flames/high heat flux, it is important that testing of the Warfighter's uniform and protective equipment use methods which are realistic to the threat.<br><br>Recycled Fibers Use in Navy Uniform Study will investigate the benefits and impact of using recycled fibers/ yarns in the manufacturing processes and production of Navy Uniforms.<br><br>The Improved Personal Protective Ensemble (PPE) for Welders is a feasibility analysis to quantify the requirements of the ensemble and identify Commercial-Off-The-Shelf (COTS) items meeting the requirements and providing recommendations to the end-user community.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>Capabilities to accurately identify the US Navy fit and define the proper "concept of fit" requirement to streamline the uniform issue process, allow the sailor to purchase an off the rack uniform without costly alternations and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>3223 / *Logistics R&D* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| enhance uniform size forecasting - resulting in having the "needed" sizes in stock. Utilization of "virtual fit" processes will greatly improve the entire uniform management process (ordering, distribution and inventory management).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.914 | 0.813 | 0.921 | - | 0.921 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

NAVSUP R&D executed through firm fixed price negotiated contracts and NAVSUP support. Performance-based reviews conducted quarterly by the Project Management Office.

**E. Performance Metrics**

Development of capability and technology gaps initiatives are monintored quarterly by the NAVSUP R&D Program Management Office.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603739N / *Navy Logistic Productivity* | Project (Number/Name)<br>3223 / *Logistics R&D* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Navy Log Productivity Projects | Various | Various : Various | 1.786 | - | | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Energy Management Techniques | C/BA | TBD : TBD | 0.000 | - | | - | | 0.102 | Apr 2016 | - | | 0.102 | - | 0.102 | - |
| Quality of Life Services Modernization & Cost Reduction | C/BA | Harmonia : Blacksburg, VA | 0.000 | - | | 0.813 | Apr 2015 | 0.122 | Apr 2016 | - | | 0.122 | - | 0.935 | - |
| Readiness through Logistics Solutions | C/BA | Gryphon Corporation / ARL Omnibus : Norfolk VA | 0.000 | 0.475 | Apr 2014 | - | | 0.153 | Apr 2016 | - | | 0.153 | - | 0.628 | - |
| Breakthrough Technologies to Improve Supply Chain Processing | C/BA | TBD : Norfolk VA | 0.000 | 0.157 | Jun 2015 | - | | 0.208 | Apr 2016 | - | | 0.208 | - | 0.365 | - |
| Clothing Protection for the Warfighter | C/BA | NCTRF : Natick,MA | 0.000 | 0.222 | Apr 2014 | - | | 0.274 | Apr 2016 | - | | 0.274 | - | 0.496 | - |
| Logistics Data Access and Information Sharing | C/BA | Lexes Associates : Mechanicsburg, PA | 0.000 | 0.060 | Apr 2014 | - | | 0.062 | Apr 2016 | - | | 0.062 | - | 0.122 | - |
| | | **Subtotal** | 1.786 | 0.914 | | 0.813 | | 0.921 | | - | | 0.921 | - | - | - |

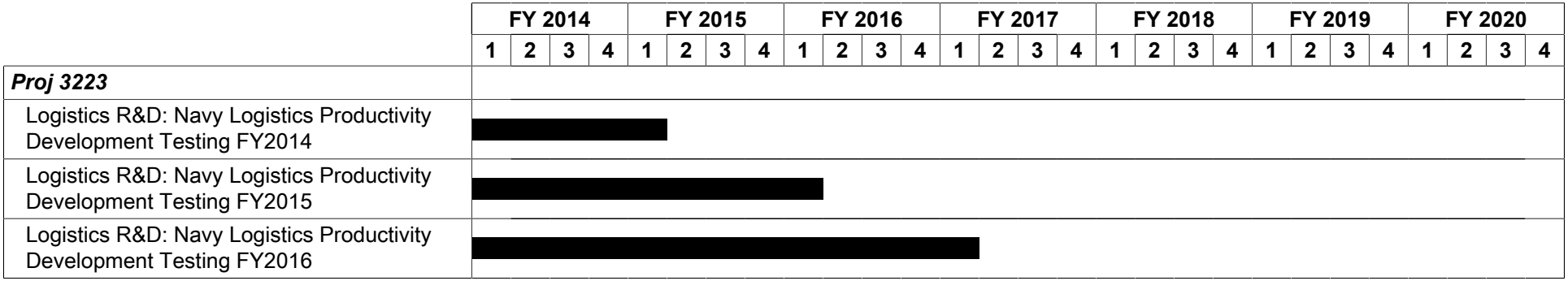
**Remarks**

Energy Management Techniques - 1) Life-Cycle ONE - $175k/contract/Washington,DC 2) Cross Domain Services - $300k - contract - Norfolk, VA
Logistics Data Access and Information Sharing - eTIMS Application - $60k/contract award/WSS/N62-MECH, PA
Breakthrough Technologies to Improve Supply Chain Processing - Deployed Additive Mfg Hub - $157k/contract/Mechanicsburg, PA
Clothing Protection for the Warfighter - 1) Recycled Fibers - $138k/contract/NATICK, MA 2) Improved PPE for Welders - $84k/contract/NATICK, MA

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1.786 | 0.914 | | 0.813 | | 0.921 | | - | | 0.921 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>3223 / *Logistics R&D* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603739N / *Navy Logistic Productivity* | **Project (Number/Name)**<br>3223 / *Logistics R&D* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3223*** | | | | |
| Logistics R&D: Navy Logistics Productivity Development Testing FY2014 | 1 | 2014 | 1 | 2015 |
| Logistics R&D: Navy Logistics Productivity Development Testing FY2015 | 1 | 2014 | 1 | 2016 |
| Logistics R&D: Navy Logistics Productivity Development Testing FY2016 | 1 | 2014 | 1 | 2017 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603746N *I (U)RETRACT MAPLE* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 293.872 | 376.028 | 360.065 | - | 360.065 | 317.148 | 215.673 | 124.717 | 112.964 | Continuing | Continuing |
| 1906: *Retract Maple* | 0.000 | 293.872 | 376.028 | 360.065 | - | 360.065 | 317.148 | 215.673 | 124.717 | 112.964 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 308.131 | 376.028 | 304.561 | - | 304.561 |
| Current President's Budget | 293.872 | 376.028 | 360.065 | - | 360.065 |
| Total Adjustments | -14.259 | - | 55.504 | - | 55.504 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -10.000 | - | | | |
| • SBIR/STTR Transfer | -4.259 | - | | | |
| • Program Adjustments | - | - | 59.870 | - | 59.870 |
| • Rate/Misc Adjustments | - | - | -4.366 | - | -4.366 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603748N *I (U)LINK PLUMERIA* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 153.214 | 260.096 | 237.416 | - | 237.416 | 294.497 | 308.166 | 291.396 | 297.613 | Continuing | Continuing |
| 1978: *Link Plumeria* | 0.000 | 153.214 | 260.096 | 237.416 | - | 237.416 | 294.497 | 308.166 | 291.396 | 297.613 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 121.189 | 272.096 | 212.438 | - | 212.438 |
| Current President's Budget | 153.214 | 260.096 | 237.416 | - | 237.416 |
| Total Adjustments | 32.025 | -12.000 | 24.978 | - | 24.978 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -12.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 33.700 | - | | | |
| • SBIR/STTR Transfer | -1.675 | - | | | |
| • Program Adjustments | - | - | 11.664 | - | 11.664 |
| • Rate/Misc Adjustments | - | - | 13.314 | - | 13.314 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603751N *I (U)RETRACT ELM* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 56.519 | 42.233 | 37.944 | - | 37.944 | 25.209 | 26.075 | 29.809 | 33.369 | Continuing | Continuing |
| 2003: *Retract Elm* | 0.000 | 56.519 | 42.233 | 37.944 | - | 37.944 | 25.209 | 26.075 | 29.809 | 33.369 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 56.358 | 42.233 | 44.223 | - | 44.223 |
| Current President's Budget | 56.519 | 42.233 | 37.944 | - | 37.944 |
| Total Adjustments | 0.161 | - | -6.279 | - | -6.279 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 0.940 | - | | | |
| • SBIR/STTR Transfer | -0.779 | - | | | |
| • Program Adjustments | - | - | -20.186 | - | -20.186 |
| • Rate/Misc Adjustments | - | - | 13.907 | - | 13.907 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603764N *I (U)LINK EVERGREEN* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 54.613 | 46.504 | 47.312 | - | 47.312 | 48.116 | 48.982 | 0.196 | 0.200 | Continuing | Continuing |
| 1972: *Link Evergreen* | 0.000 | 54.613 | 46.504 | 47.312 | - | 47.312 | 48.116 | 48.982 | 0.196 | 0.200 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 55.378 | 46.504 | 47.312 | - | 47.312 |
| Current President's Budget | 54.613 | 46.504 | 47.312 | - | 47.312 |
| Total Adjustments | -0.765 | - | - | - | - |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.765 | - | | | |

**Change Summary Explanation**

Technical: Not applicable.
Schedule: Not applicable.

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603787N *I (U)SPECIAL PROCESSES* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 47.227 | 25.109 | 17.408 | - | 17.408 | 13.690 | 12.420 | 12.909 | 13.242 | Continuing | Continuing |
| 0000: *UNDIST* | 0.000 | - | 0.071 | - | - | - | - | - | - | - | - | 0.071 |
| 0116: *Linear Tank* | 0.000 | 47.227 | 25.038 | 17.408 | - | 17.408 | 13.690 | 12.420 | 12.909 | 13.242 | Continuing | Continuing |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 48.842 | 25.109 | 18.259 | - | 18.259 |
| Current President's Budget | 47.227 | 25.109 | 17.408 | - | 17.408 |
| Total Adjustments | -1.615 | - | -0.851 | - | -0.851 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.940 | - | | | |
| • SBIR/STTR Transfer | -0.675 | - | | | |
| • Program Adjustments | - | - | -2.002 | - | -2.002 |
| • Rate/Misc Adjustments | - | - | 1.151 | - | 1.151 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603787N / *(U)SPECIAL PROCESSES* | Project (Number/Name)<br>0000 / *UNDIST* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0000: *UNDIST* | - | - | 0.071 | - | - | - | - | - | - | - | - | 0.071 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0603787N / *(U)SPECIAL PROCESSES* | | | | Project (Number/Name)<br>0116 / *Linear Tank* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 0116: *Linear Tank* | - | 47.227 | 25.038 | 17.408 | - | 17.408 | 13.690 | 12.420 | 12.909 | 13.242 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603790N *I NATO Research and Deve* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 48.106 | 7.502 | 9.659 | 9.359 | - | 9.359 | 10.972 | 10.565 | 10.229 | 10.578 | Continuing | Continuing |
| 2293: *NATO Cooperative R & D* | 48.106 | 7.502 | 9.659 | 9.359 | - | 9.359 | 10.972 | 10.565 | 10.229 | 10.578 | Continuing | Continuing |

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

In accordance with Title 10 United States Code, Section 2350a, this Program Element (PE) provides funding for research and development (R&D) programs with approved allies under international agreements. These funds can only be applied to work efforts in the U.S., and the Under Secretary of Defense, Acquisition and Technology and Logistics (USD, AT&L) must approve each international agreement. The program provides funds for multiple projects under separately approved international agreements as well as funds that support the establishment of such agreements. Each international agreement is summarized in a separate Summary Statement of Intent (SSOI) that also states why the project serves to increase the defense capabilities of the U.S. The SSOI is used to obtain Project approval by the Department of the Navy and the Office of the Secretary of Defense.

The North Atlantic Treaty Organization (NATO) R&D cooperative programs differ from other Research, Development, Test and Evaluation (RDT&E) programs because issuance of funding from this PE coincides with the signature of international agreements. These signatures occur throughout the fiscal year and often encounter unexpected delays during the staffing and negotiation phases of agreement processing prior to signature.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 7.502 | 9.659 | 10.900 | - | 10.900 |
| Current President's Budget | 7.502 | 9.659 | 9.359 | - | 9.359 |
| Total Adjustments | - | - | -1.541 | - | -1.541 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | - | - | -0.017 | - | -0.017 |
| • Rate/Misc Adjustments | - | - | -1.524 | - | -1.524 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $1.4 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603790N / *NATO Research and Deve* | Project (Number/Name)<br>2293 / *NATO Cooperative R & D* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2293: *NATO Cooperative R & D* | 48.106 | 7.502 | 9.659 | 9.359 | - | 9.359 | 10.972 | 10.565 | 10.229 | 10.578 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

In accordance with Title 10 U.S. Code Section 2350a, this project provides funding for research and development projects with approved allies under international agreements. These funds can only be applied to work efforts in the U.S., and the Office of Secretary of Defense must approve each international agreement. The program provides funds for multiple projects under separately approved international agreements as well as funds that support the establishment of such agreements. Each international agreement is summarized in a separate SSOI which also states why the project serves to increase the conventional defense capabilities of the U.S. The SSOI is used to obtain project approval by the Department of the Navy and the Office of the Secretary of Defense.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** NATO Cooperative R & D | 7.502 | 9.659 | 9.359 | - | 9.359 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |
| -Supported FY14 approved Cooperative Projects. | | | | | |
| -Advanced Electrical Magnetic (EM) Silencing U.S. and United Kingdom (UK) | | | | | |
| -Advance Electric Power and Propulsion U.S. and United Kingdom (UK) | | | | | |
| -Advance Material Propeller U.S. and Australia | | | | | |
| -High-Speed Multi-Hull Vessel Optimization (HSMVO) U.S. and Japan | | | | | |
| -Large Displacement Unmanned Undersea Vehicles (LD UUV)U.S. and Korea | | | | | |
| -Mine Counter-Measures Vessel (MCMV) U.S. and Finland | | | | | |
| -Modeling and Simulation U.S. | | | | | |
| -Pro-Simon U.S. and Netherlands (NL) | | | | | |
| -Sub Sonar Telemetry U.S. and United Kingdom (UK) | | | | | |
| -Sub Very Low Frequency U.S. and United Kingdom (UK) | | | | | |
| -Submarine Hydrodynamics U.S. and Australia | | | | | |
| -Test, Planning, and Execution (TPEX)U.S. and Multilateral (ML) | | | | | |
| -Waterside Rapid Deployment U.S., Australia, and Canada (CA) | | | | | |
| -Completed the following FY14 Cooperative Projects | | | | | |
| -Advanced Electrical Magnetic (EM) Silencing U.S. and United Kingdom (UK) | | | | | |
| -Modeling and Simulation U.S. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603790N / *NATO Research and Deve* | **Project (Number/Name)**<br>2293 / *NATO Cooperative R & D* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Sub Very Low Frequency U.S. and United Kingdom (UK)<br>-Test, Planning, and Execution (TPEX)U.S. and Multilateral (ML)<br>- | | | | | |
| ***FY 2015 Plans:***<br>-Continue to support FY2014 approved Cooperative projects. Plan and support approved FY2015 Cooperative projects.<br>-Advance Electric Power and Propulsion U.S. and United Kingdom (UK)<br>-Advance Material Propeller U.S. and Australia<br>-Australia/U.S. Expeditionary Modeling & Simulation Project Arrangement (AUSEMS) U.S. and Australia<br>-Biomass to Fuel U.S. and Chile<br>-Dynamic System Mechanics Advanced Simulation-Shallow Confined Waters (DYSMAS-SCW) U.S.and Germany<br>-High-Speed Multi-Hull Vessel Optimization (HSMVO) U.S.and Japan<br>-Hull Treatment U.S. and United Kingdom (UK)<br>-Large Displacement Unmanned Undersea Vehicles (LD UUV)U.S.and Korea<br>-Mine Counter-Measures Vessel (MCMV) U.S. and Finland<br>-Optical Laser Capability (OLC)U.S.and United Kingdom (UK)<br>-Pro-Simon U.S. and Netherlands (NL)<br>-Sub Sonar Telemetry U.S.and United Kingdom (UK)<br>-Submarine Hydrodynamics U.S.and Australia<br>-Super Quantum Small Electromagnetic Sensor(QSES)U.S.and Australia<br>-Ultra HeavyLift Amphibious Connector(UHAC) U.S.and Singapore<br>-Waterside Rapid Deployment U.S.,Australia,and Canada (CA) | | | | | |
| ***FY 2016 Base Plans:***<br>-Continue to support approved Cooperative projects from FY2014/FY2015. Plan and support approved FY2016 Cooperative projects.<br>-Advance Material Propeller U.S. and Australia<br>-Australia/U.S. Expeditionary Modeling & Simulation Project Arrangement (AUSEMS) U.S. and Australia<br>-Biomass to Fuel U.S. and Chile<br>-Dynamic System Mechanics Advanced Simulation-Shallow Confined Waters (DYSMAS-SCW) U.S. and Germany<br>-Hull Treatments U.S.and United Kingdom (UK)<br>-Large Displacement Unmanned Undersea Vehicles (LD UUV)U.S.and Korea | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603790N / *NATO Research and Deve* | **Project (Number/Name)**<br>2293 / *NATO Cooperative R & D* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Optical Laser Capability (OLC)U.S. and United Kingdom (UK)<br>-Submarine Hydrodynamics U.S. and Australia<br>-Super Quantum Small Electromagnetic Sensor(QSES)U.S. and Australia<br>-Ultra HeavyLift Amphibious Connector(UHAC) U.S. and Singapore<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.502 | 9.659 | 9.359 | - | 9.359 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

The intent of the North Atlantic Treaty Organization (NATO) cooperative R&D program is to provide "start-up" funds for projects seeking allied contributions into cooperative research and development projects with the U.S. The primary metric used in the program is foreign contributions into projects supported by the program. The performance goal is met if total foreign contributions into projects exceed total NATO cooperative R&D program funds by over 100%.

This program historically does not meet established execution benchmarks. The North Atlantic Treaty Organization (NATO) R&D cooperative programs differ from other Research, Development, Test and Evaluation (RDT&E) programs because issuance of funding from this PE coincides with the signature of international agreements. These signatures occur throughout the fiscal year and often encounter unexpected delays during the staffing and negotiation phases of agreement processing prior to signature.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603790N / *NATO Research and Deve* | Project (Number/Name)<br>2293 / *NATO Cooperative R & D* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test and Evaluation | C/FP | NAVSEA : Washington Navy Yard, DC | 14.107 | 3.982 | May 2014 | 5.124 | Nov 2014 | 3.432 | Nov 2015 | - | | 3.432 | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | C/FP | NSWC : West Bethesda, MD | 11.621 | 2.000 | Sep 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | C/FP | NUWC : Newport, RI | 1.752 | 0.500 | Jan 2014 | 0.100 | Feb 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | C/FP | SPAWAR : San Diego, CA | 3.853 | 0.500 | Sep 2014 | - | | 0.500 | Jan 2016 | - | | 0.500 | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | C/FP | NAVAIR : Patuxent River, MD | 1.750 | 0.386 | Apr 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | C/FP | NRL : Washington, DC | 2.350 | 0.134 | Sep 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | C/FP | NAWC : Point Mugu, CA | 5.500 | - | | - | | 0.600 | Mar 2016 | - | | 0.600 | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | C/FP | Miscellaneous : Philadelphia, PA | 7.124 | - | | - | | 2.927 | Apr 2016 | - | | 2.927 | Continuing | Continuing | Continuing |
| Deveiopmental Test and Evaulation | C/FP | MARCOR : Washington.DC | 0.000 | - | | 0.900 | Jan 2015 | 0.300 | Dec 2015 | - | | 0.300 | - | 1.200 | - |
| Developmental Test and Evaulation | C/FP | NSWCCD : Carderock, MD | 0.000 | - | | 2.035 | Jan 2015 | - | | - | | - | - | 2.035 | - |
| Developmental Test and Evaulation | C/FP | ONR : Washington DC | 0.000 | - | | 1.500 | May 2015 | 1.600 | Jan 2016 | - | | 1.600 | - | 3.100 | - |
| | | **Subtotal** | 48.057 | 7.502 | | 9.659 | | 9.359 | | - | | 9.359 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACQ Workforce Fund | Various | Various : Various | 0.049 | - | | - | | - | | - | | - | - | 0.049 | - |
| | | **Subtotal** | 0.049 | - | | - | | - | | - | | - | - | 0.049 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603790N / *NATO Research and Deve* | Project (Number/Name)<br>2293 / *NATO Cooperative R & D* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 48.106 | 7.502 | | 9.659 | | 9.359 | | - | | 9.359 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603790N / *NATO Research and Deve* | **Project (Number/Name)**<br>2293 / *NATO Cooperative R & D* |

| | FY 2014 | | | | FY 2015 | | | | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 2293*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| International Agreements | [redacted] | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603790N / *NATO Research and Deve* | **Project (Number/Name)**<br>2293 / *NATO Cooperative R & D* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2293*** | | | | |
| International Agreements | 1 | 2014 | 4 | 2017 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603795N *I Land Attack Tech* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 14.274 | - | 0.318 | 0.887 | - | 0.887 | 0.591 | - | - | - | - | 16.070 |
| 2038: *ADVANCED MINOR CALIBER GUN* | 14.274 | - | 0.318 | 0.887 | - | 0.887 | 0.591 | - | - | - | - | 16.070 |

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

The Advanced Minor Caliber Gun will support non-recurring engineering, component integration, and testing efforts required for capability upgrades to the MK38 Mod 2, a minor caliber gun weapon system.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | - | 0.318 | 0.887 | - | 0.887 |
| Current President's Budget | - | 0.318 | 0.887 | - | 0.887 |
| Total Adjustments | - | - | - | - | - |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603795N / *Land Attack Tech* | Project (Number/Name)<br>2038 / *ADVANCED MINOR CALIBER GUN* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2038: *ADVANCED MINOR CALIBER GUN* | 14.274 | - | 0.318 | 0.887 | - | 0.887 | 0.591 | - | - | - | - | 16.070 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Advanced Minor Caliber Gun project will support non-recurring engineering, component integration, testing and qualification efforts required for the capability upgrades to the MK38 Mod 2, a minor caliber gun weapon system. The new configuration (MOD 3) creates a near term improvement to address ship based, close range solutions to defeat the Fast Attack Craft (FAC)/Fast In-Shore Attack Craft (FIAC) threat. The MK38 Mod 2 was developed in FY04 under Chief of Naval Operations (CNO) direction to outfit near term deployers to counter small boat threats.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Systems Engineering and Testing | - | 0.318 | 0.887 | - | 0.887 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>FY14 funding reduced by congressional direction. | | | | | |
| ***FY 2015 Plans:***<br>Complete final system qualification effort in order to obtain Weapon System Explosive Safety Review Board (WSESRB) deployment concurrence. | | | | | |
| ***FY 2016 Base Plans:***<br>Implement system improvement based on qualification/Sea Trials results. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 0.318 | 0.887 | - | 0.887 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

The hardware improvements for MOD 3 will be integrated into new production orders and separate kits for backfit beginning in FY15.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603795N / *Land Attack Tech* | **Project (Number/Name)**<br>2038 / *ADVANCED MINOR CALIBER GUN* |

**E. Performance Metrics**

Quarterly program reviews and semi-annual product certification panel reviews.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603795N / *Land Attack Tech* | Project (Number/Name)<br>2038 / *ADVANCED MINOR CALIBER GUN* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Product Integration | SS/BOA | BAE Systems : Minneapolis MN | 11.927 | - | | 0.143 | Dec 2014 | - | | - | | - | 0.200 | 12.270 | - |
| | | **Subtotal** | 11.927 | - | | 0.143 | | - | | - | | - | 0.200 | 12.270 | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Services | WR | NSWC, DD : Dahlgren, VA | 1.713 | - | | 0.072 | Dec 2014 | 0.621 | Dec 2015 | - | | 0.621 | 1.000 | 3.406 | - |
| Government Engineering Services | WR | NSWC, IHD : Indian Head, MD | 0.300 | - | | 0.072 | Dec 2014 | 0.266 | Dec 2015 | - | | 0.266 | 0.278 | 0.916 | - |
| | | **Subtotal** | 2.013 | - | | 0.144 | | 0.887 | | - | | 0.887 | 1.278 | 4.322 | - |

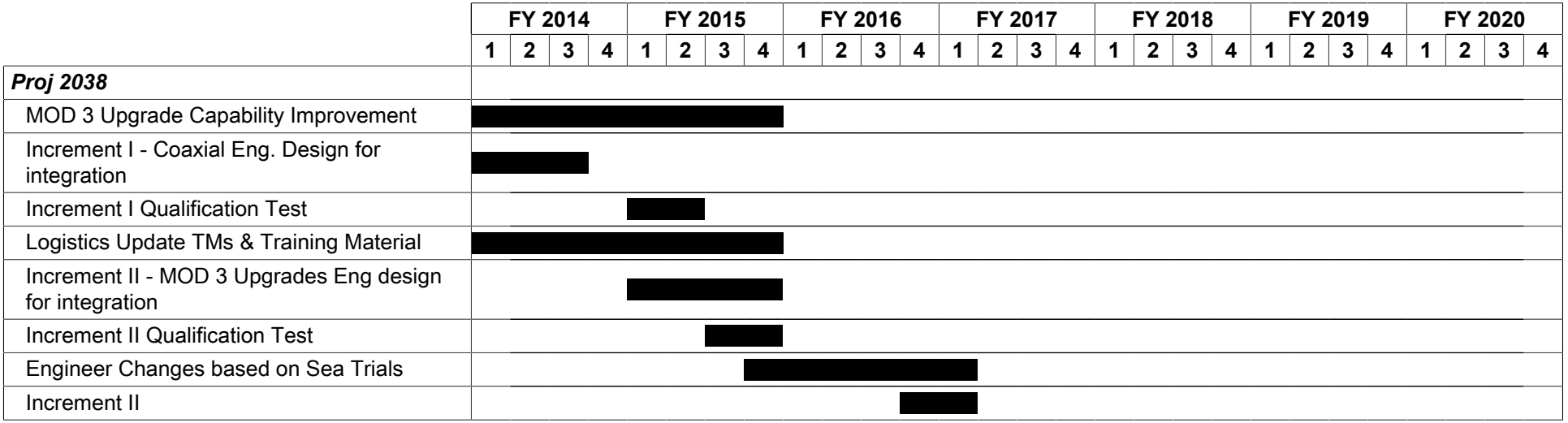
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Support Services | C/CPFF | ALION : Washington, DC | 0.334 | - | | 0.031 | Jan 2015 | - | | - | | - | - | 0.365 | - |
| | | **Subtotal** | 0.334 | - | | 0.031 | | - | | - | | - | - | 0.365 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 14.274 | - | | 0.318 | | 0.887 | | - | | 0.887 | 1.478 | 16.957 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603795N / *Land Attack Tech* | **Project (Number/Name)**<br>2038 / *ADVANCED MINOR CALIBER GUN* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603795N / *Land Attack Tech* | **Project (Number/Name)**<br>2038 / *ADVANCED MINOR CALIBER GUN* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2038*** | | | | |
| MOD 3 Upgrade Capability Improvement | 1 | 2014 | 4 | 2015 |
| Increment I - Coaxial Eng. Design for integration | 1 | 2014 | 3 | 2014 |
| Increment I Qualification Test | 1 | 2015 | 2 | 2015 |
| Logistics Update TMs & Training Material | 1 | 2014 | 4 | 2015 |
| Increment II - MOD 3 Upgrades Eng design for integration | 1 | 2015 | 4 | 2015 |
| Increment II Qualification Test | 3 | 2015 | 4 | 2015 |
| Engineer Changes based on Sea Trials | 4 | 2015 | 1 | 2017 |
| Increment II | 4 | 2016 | 1 | 2017 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603851M *I Joint Non-Lethal Weapons Testing* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 420.695 | 39.470 | 35.627 | 29.448 | - | 29.448 | 29.151 | 29.949 | 30.874 | 31.745 | Continuing | Continuing |
| 2319: *Non-Lethal Weapons* | 420.695 | 39.470 | 35.627 | 29.448 | - | 29.448 | 29.151 | 29.949 | 30.874 | 31.745 | Continuing | Continuing |

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

The DOD Non-Lethal Weapons Program was established by the Office of the Secretary of Defense, which designated the Commandant of the Marine Corps (CMC) as the DoD NLW Executive Agent (EA). The EA exercises centralized responsibility for joint research and development of non-lethal weapons and technology through the Joint Non-Lethal Weapons Program (JNLWP). The Office of the Under Secretary of Defense for Acquisition, Technology and Logistics provides direct oversight of the JNLWP.

The efforts described in this Program Element (PE) reflect Joint Service research and development (R&D) investment decisions provided by the Joint Non-Lethal Weapons Integrated Product Team, a multi-service flag level corporate board that executes the JNLWP for the Executive Agent. Research conducted is based on the needs and capabilities of the Services, the Special Operations Command and the Coast Guard, as identified in the DoD's Non-Lethal Weapons Joint Capabilities Document. This coordinated joint R&D development approach addresses mutual capability gaps and assures the best non-lethal technologies and equipment are provided to the operating forces while eliminating duplicative Service investment. Advanced Component Development and Prototypes provide non-lethal capabilities which directly support the three pillars of the 2014 Quadrennial Defense Review and comprise a fundamental part of DoD's security cooperation efforts to build partner capacity. The resulting capabilities will facilitate a fully integrated non-lethal competency as a complement to lethal firepower, providing force application options for short-of-lethal scenarios.

This PE funds Joint Service research, development, test, and evaluation of non-lethal weapon (NLW) systems and technologies that provide a non-lethal capability to minimize fatal or permanent injuries as well as undesired damage to property and the environment. NLWs are defined as weapons, devices, and munitions that are explicitly designed and primarily employed to incapacitate targeted personnel or materiel immediately, while minimizing fatalities, permanent injury to personnel, and undesired damage to property in the target area or environment. NLW are intended to have reversible effects on personnel and materiel. (DoDD 3000.03E, DoD Executive Agent for Non-Lethal Weapons (NLW), and NLW Policy)

The Joint Non-Lethal Weapons Directorate is designated as a R&D organization and was established by the Executive Agent to manage the day to day research and development activities of the DoD Joint Non-Lethal Weapons Program. The JNLWP funding resources the USA, USAF, USN, USMC, SOCOM, and USCG in support of NLW research and development efforts. Each Service is responsible for their procurement and operating support costs.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | R-1 Program Element (Number/Name)<br>PE 0603851M *I Joint Non-Lethal Weapons Testing* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | 49.278 | 40.912 | 40.753 | - | 40.753 |
| Current President's Budget | 39.470 | 35.627 | 29.448 | - | 29.448 |
| Total Adjustments | -9.808 | -5.285 | -11.305 | - | -11.305 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -5.285 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -8.582 | - | | | |
| • SBIR/STTR Transfer | -1.226 | - | | | |
| • Rate/Misc Adjustments | - | - | -11.305 | - | -11.305 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $6.283M to account for the availability of prior year execution balances. The decrease in funding from FY15 to FY16 reflects changes and modifications to Joint NLWs investments.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | Project (Number/Name)<br>2319 / *Non-Lethal Weapons* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2319: *Non-Lethal Weapons* | 420.695 | 39.470 | 35.627 | 29.448 | - | 29.448 | 29.151 | 29.949 | 30.874 | 31.745 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project develops non-lethal weapon (NLW) systems that provide a new non-lethal capability to minimize fatal or permanent injuries and undesired damage to property and the environment. These systems are designed to stun, incapacitate, or hinder movement of individuals, crowds or equipment. The availability of NLW allows commanders less than lethal options, particularly in urban warfare and military operations other than war, i.e., peacekeeping, humanitarian assistance and disaster relief, as well as special operations. All significant increases/decreases from FY15 to FY16 are related to changes/modifications to Joint Service NLWs investments.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** *Modeling and Simulation (M&S) of NLWs | 2.176 | 2.515 | 0.677 | - | 0.677 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued modeling and simulation (M&S) of NLWs in warfighter training/war gaming models and performance effects data collection/population to demonstrate/analyze NL effects and optimize training. | | | | | |
| ***FY 2015 Plans:***<br>Continue modeling and simulation (M&S) of NLWs in warfighter training/war gaming models and performance effects data collection/population to demonstrate/analyze NL effects and optimize training. | | | | | |
| ***FY 2016 Base Plans:***<br>Continue modeling and simulation (M&S) of NLWs in warfighter training/war gaming models and performance effects data collection/population to demonstrate/analyze NL effects and optimize training. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** *Evaluations of NLWs | 3.414 | 3.463 | 0.652 | - | 0.652 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continued evaluation of NLWs by Service warfighting laboratories and Joint Staff, J7, Joint and Coalition Warfighting for direct user feedback of various non-lethal (NL) technologies and munitions to include policy and strategy and strategic communication.<br>***FY 2015 Plans:***<br>Continue evaluation of NLWs by Service warfighting laboratories and Joint Staff, J7, Joint and Coalition Warfighting for direct user feedback of various non-lethal (NL) technologies and munitions to include policy and strategy and strategic communication.<br>***FY 2016 Base Plans:***<br>Continue evaluation of NLWs by Service warfighting laboratories and Joint Staff, J7, Joint and Coalition Warfighting for direct user feedback of various non-lethal (NL) technologies and munitions to include policy and strategy and strategic communication.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** *JNLW Program's execution oversight and technologies database support | 5.652 | 5.681 | 5.181 | - | 5.181 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued execution oversight, administration and support of the Joint NLW Program and technologies database.<br>***FY 2015 Plans:***<br>Continue execution oversight, administration and support of the Joint NLW Program and technologies database.<br>***FY 2016 Base Plans:***<br>Continue execution oversight, administration and support of the Joint NLW Program and technologies database.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** *Service Coordination and Requirements Development | 4.189 | 3.742 | 1.668 | - | 1.668 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continued program support efforts for each Service's coordination and participation in the Joint NLW Program. This includes SOCOM and USCG.<br>***FY 2015 Plans:***<br>Continue program support efforts for each Service's coordination and participation in the Joint NLW Program. This includes SOCOM and USCG.<br>***FY 2016 Base Plans:***<br>Continue program support efforts for each Service's coordination and participation in the Joint NLW Program. This includes SOCOM and USCG.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** *Active Denial Technology (ADT) Transition | 3.657 | 0.364 | 3.284 | - | 3.284 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued maturation of active denial technologies to increase system efficiencies and reduce system size, weight and cost in preparation for transition to joint acquisition programs of record.<br>***FY 2015 Plans:***<br>Continue maturation of active denial technologies to increase system efficiencies and reduce system size, weight and cost in preparation for transition to joint acquisition programs of record.<br>***FY 2016 Base Plans:***<br>Continue maturation of active denial technologies to increase system efficiencies and reduce system size, weight and cost in preparation for transition to joint acquisition programs of record.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** *JNLW Emerging Technologies | 4.355 | 3.192 | 4.134 | - | 4.134 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued the advanced development of a wide range of Counter-Personnel and Counter-Materiel emerging technologies in directed energy and kinetic weapons and munitions to support Combatant Commands and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Service capability gaps and priorities. This line item funds maturing technology transitions from advanced technology development efforts.<br>***FY 2015 Plans:***<br>Continue the advanced development of a wide range of Counter-Personnel and Counter-Materiel emerging technologies in directed energy and kinetic weapons and munitions to support Combatant Commands and Service capability gaps and priorities. This line item funds maturing technology transitions from advanced technology development efforts.<br>***FY 2016 Base Plans:***<br>Continue the advanced development of a wide range of Counter-Personnel and Counter-Materiel emerging technologies in directed energy and kinetic weapons and munitions to support Combatant Commands and Service capability gaps and priorities. This line item funds maturing technology transitions from advanced technology development efforts.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** *System development and Design of technology development | 3.453 | 3.899 | 1.656 | - | 1.656 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued system development and design of technology development down selected items to proceed into the acquisition cycle to provide NL technology solutions to critical joint mission tasks.<br>***FY 2015 Plans:***<br>Continue system development and design of technology development down selected items to proceed into the acquisition cycle to provide NL technology solutions to critical joint mission tasks.<br>***FY 2016 Base Plans:***<br>Continue system development and design of technology development down selected items to proceed into the acquisition cycle to provide NL technology solutions to critical joint mission tasks.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** *Develop/expand the NATO Measures of Effectives (MOE) efforts | 2.710 | 2.557 | 1.547 | - | 1.547 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Continued to develop/expand the NATO Measures of Effectives (MOE) efforts, chaired by the U.S. to provide input for Defense Capabilities Initiative (DCI) and NATO assessment of NLW in the Defense planning process. Expanded interaction with combatant commander (COCOM) staffs to identify emerging NLW capabilities and their utility in theater operations and Homeland Security missions.<br>***FY 2015 Plans:***<br>Continue to develop/expand the NATO Measures of Effectives (MOE) efforts, chaired by the U.S. to provide input for Defense Capabilities Initiative (DCI) and NATO assessment of NLW in the Defense planning process. Expanded interaction with combatant commander (COCOM) staffs to identify emerging NLW capabilities and their utility in theater operations and Homeland Security missions.<br>***FY 2016 Base Plans:***<br>Continue to develop/expand the NATO Measures of Effectives (MOE) efforts, chaired by the U.S. to provide input for Defense Capabilities Initiative (DCI) and NATO assessment of NLW in the Defense planning process. Expanded interaction with combatant commander (COCOM) staffs to identify emerging NLW capabilities and their utility in theater operations and Homeland Security missions.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** *Mission Payload Module Non Lethal Weapon System | 3.683 | 4.236 | 6.826 | - | 6.826 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Complete the Critical Design Review (CDR) and post-CDR assessment.<br>-Complete developmental test activities (Developmental Test & Evaluation) and Operational Assessment.<br>***FY 2015 Plans:***<br>-Complete design by completing the Critical Design Review (CDR), and post-CDR assessment.<br>-Complete developmental test activities (Developmental Test & Evaluation) and Operational Assessment.<br>***FY 2016 Base Plans:***<br>-Continue Developmental, Test and Evaluation and Initial Operational Test. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Continue Engineering Manufacturing Development Physical Configuration Audit, Operational Assessment, and User Evaluation.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** *Joint Integration Program (JIP)<br>***Articles:***<br>***FY 2014 Accomplishments:***<br>Continued to select and test newly developed commercial products that may meet the Joint Service requirements for specific NL capability set common items.<br>***FY 2015 Plans:***<br>Continue to select and test newly developed commercial products that may meet the Joint Service requirements for specific NL capability set common items.<br>***FY 2016 Base Plans:***<br>Continue to select and test newly developed commercial products that may meet the Joint Service requirements for specific NL capability set common items.<br>***FY 2016 OCO Plans:***<br>N/A | 0.775<br>- | 0.125<br>- | 0.311<br>- | -<br>- | 0.311<br>- |
| ***Title:*** *Studies and Analysis<br>***Articles:***<br>***FY 2014 Accomplishments:***<br>Continued medical and NL casualty data research and collection; human effects assessments; acceptability analysis; and technical studies/ analysis of emerging technologies for possible NL application.<br>***FY 2015 Plans:***<br>Continue medical and NL casualty data research and collection; human effects assessments; acceptability analysis; and technical studies/ analysis of emerging technologies for possible NL application.<br>***FY 2016 Base Plans:*** | 5.406<br>- | 5.853<br>- | 3.512<br>- | -<br>- | 3.512<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue medical and NL casualty data research and collection; human effects assessments; acceptability analysis; and technical studies/ analysis of emerging technologies for possible NL application.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 39.470 | 35.627 | 29.448 | - | 29.448 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PE 0602651M: *Joint Non-Lethal Weapons Applied Research* | 5.805 | 5.880 | 6.119 | - | 6.119 | 6.327 | 6.425 | 6.425 | 6.425 | Continuing | Continuing |
| • PE 0603651M: *Joint Non-Lethal Weapons Advanced Technology Development* | 11.452 | 11.498 | 12.745 | - | 12.745 | 13.117 | 13.448 | 13.387 | 13.387 | Continuing | Continuing |
| • PE 0206623M: *Marine Corps Ground Weaponry* | 7.785 | - | - | - | - | - | - | - | - | - | 7.785 |

**Remarks**

**D. Acquisition Strategy**

The JNLW Program strategy is to continue to pursue the fielding of NLW systems through modifying Commercial-Off-The-Shelf (COTS) products for near term capabilities and the development of new technology NLW systems in various stages of acquisition. These are balanced with efforts in modeling and simulation, experimentation, and state-of-the-art technology investment. The acquisition strategy for each weapon system is largely Lead Service dependent. The JNLWP provides RDT&E funding while the Services are responsible for procurement and operations and maintenance funding. For complex development programs, such as directed energy research, JNLWP RDT&E funds will support each Service's RDT&E joint application efforts.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NLW Product Development | MIPR | ARDEC : Picatinny, NJ | 48.999 | 3.500 | Oct 2013 | 3.204 | Oct 2014 | 3.067 | Oct 2015 | - | | 3.067 | Continuing | Continuing | Continuing |
| NLW Product Development | MIPR | SOCOM : McDill AFB, FL | 21.374 | 4.200 | Oct 2013 | 4.210 | Oct 2014 | 3.956 | Oct 2015 | - | | 3.956 | Continuing | Continuing | Continuing |
| NLW Product Development | Various | NSWC : Various | 26.556 | 5.239 | Oct 2013 | 3.709 | Oct 2014 | 4.182 | Oct 2015 | - | | 4.182 | Continuing | Continuing | Continuing |
| NLW Product Development | MIPR | USAF : Kirtland AFB, NM | 27.596 | 2.975 | Oct 2013 | 2.576 | Oct 2014 | 2.544 | Oct 2015 | - | | 2.544 | Continuing | Continuing | Continuing |
| NLW Product Development | MIPR | USAF : Ft. Sam Houston AFB, TX | 53.123 | 3.611 | Oct 2013 | 3.391 | Oct 2014 | 3.805 | Oct 2015 | - | | 3.805 | Continuing | Continuing | Continuing |
| NLW Product Development | Various | MCSC : Quantico, VA | 25.940 | 0.583 | Oct 2013 | 4.453 | Oct 2014 | - | Oct 2015 | - | | - | Continuing | Continuing | Continuing |
| NLW Product Development | MIPR | M&S : Various | 19.618 | 1.500 | Oct 2013 | 1.214 | Oct 2014 | 1.156 | Oct 2015 | - | | 1.156 | Continuing | Continuing | Continuing |
| NLW Product Development | Various | JIP : Various | 13.712 | - | Oct 2013 | 0.515 | Oct 2014 | 0.311 | Oct 2015 | - | | 0.311 | Continuing | Continuing | Continuing |
| NLW Product Development | Various | Uniformed Services : Various | 132.842 | 12.478 | Oct 2013 | 7.955 | Oct 2014 | 9.827 | Oct 2015 | - | | 9.827 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 369.760 | 34.086 | | 31.227 | | 28.848 | | - | | 28.848 | - | - | - |

**Remarks**

Joint Program funds are distributed amongst the USA, USAF, USN, USMC, SOCOM, and USCG in support of NLW research and development efforts. Each Cost Category Item does not correlate to an individual project/effort. They fund multiple non-lethal projects/efforts that are incrementally funded throughout the fiscal year as each service identifies the project/effort requiring funding. October award dates reflect the start of incremental funding and does not indicate that the full amount will be awarded in October.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NLW Support Cost | WR | NSWC : Dahlgren, VA | 14.998 | 0.600 | Oct 2013 | 0.600 | Oct 2014 | 0.600 | Oct 2015 | - | | 0.600 | Continuing | Continuing | Continuing |
| NLW Support Cost | Various | Various : Various | 35.937 | 4.784 | Feb 2014 | 3.800 | Feb 2015 | - | Feb 2016 | - | | - | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |

**Support ($ in Millions)**

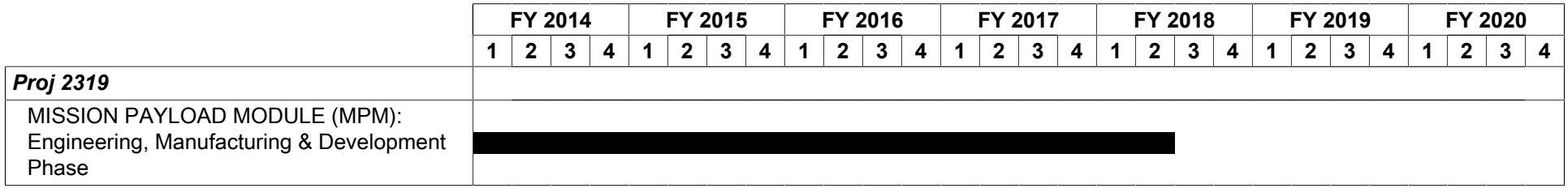
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 50.935 | 5.384 | | 4.400 | | 0.600 | | - | | 0.600 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 420.695 | 39.470 | | 35.627 | | 29.448 | | - | | 29.448 | - | - | - |

**Remarks**

Joint Program funds are distributed amongst the USA, USAF, USN, USMC, SOCOM, and USCG in support of NLW research and development efforts. Each Cost Category Item does not correlate to an individual project/effort. They fund multiple non-lethal projects/efforts that are incrementally funded throughout the fiscal year as each service identifies the project/effort requiring funding. October award dates reflect the start of incremental funding and does not indicate that the full amount will be awarded in October.

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603851M / *Joint Non-Lethal Weapons Testing* | **Project (Number/Name)**<br>2319 / *Non-Lethal Weapons* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2319*** | | | | |
| MISSION PAYLOAD MODULE (MPM): Engineering, Manufacturing & Development Phase | 1 | 2014 | 2 | 2018 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603860N *I JT Precision Approach & Ldg Sys* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 774.992 | 126.802 | 41.886 | 91.479 | - | 91.479 | 75.934 | 24.003 | 1.772 | 1.449 | Continuing | Continuing |
| 2329: *JPALS* | 774.992 | 126.802 | 41.886 | 91.479 | - | 91.479 | 75.934 | 24.003 | 1.772 | 1.449 | Continuing | Continuing |
| **MDAP/MAIS Code:** 238 | | | | | | | | | | | | |

**Note**

On 15 June 2014, USD(AT&L) signed the Nunn-McCurdy Acquisition Decision Memorandum (ADM) for the restructured Joint Precision Approach and Landing System (JPALS) Increment 1A program, which certified the program in lieu of termination. Accordingly, the JPALS Milestone B decision of July 2008 has been rescinded. JPALS has been directed to complete the development phase of the current program, which provides precision approach and landing capability for JPALS-equipped manned aircraft at sea, with the addition of risk reduction efforts to prepare for manned and unmanned auto-land capability. However, the actual production phase of JPALS Increment 1A shall be deferred to align with future acquisition of the auto-land capability. The ADM directed the Navy to: continue Increment 1A development that will culminate with completion of developmental testing activities and a Letter of Observation from the Commander, Operational Test and Evaluation Force on the JPALS Increment 1A ship system, and provide a draft Increment 1A Technical Data Package; and continue auto-land trade studies and risk reduction efforts through 3rd Quarter FY16. The ADM also directed the Navy to return to the Defense Acquisition Board (DAB) for Milestone B approval for the restructured JPALS program not later than 3rd Quarter FY16.

FY14 funding for Projects 3228 and 3354 was used to finance the single increment of JPALS. The FY14 funding was also carried over to finance some FY15 requirements on the single increment of JPALS.

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

A. Mission Description and Budget Item Justification
The JPALS is an Acquisition Category 1D program. JPALS is the next generation GPS-based precision approach and landing system and is intended to provide an adverse weather, day/night precision approach and landing capability for manned and unmanned aircraft.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in high fidelity and realistic operating environment.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | R-1 Program Element (Number/Name)<br>PE 0603860N *I JT Precision Approach & Ldg Sys* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | 156.178 | 54.896 | 92.522 | - | 92.522 |
| Current President's Budget | 126.802 | 41.886 | 91.479 | - | 91.479 |
| Total Adjustments | -29.376 | -13.010 | -1.043 | - | -1.043 |
| • Congressional General Reductions | - | -0.010 | | | |
| • Congressional Directed Reductions | - | -13.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -4.376 | - | | | |
| • Rate/Misc Adjustments | - | - | -1.043 | - | -1.043 |
| • Congressional Rescission Adjustments | -25.000 | - | - | - | - |

**Change Summary Explanation**

Technical: Not applicable.

Schedule:

Schedule revised to reflect the ADM of 14 June 2014 (discussed above) and the impact of the 2015 reduction $13 million) that revises MS B decision from April 2016 to June 2016. The 2014 rescission (25 million) impacted the award of a 10 month contract extension to the existing prime contractor by one quarter, 2nd to 3rd, in FY15. This extension adds the efforts necessary to conduct the Preliminary Design Review for auto-land capability in support of F-35B/C and UCLASS.

Cost: As discussed in the schedule changes, the project was reduced by the Congress in 2015 for execution ($13 million)and in FY 2014 (rescission action of $25 million) for the cancellation of JPALS Inc 2.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | Project (Number/Name)<br>2329 / *JPALS* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2329: *JPALS* | 774.992 | 126.802 | 41.886 | 91.479 | - | 91.479 | 75.934 | 24.003 | 1.772 | 1.449 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Joint Precision Approach and Landing System (JPALS) provides for development, integration, installation, and test of Sea-Based JPALS on CVN/LHA/LHD-class ships in accordance with the JPALS Capability Development Document. This requirement supports the JPALS Integration on CVN/LHA/LHD-class ships and establishes requirements for enabling critical technology for Joint Strike Fighter (JSF) F-35B Marine Corps Short Take-Off and Vertical Landing and F-35C Navy Carrier Variant, and Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS). Interim JPALS capability is baselined in F-35 Block 3F software.

JPALS Engineering Development Model (EDM) test articles have been delivered to support system development and demonstration, and JPALS ship systems will be installed on CVN/LHA/LHD-class ships in support of the F-35B/C and UCLASS shipboard testing.

JPALS will continue to invest in software development in direct support of auto-land capabilities for the F-35B/C and UCLASS.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** JPALS Ship Systems and Test | 126.802 | 36.029 | 86.329 | - | 86.329 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** JPALS provides for development, integration, installation, and test of Sea-Based JPALS on CVN/ LHA/LHD ships. | | | | | |
| ***FY 2014 Accomplishments:***<br>Continued shipboard integration testing, awarded Engineering Manufacturing and Development (EMD) extension contract. Performed auto-land trade studies and risk reduction activities. Performed Initial Program Review. Begin update of acquisition and technical documentation in preparation for Milestone B in 3rd quarter FY16. | | | | | |
| ***FY 2015 Plans:***<br>Continue development of JPALS system and activities related to technical maturity and auto-land risk reduction. Continue updating of acquisition and technical documentation in preparation of 3rd quarter FY16 Milestone B. Award contract modification for pre-Milestone B efforts. Continue Prototype Risk Reduction testing. Perform System Requirements Review (SRR) in 3rd quarter and Systems Functional Review (SFR) in 4th quarter. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | **Project (Number/Name)**<br>2329 / *JPALS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Complete Integrated Logistics Assessment (ILA) in 1st quarter. Complete required update of acquisition and technical documentation to support Milestone B decision. Complete Preliminary Design Review (PDR) in 2nd quarter. Accomplish Milestone B and award new Engineering Manufacturing and Development contract in 3rd quarter. Continue Prototype Risk Reduction testing in preparation for JPALS Integrated Test (IT) in FY17. Continue auto-land risk reduction activities.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Joint Strike Fighter (JSF) F-35B Marine Corp STOVL and F-35C Navy Carrier Variant Test Support | - | 4.157 | 3.750 | - | 3.750 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provide support for F-35B Marine Corps Short Take-Off and Vertical Landing (STOVL) aircraft and F-35C Navy Carrier Variant Developmental Test (DT) and Operational Tests (OT).<br>***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>Install Engineering Development Model (EDM) on a CVN in 2nd quarter in support of F-35C Navy Carrier Variant DT-2. Provide support for F-35B Marine Corps STOVL DT-3 on an LHA in 3rd quarter.<br>***FY 2016 Base Plans:***<br>Provide support for F35-B Marine Corps STOVL variant DT-3 on an LHA. Install EDM on a CVN in 4th quarter in support of F-35C Navy Carrier Variant DT-3.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) Test Support | - | 1.700 | 1.400 | - | 1.400 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provide Developmental Test (DT) and Operational Test (OT) support for UCLASS.<br>***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | **Project (Number/Name)**<br>2329 / *JPALS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Provide test planning and other support as required for Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) Developmental Test (DT).<br>***FY 2016 Base Plans:***<br>Continue development of test documentation and planning in support of UCLASS DT.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 126.802 | 41.886 | 91.479 | - | 91.479 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2867: *JPALS* | - | - | - | - | - | - | - | 58.202 | 68.534 | - | 126.736 |

**Remarks**

**D. Acquisition Strategy**

Technology Development phase was conducted jointly by NAVAIRSYSCOM (PMA213), USAF Electronic Systems Command (Global Air) and multiple industry partners. This effort provided the concept of operations, performance specifications and technology readiness levels necessary to provide the foundation from which to launch the Increment 1 System Development and Demonstration (SDD) phase development. Joint Precision Approach and Landing System (JPALS) reached MS-B on 14 July 2008 and the SDD phase development contract was awarded on 17 July 2008. Tasking consists of sea-based JPALS, related ship and airborne reference systems, end-to-end software algorithms, necessary ship installation hardware, test equipment, system simulation software, and other RDT&E deliverable products. The SDD contract was decided after full and open competition. JPALS is being developed by the Navy with an open system architecture in order to facilitate the compatible integration of many different aircraft and avionics architectures. JPALS provides for development, integration, installation, and test of Sea-Based JPALS to meet Initial Operation Capability of CVN/LHA/LHD-class ships in accordance with the JPALS Capability Development Document (CDD). Additionally, this requirement provides critical enabling technology for Joint Strike Fighter (JSF) F-35B Marine Corps Short Take-Off and Vertical Landing (STOVL) and F-35C Navy Carrier Variant, and ship-based Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS).

As a result of the DON Resource and Requirements Review Board approved PALC Roadmap, the JPALS development program was extended to include design improvements to provide manned and unmanned aircraft with autoland capabilities. The current Engineering and Manufacturing Development (EMD) contract was modified in FY14 to add detailed requirements and design trade studies to identify specific system design improvements. An extension for pre-Milestone B efforts will be awarded in 3rd quarter of FY15. After Milestone B approval in FY16, an EMD implementation contract will be awarded for the required autoland system improvements

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | **Project (Number/Name)**<br>2329 / *JPALS* |

and support JSF F-35B Marine Corps STOVL and F-35C Navy Carrier Variant and UCLASS shipboard testing prior to conducting a MS-C Low Rate Initial Production (LRIP) review and awarding an LRIP contract.

**E. Performance Metrics**

Original Milestone B (June 2008) was rescinded by USD(ATL)-issued Acquisition Decision Memorandum, dtd 15 June 2014. New Milestone B is scheduled for 3rd quarter FY16.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | **Project (Number/Name)**<br>2329 / *JPALS* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ship Integration | WR | NAWCAD : Pax River, MD | 24.482 | 10.609 | Dec 2013 | 1.724 | Dec 2014 | 12.650 | Dec 2015 | - | | 12.650 | Continuing | Continuing | Continuing |
| Primary Hardware Development - EMD Phase I | C/CPAF | Raytheon : Fullerton, CA | 296.794 | 58.424 | Jan 2014 | 19.081 | May 2015 | 19.020 | Nov 2015 | - | | 19.020 | - | 393.319 | 393.319 |
| Primary Hardware Development - New EMD Contract | TBD | Raytheon : Fullerton, CA | 0.000 | - | | - | | 11.365 | Jun 2016 | - | | 11.365 | - | 11.365 | Continuing |
| Risk Reduction for Auto-land | Various | Various : Various | 0.000 | 13.653 | Dec 2013 | - | | - | | - | | - | - | 13.653 | - |
| Risk Reduction for Auto-land - ARC-210 | C/CPFF | RCI : Cedar Rapids, IA | 0.000 | 1.549 | Dec 2013 | 1.480 | Dec 2014 | 1.700 | Dec 2015 | - | | 1.700 | - | 4.729 | 4.729 |
| Risk Reduction for Auto-land - FFRDC Support | FFRDC | JHU : Laurel, MD | 0.000 | 0.493 | Dec 2013 | - | | 1.500 | Oct 2015 | - | | 1.500 | - | 1.993 | - |
| Award Fee | C/CPAF | Various : Various | 12.068 | - | | - | | - | | - | | - | - | 12.068 | 12.068 |
| Prior Year Prod Dev costs no longer funded in FYDP | Various | Various : Various | 130.650 | - | | - | | - | | - | | - | - | 130.650 | - |
| Prior year funding for JPALS 1B | TBD | Various : Various | 93.499 | - | | - | | - | | - | | - | - | 93.499 | - |
| | | **Subtotal** | 557.493 | 84.728 | | 22.285 | | 46.235 | | - | | 46.235 | - | - | - |

**Remarks**

The Primary Hardware Development contract with Raytheon is a combined CPAF and CPIF contract.
New EMD contract award is projected for third quarter 2016.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering Support | WR | NAWCAD : Pax River, MD | 110.768 | 24.730 | Dec 2013 | 8.190 | Dec 2014 | 26.167 | Dec 2015 | - | | 26.167 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | Project (Number/Name)<br>2329 / *JPALS* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | NAWCAD : Pax River, MD | 18.373 | 3.190 | Dec 2013 | 1.229 | Dec 2014 | 2.220 | Dec 2015 | - | | 2.220 | Continuing | Continuing | Continuing |
| Prior Year Support Costs non longer funded in FYDP | Various | Various : Various | 21.514 | - | | - | | - | | - | | - | - | 21.514 | - |
| | | **Subtotal** | 150.655 | 27.920 | | 9.419 | | 28.387 | | - | | 28.387 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWCAD : Pax River, MD | 41.354 | 6.662 | Dec 2013 | 6.234 | Dec 2014 | 9.853 | Dec 2015 | - | | 9.853 | Continuing | Continuing | Continuing |
| Operational Test & Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 2.609 | 0.638 | Dec 2013 | 0.250 | Dec 2014 | 0.650 | Dec 2015 | - | | 0.650 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 43.963 | 7.300 | | 6.484 | | 10.503 | | - | | 10.503 | - | - | - |

**Management Services ($ in Millions)**

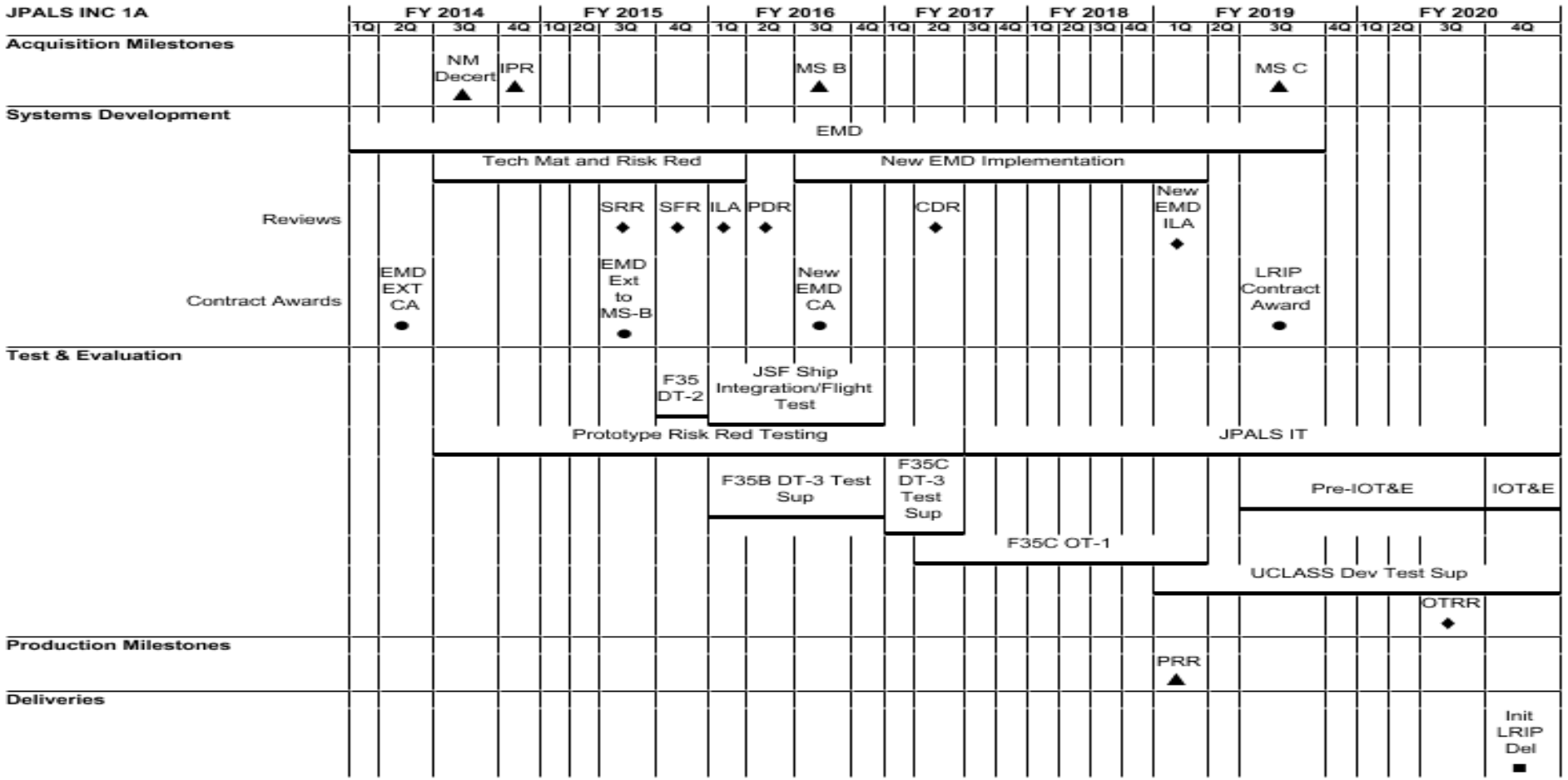
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Pax River, MD | 12.510 | 3.428 | Dec 2013 | 0.978 | Dec 2014 | 3.584 | Dec 2015 | - | | 3.584 | Continuing | Continuing | Continuing |
| PM Support-MSS | C/CPFF | TBD : TBD | 10.315 | 1.203 | Dec 2013 | 1.172 | Dec 2014 | 1.200 | Dec 2015 | - | | 1.200 | - | 13.890 | 13.890 |
| PM Support-MSS | C/CPFF | Avian : Pax River, MD | 0.000 | 1.140 | Dec 2013 | 0.452 | Dec 2014 | 0.450 | Dec 2015 | - | | 0.450 | - | 2.042 | 2.042 |
| PM Support-MSS | C/CPFF | SAIC : Pax River, MD | 0.000 | 1.027 | Dec 2013 | 1.026 | Dec 2014 | 1.050 | Dec 2015 | - | | 1.050 | - | 3.103 | 3.103 |
| Travel | WR | NAVAIR : Pax River, MD | 0.056 | 0.056 | Dec 2013 | 0.070 | Dec 2014 | 0.070 | Dec 2015 | - | | 0.070 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 22.881 | 6.854 | | 3.698 | | 6.354 | | - | | 6.354 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | Project (Number/Name)<br>2329 / *JPALS* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 774.992 | 126.802 | | 41.886 | | 91.479 | | - | | 91.479 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | **Project (Number/Name)**<br>2329 / *JPALS* |




*2016PB - 0603860N - 2329*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | **Project (Number/Name)**<br>2329 / *JPALS* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***JPALS INC 1A*** | | | | |
| Acquisition Milestones: MS B | 3 | 2016 | 3 | 2016 |
| Acquisition Milestones: MS C | 3 | 2019 | 3 | 2019 |
| Acquisition Milestones: Nunn_McCurdy Decertification | 3 | 2014 | 3 | 2014 |
| Acquisition Milestones: Initial Program Review (IPR) | 4 | 2014 | 4 | 2014 |
| Systems Development: Engineering and Manufacturing Development | 1 | 2014 | 3 | 2019 |
| Systems Development: Tech Maturity and Risk Reduction in support of Autoland | 3 | 2014 | 1 | 2016 |
| Systems Development: New Engineering & Manufacturing Development Implementation | 3 | 2016 | 1 | 2019 |
| Systems Development: Reviews: Critical Design Review (CDR) | 2 | 2017 | 2 | 2017 |
| Systems Development: Reviews: System Readiness Review (SRR) | 3 | 2015 | 3 | 2015 |
| Systems Development: Reviews: Preliminary Design Review (PDR) | 2 | 2016 | 2 | 2016 |
| Systems Development: Reviews: Systems Functional Review (SFR) | 4 | 2015 | 4 | 2015 |
| Systems Development: Reviews: Integrated Logistics Assessment (ILA) | 1 | 2016 | 1 | 2016 |
| Systems Development: Reviews: New EMD Integrated Logistics Assessment (ILA) | 1 | 2019 | 1 | 2019 |
| Systems Development: Contract Awards: LRIP Contract Award | 3 | 2019 | 3 | 2019 |
| Systems Development: Contract Awards: EMD Extension Contract Award | 2 | 2014 | 2 | 2014 |
| Systems Development: Contract Awards: EMD Extension adding pre- MS B efforts | 3 | 2015 | 3 | 2015 |
| Systems Development: Contract Awards: New Contract Award | 3 | 2016 | 3 | 2016 |
| Test & Evaluation: JSF Ship Integration / Flight Test F35/JSF | 1 | 2016 | 4 | 2016 |
| Test & Evaluation: F35C DT-2 | 4 | 2015 | 4 | 2015 |
| Test & Evaluation: Prototype Risk Reduction Test | 3 | 2014 | 2 | 2017 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603860N / *JT Precision Approach & Ldg Sys* | **Project (Number/Name)**<br>2329 / *JPALS* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluation: JPALS Integration Test (IT) | 3 | 2017 | 4 | 2020 |
| Test & Evaluation: Pre-Integration and Operational Test and Evaluation (IOT&E) | 3 | 2019 | 3 | 2020 |
| Test & Evaluation: Operational Test and Evaluation (IOT&E) | 4 | 2020 | 4 | 2020 |
| Test & Evaluation: F35B DT-3 Test Support | 1 | 2016 | 4 | 2016 |
| Test & Evaluation: F35C DT-3 Test Support | 1 | 2017 | 2 | 2017 |
| Test & Evaluation: F35C OT-1 Test Support | 2 | 2017 | 1 | 2019 |
| Test & Evaluation: UCLASS Developmental Test Support | 1 | 2019 | 4 | 2020 |
| Test & Evaluation: JPALS Operational Test Readiness Review (OTRR) | 3 | 2020 | 3 | 2020 |
| Production Milestones: Production Readiness Review (PRR) | 1 | 2019 | 1 | 2019 |
| Deliveries: Inital LRIP Deliveries | 4 | 2020 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603925N *I Directed Energy and Electric Weapon System* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 4.349 | 55.696 | 67.360 | - | 67.360 | 66.865 | 84.677 | 78.438 | 56.768 | Continuing | Continuing |
| 3370: *Railgun* | 0.000 | - | 47.005 | 57.896 | - | 57.896 | 57.603 | 75.220 | 69.076 | 47.216 | Continuing | Continuing |
| 9823: *Lasers for Navy applicat* | 0.000 | 4.349 | 8.691 | 9.464 | - | 9.464 | 9.262 | 9.457 | 9.362 | 9.552 | Continuing | Continuing |

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

This program element will transition Directed Energy and Electric Weapon Systems (DE&EWS) technology from Science and Technology (S&T) research through Technology Development into System Development and Demonstration, leading to acquisition initiation for the Surface/Subsurface Navy.

DE&EWS consist of multiple breakthrough technologies including: laser weapons that provide for speed-of-light engagements at tactically significant ranges resulting in savings realized by minimizing the use of defensive missiles and projectiles; electromagnetic launch of projectiles that will significantly increase firing ranges imposing greater cost to adversaries of ballistic and air defense missile engagements; enhance the land attack mission; and fielding of high power radio frequency systems for non-kinetic electronic attack and active denial technology, allowing for non-lethal determination of threat intent beyond small arms fire ranges.

Development of DE&EWS incldues: Weapons Grade High Energy Lasers, Free Electron Lasers, Electromagnetic Railgun (EMRG) Weapon Systems, High Power Radio Frequency Weapon/Sensor Systems, and other systems/capabilities.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | - | 58.696 | 34.964 | - | 34.964 |
| Current President's Budget | 4.349 | 55.696 | 67.360 | - | 67.360 |
| Total Adjustments | 4.349 | -3.000 | 32.396 | - | 32.396 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -3.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 4.500 | - | | | |
| • SBIR/STTR Transfer | -0.151 | - | | | |
| • Program Adjustments | - | - | 29.500 | - | 29.500 |
| • Rate/Misc Adjustments | - | - | 2.896 | - | 2.896 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0603925N *I Directed Energy and Electric Weapon System* |

**Change Summary Explanation**

FY16 funding in the amount of $5.3M was provided to begin transition development of a Naval Surface Fire Support (NSFS) Hyper Velocity Projectile (HVP) for the Mk 34 Gun Weapon System. Also funding in the amount of $27.5M was provided to conduct a Railgun demonstration aboard a Joint High Speed Vessel (JHSV) in FY19.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603925N / *Directed Energy and Electric Weapon System* | Project (Number/Name)<br>3370 / *Railgun* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3370: *Railgun* | - | - | 47.005 | 57.896 | - | 57.896 | 57.603 | 75.220 | 69.076 | 47.216 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Electromagnetic Railgun (EMRG): Provides ship-based program/technical commonality with the Office of the Secretary of Defense (OSD) Strategic Capabilities Office (SCO) Land Based Rail Gun (LBRG) Experimental Campaign. The Navy will leverage the LBRG development to produce a common Railgun and mount for use onboard Navy warships.

Railgun provides increased capability for the following mission sets: Naval Surface Fire Support (NSFS), Integrated Air and Missile Defense (IAMD), Fast Attack Craft and Fast Inshore Attack Craft (FAC/FIAC), and future potential for Anti-Surface Warfare (ASuW). Funding increases in FY16 are to support the time-phased transition of the HVP from a Future Naval Capability (FNC) to a program of record while keeping aligned with Railgun development and to achieve a second, more robust at-sea demonstration by FY19.

The EMRG will launch the Hyper Velocity Projectile (HVP), currently in development as a Future Naval Capability (FNC).

EMRG uses electromagnetic energy, vice traditional chemical propellant (i.e. gun powder), to launch projectiles providing: greatly increased range (110nm vice 13nm for chemical propellant); increased ammunition storage capacity; increased ship safety; increased layered point defense; decreased costs when compared to current missiles. The net effect is an increased capacity against multiple simultaneous threats at a lower operational cost.

Funding increase in FY16 is due to the nature of the time-phased requirements to support the execution strategy for the program.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Electromagnetic Railgun | - | 47.005 | 57.896 | - | 57.896 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Electromagnetic Railgun (EMRG): Provides ship-based program/technical commonality with the Office of the Secretary of Defense (OSD) Strategic Capabilities Office (SCO) Land Based Rail Gun (LBRG) Experimental Campaign. The Navy will leverage the LBRG development to produce a common Railgun and mount for use onboard Navy warships. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>3370 / *Railgun* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Funding increase in FY 2016 supports the Railgun JHSV operational test in FY19, begins transition development of a Hyper Velocity Projectile, and supports software development necessary to integrate the future Railgun system into a Combat System.<br><br>***FY 2014 Accomplishments:***<br>N/A<br><br>***FY 2015 Plans:***<br>Commonality: Engineer/manage commonality with the OSD Experimental Campaign for mount, power, projectile, weapon, and combat interface/control; conduct sensor/shooter engineering trade studies, define interface and control requirements; design/develop ship-based hardware/software for shipboard gun mount; design/develop ship-based prime power components/subsystems; design/develop ship-based pulsed power components/subsystems; design/develop/certify ship-based battery and charging components/subsystems; define/design projectile critical components, develop/conduct flight simulations, conduct lethality analyses; conduct airframe simulations and analyses; define/develop projectile electronics components/subsystems.<br><br>***FY 2016 Base Plans:***<br>Commonality and Near-Term Demonstration: Continue engineering/management of shipboard commonality with the shore based OSD SCO Experimental Campaign for the Electromagnetic Railgun Weapon System and associated subsystems and components initiated in FY 15. Additionally, provide the engineering/technical support, material buys, and test event planning and execution for an at-sea test of a 20MJ Railgun on board a JHSV in FY 16. Initiate software development for the improved Naval Surface Fire Support capabilities and their interface to the AEGIS Combat System. Initiate the development and qualification process for the Mk 34 GWS ORDALT and propellant to support HVP use by existing gun system.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 47.005 | 57.896 | - | 57.896 |

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

N/A

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>3370 / *Railgun* |

**D. Acquisition Strategy**

The development and acquisition strategy will transition the capabilities developed/demonstrated by ONR's Science & Technology efforts, along with earlier Congressionally funded efforts, into the BA-4 funded Technology Development Phase, which leads to Engineering & Manufacturing Development and production/fielding in the early 2020's.

**E. Performance Metrics**

Quarterly Reviews, Monthly Reports, Periodic Design Reviews.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>3370 / *Railgun* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware - Gun Mount Requirements/ Development | C/CPFF | BAE via ARDEC : Washington, D.C. Dahlgren, VA | 0.000 | - | | 6.200 | Jan 2015 | 4.000 | Jan 2016 | - | | 4.000 | Continuing | Continuing | Continuing |
| Hardware - Gun Mount Requirements/ Development | C/CPFF | NAVSEA PMS405 Contract : Washington,D.C., Dahlgren, VA | 0.000 | - | | 1.000 | Jan 2015 | 1.000 | Jan 2016 | - | | 1.000 | - | 2.000 | - |
| Hardware - Prime Power Development | C/CPFF | NAVSEA PMS 320 Contract : Washington, D.C. | 0.000 | - | | 1.000 | Feb 2015 | 1.500 | Feb 2016 | - | | 1.500 | Continuing | Continuing | Continuing |
| Hardware - PrimePower Development | WR | NAVSSESS : Philadelphia, PA | 0.000 | - | | 0.500 | Feb 2015 | 0.500 | Feb 2016 | - | | 0.500 | - | 1.000 | - |
| Hardware - Pulsed Power Development | C/CPFF | NAVSEA PMS 320 Contract : Washington, D.C. | 0.000 | - | | 5.000 | Feb 2015 | 6.000 | Feb 2016 | - | | 6.000 | Continuing | Continuing | Continuing |
| Hardware - Battery and Charging Supply Development/Certification | C/CPFF | NAVSEA PMS 320 Contract : Washington, D.C. | 0.000 | - | | 5.668 | Mar 2015 | 5.398 | Mar 2016 | - | | 5.398 | Continuing | Continuing | Continuing |
| Hardware - Projectile Development | C/CPFF | Contractor via ARDEC : Washington,D.C., Dahlgren, VA | 0.000 | - | | 1.500 | Jan 2015 | 4.150 | Jan 2016 | - | | 4.150 | Continuing | Continuing | Continuing |
| Hardware - Projectile Development | WR | NSWC/DD : Dahlgren, VA | 0.000 | - | | 1.500 | Jan 2015 | 4.150 | Jan 2016 | - | | 4.150 | - | 5.650 | - |
| Software - Combat System & Fire Control Engineering | WR | NSWC/DD : Dahlgren, VA | 0.000 | - | | - | | 1.000 | Mar 2016 | - | | 1.000 | Continuing | Continuing | Continuing |
| Software - Combat System & Fire Control System | C/CPFF | PEO IWS Contract : Washington,D.C. | 0.000 | - | | - | | 0.500 | Mar 2016 | - | | 0.500 | - | 0.500 | - |
| Software - Combat System & Fire Control Engineering | C/CPFF | AEGIS BMD Contract : Washington, D.C. | 0.000 | - | | - | | 0.500 | Mar 2016 | - | | 0.500 | - | 0.500 | - |
| Software Weapon System | WR | NSWC/DD : Dahlgren, VA | 0.000 | - | | - | | 4.000 | Mar 2016 | - | | 4.000 | - | 4.000 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603925N / *Directed Energy and Electric Weapon System* | Project (Number/Name)<br>3370 / *Railgun* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Fire Control System | WR | NSWC/DD, NSWC Corona : Dahlgren, VA, Corona, CA | 0.000 | - | | 6.387 | Mar 2015 | 3.698 | Mar 2016 | - | | 3.698 | - | 10.085 | - |
| | | **Subtotal** | 0.000 | - | | 28.755 | | 36.396 | | - | | 36.396 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering/ Management | WR | NSWC/DD : Dahlgren, VA | 0.000 | - | | 8.000 | Feb 2015 | 8.000 | Dec 2015 | - | | 8.000 | Continuing | Continuing | Continuing |
| Systems Engineering/ Management | WR | NSWC CD : Bethesda, MD | 0.000 | - | | 1.000 | Feb 2015 | 1.000 | Dec 2015 | - | | 1.000 | - | 2.000 | - |
| | | **Subtotal** | 0.000 | - | | 9.000 | | 9.000 | | - | | 9.000 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Airframe Analysis | C/CPFF | NAVSEA PMS 405 Contractor : Washington, D.C. | 0.000 | - | | 0.140 | Mar 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| Airframe Analysis | C/CPFF | JHU/APL : Washington, D.C. | 0.000 | - | | 1.200 | Mar 2015 | - | | - | | - | - | 1.200 | - |
| High G Electronics Engineering | C/CPFF | MDA : Washington, D.C. | 0.000 | - | | 0.160 | Mar 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| High G Electronics Engineering | WR | NSWC DD : Dahlgren, VA | 0.000 | - | | 0.500 | Mar 2015 | - | | - | | - | - | 0.500 | - |
| JHSV Plan/Install/Conduct | WR | NSWC/DD : Dahlgren, VA, Corona, CA | 0.000 | - | | 3.000 | Feb 2015 | 4.000 | Dec 2015 | - | | 4.000 | - | 7.000 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603925N / *Directed Energy and Electric Weapon System* | Project (Number/Name)<br>3370 / *Railgun* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JHSV Plan/Install/Conduct | C/CPFF | HM&E Contractor TBA : Washington, D.C. | 0.000 | - | | - | | 3.500 | Dec 2015 | - | | 3.500 | - | 3.500 | - |
| JHSV Plan/Install/Conduct | C/CPFF | CSC via SEAPORT : Washington, D.C. | 0.000 | - | | 0.500 | Mar 2015 | 0.500 | Dec 2015 | - | | 0.500 | - | 1.000 | - |
| JHSV Plan/Install/Conduct | WR | NAVSSESS : Philadelphia, PA | 0.000 | - | | 1.500 | Feb 2015 | 2.000 | Dec 2015 | - | | 2.000 | - | 3.500 | - |
| | | **Subtotal** | 0.000 | - | | 7.000 | | 10.000 | | - | | 10.000 | - | - | - |

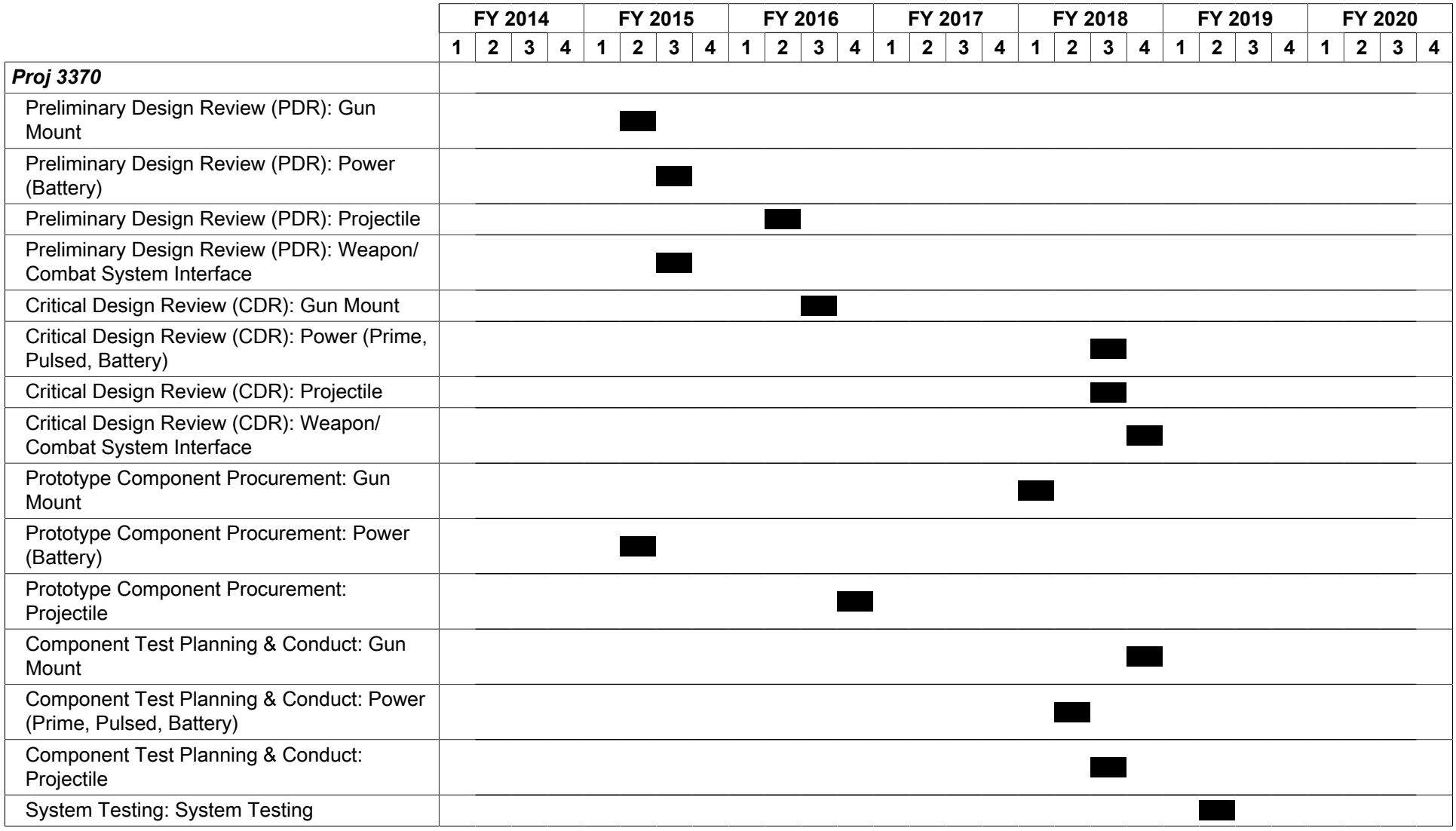
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Engineering/ Management | C/CPFF | NAVSEA PMS 405 Contractor : Washington, D.C. | 0.000 | - | | 2.250 | Mar 2015 | 2.500 | Mar 2016 | - | | 2.500 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 2.250 | | 2.500 | | - | | 2.500 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 47.005 | | 57.896 | | - | | 57.896 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>3370 / *Railgun* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>3370 / *Railgun* |

| | FY 2014 | | | | FY 2015 | | | | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 |
| System Analysis: System Analysis | | | | | | | | | | | | | | | | | | | | | | | | ■ | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>3370 / *Railgun* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3370*** | | | | |
| Preliminary Design Review (PDR): Gun Mount | 2 | 2015 | 2 | 2015 |
| Preliminary Design Review (PDR): Power (Battery) | 3 | 2015 | 3 | 2015 |
| Preliminary Design Review (PDR): Projectile | 2 | 2016 | 2 | 2016 |
| Preliminary Design Review (PDR): Weapon/Combat System Interface | 3 | 2015 | 3 | 2015 |
| Critical Design Review (CDR): Gun Mount | 3 | 2016 | 3 | 2016 |
| Critical Design Review (CDR): Power (Prime, Pulsed, Battery) | 3 | 2018 | 3 | 2018 |
| Critical Design Review (CDR): Projectile | 3 | 2018 | 3 | 2018 |
| Critical Design Review (CDR): Weapon/Combat System Interface | 4 | 2018 | 4 | 2018 |
| Prototype Component Procurement: Gun Mount | 1 | 2018 | 1 | 2018 |
| Prototype Component Procurement: Power (Battery) | 2 | 2015 | 2 | 2015 |
| Prototype Component Procurement: Projectile | 4 | 2016 | 4 | 2016 |
| Component Test Planning & Conduct: Gun Mount | 4 | 2018 | 4 | 2018 |
| Component Test Planning & Conduct: Power (Prime, Pulsed, Battery) | 2 | 2018 | 2 | 2018 |
| Component Test Planning & Conduct: Projectile | 3 | 2018 | 3 | 2018 |
| System Testing: System Testing | 2 | 2019 | 2 | 2019 |
| System Analysis: System Analysis | 4 | 2019 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603925N / *Directed Energy and Electric Weapon System* | Project (Number/Name)<br>9823 / *Lasers for Navy applicat* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9823: *Lasers for Navy applicat* | - | 4.349 | 8.691 | 9.464 | - | 9.464 | 9.262 | 9.457 | 9.362 | 9.552 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Lasers for Navy Applications, Solid State Laser (SSL) Development: The SSL provides a capability to support existing Gaps (JROC EW ICD 177-09; MAMDJF ICD; IAMD JCD; USPACOM FY 10-15 IPL - Gap 6; SAG V SAG Roadmap; 3rd Fleet IPCLs; 7th Fleet IPCLs; JUONS: Counter-Boat Swarm///UAV) with the ability to dazzle, damage, and/or destroy asymmetric threats including rockets, missiles, fast attack craft, and Unmanned Aerial Systems (UASs). An SSL Weapon System, at varying power levels, can deter or blind ISR systems at low powers, as well as, destroy the platforms (UAS, small boat) that carry them. SSL leverages the Office of Naval Research (ONR) efforts on the SSL Quick Reaction Capability (QRC) and SSL Technology Maturation (TM) efforts. SSL will transition this capability from Science and Technology (S&T) development to a Program of Record (PoR).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Solid State Laser (SSL) Low Power Module (LPM) Development | 4.349 | 8.691 | 9.464 | - | 9.464 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Lasers for Navy Applications, Solid State Laser (SSL) Development provides the ability to dazzle, damage, and/or destroy asymmetric threats including rockets, missiles, fast attack craft, and Unmanned Aerial Systems (UASs).<br><br>The funding increase from FY 15 to FY 16 supports the compilation/assembly of components into a prototype LPM for testing. Systems Management Engineering funding decreases in FY 16 as a majority of the systems engineering is required to be accomplished in FY15, with the focus shifting to prototype test execution.<br><br>***FY 2014 Accomplishments:***<br>Solid State Laser (SSL) Low Power Module (LPM) Specification/Capability Requirements Development: Develop the overall system and test bed architecture of the Low Power Module (LPM) Counter-Electro Optic Infra-Red (EO/IR) capability. Manage/systems engineer development of the LPM EO/IR and Mid-Wave Infra-Red (MWIR) system specifications and the hardware/software/firmware module that will interface to the SSL TM System and/or future weapon system configurations. This will provide the capability to dazzle ISR sensors at tactically significant ranges. The modular nature of the LPM will allow it to be more easily integrated onto pointing and tracking mounts, if required.<br><br>***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>9823 / *Lasers for Navy applicat* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Solid State Laser (SSL) Low Power Module (LPM) Development: Procure the modeling and simulation software (1 time buy) that is required to be run in order to determine the operational capabilities that need to be built into the LPM. Manage/system engineer product development of the Low Power Module (LPM) Counter-Electro Optic Infra-Red (EO/IR) and MWIR hardware/software/firmware module, along with the associated test and control equipment to interface with Laser Weapon System(s).<br>***FY 2016 Base Plans:***<br>Continue Low Power Module management, engineering, design, development, and integration of test bed components. Conduct lab/field testing of the Low Power Module: accomplish test planning for preparation/ conduct of the Low Power Module prototype integrated testing in FY 16.<br>***FY 2016 OCO Plans:***<br>N/A. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.349 | 8.691 | 9.464 | - | 9.464 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

The development and acquisition strategy will transition the capabilities developed/demonstrated by ONR's Science & Technology efforts, along with PMS 405's Congressionally funded efforts, into the BA-4 funded Technology Development Phase, which leads to Engineering & Manufacturing Development and production/fielding in the early 2020's.

Task Planning Sheets for government entities and Statements of Work for contractors will delineate the requisite development, engineering, integration, and test/ demonstration requirements for designated components/subsystems as approved by the Program Office.

**E. Performance Metrics**

Quarterly Reviews, Monthly Progress/Status Reports, Scheduled Design/Program Reviews.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>9823 / *Lasers for Navy applicat* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low Power Module | WR | NSWC DD : DAHLGREN, VA | 0.000 | 0.636 | Nov 2014 | 0.536 | Feb 2015 | 0.652 | Jan 2016 | - | | 0.652 | - | 1.824 | - |
| Low Power Module | WR | SSC PAC : SAN DIEGO, CA | 0.000 | 0.475 | Nov 2014 | 0.500 | Feb 2015 | 0.500 | Jan 2016 | - | | 0.500 | - | 1.475 | - |
| Low Power Module | WR | NSWC CRANE : CRANE, IN | 0.000 | 0.380 | Nov 2014 | 0.500 | Feb 2015 | 0.644 | Jan 2016 | - | | 0.644 | - | 1.524 | - |
| Low Power Module | WR | NRL : WASHINGTON, D.C. | 0.000 | 0.045 | Nov 2014 | 0.250 | Feb 2015 | 0.250 | Jan 2016 | - | | 0.250 | - | 0.545 | - |
| Low Power Module | C/CPFF | BOEING : SAN DIEGO, CA | 0.000 | 1.349 | Feb 2015 | 0.651 | Mar 2015 | 0.250 | Mar 2016 | - | | 0.250 | - | 2.250 | - |
| MSM Testbed | WR | NSWC DD : DAHLGREN, VA | 0.000 | - | | 1.227 | Feb 2015 | 0.219 | Jan 2016 | - | | 0.219 | Continuing | Continuing | Continuing |
| MSM Testbed | C/CPFF | PSU EOC : FREEPORT, PA | 0.000 | - | | 0.500 | Mar 2015 | - | | - | | - | - | 0.500 | - |
| Platform Integration | WR | NSWC DD : DAHLGREN, VA | 0.000 | - | | - | | 0.997 | Feb 2016 | - | | 0.997 | - | 0.997 | - |
| Platform Integration | WR | SSC PAC : SAN DIEGO, CA | 0.000 | - | | - | | 0.300 | Feb 2016 | - | | 0.300 | - | 0.300 | - |
| Platform Integration | WR | NSWC CRANE : CRANE, IN | 0.000 | - | | - | | 0.299 | Feb 2016 | - | | 0.299 | - | 0.299 | - |
| | | **Subtotal** | 0.000 | 2.885 | | 4.164 | | 4.111 | | - | | 4.111 | - | - | - |

**Remarks**

The hardware for this development effort consists of a mount, beam director, laser power, and the development of a Weapon Control Console. Software consists of the development, integration & validation of Weapon, Fire Control, and Combat System Engineering.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>9823 / *Lasers for Navy applicat* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems/Mgmt Engineering | C/CPFF | NAVSEA PMS 405 Contract : WASHINGTON, D.C. | 0.000 | 0.640 | Feb 2015 | 1.207 | Mar 2015 | 1.150 | Dec 2015 | - | | 1.150 | - | 2.997 | - |
| Systems/Mgmt Engineering | C/CPFF | PSU EOC : FREEPORT, PA | 0.000 | 0.485 | Dec 2014 | 1.000 | Mar 2015 | 0.350 | Jan 2016 | - | | 0.350 | - | 1.835 | - |
| Modeling & Simulation | WR | NSWC DD : DAHLGREN, VA | 0.000 | - | | 0.889 | Feb 2015 | - | | - | | - | - | 0.889 | - |
| | | **Subtotal** | 0.000 | 1.125 | | 3.096 | | 1.500 | | - | | 1.500 | - | 5.721 | - |

**Remarks**

If there is a Continuing Resolution (CR) starting in FY 15, all First Quarter Start or planned/projected Award Dates will be delayed by the length of the CR, as this is a new start effort in FY 15.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Planning & Execution | C/CPFF | NSWC DAHGREN : DAHLGREN, VA | 0.000 | - | | 0.200 | Mar 2015 | 0.612 | Mar 2016 | - | | 0.612 | Continuing | Continuing | Continuing |
| Test Planning & Execution | WR | PHD NSWC : PORT HUENEME, CA | 0.000 | 0.150 | Nov 2014 | 0.442 | Feb 2015 | 0.997 | Dec 2015 | - | | 0.997 | - | 1.589 | - |
| Test Planning & Execution | WR | NSWC DD : DAHLGREN, VA | 0.000 | - | | 0.100 | Feb 2015 | 0.997 | Jan 2016 | - | | 0.997 | - | 1.097 | - |
| Test Planning & Execution | WR | NSWC CRANE : CRANE, IN | 0.000 | - | | 0.100 | Feb 2015 | 0.498 | Feb 2016 | - | | 0.498 | - | 0.598 | - |
| | | **Subtotal** | 0.000 | 0.150 | | 0.842 | | 3.104 | | - | | 3.104 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0603925N / *Directed Energy and Electric Weapon System* | Project (Number/Name)<br>9823 / *Lasers for Navy applicat* | |

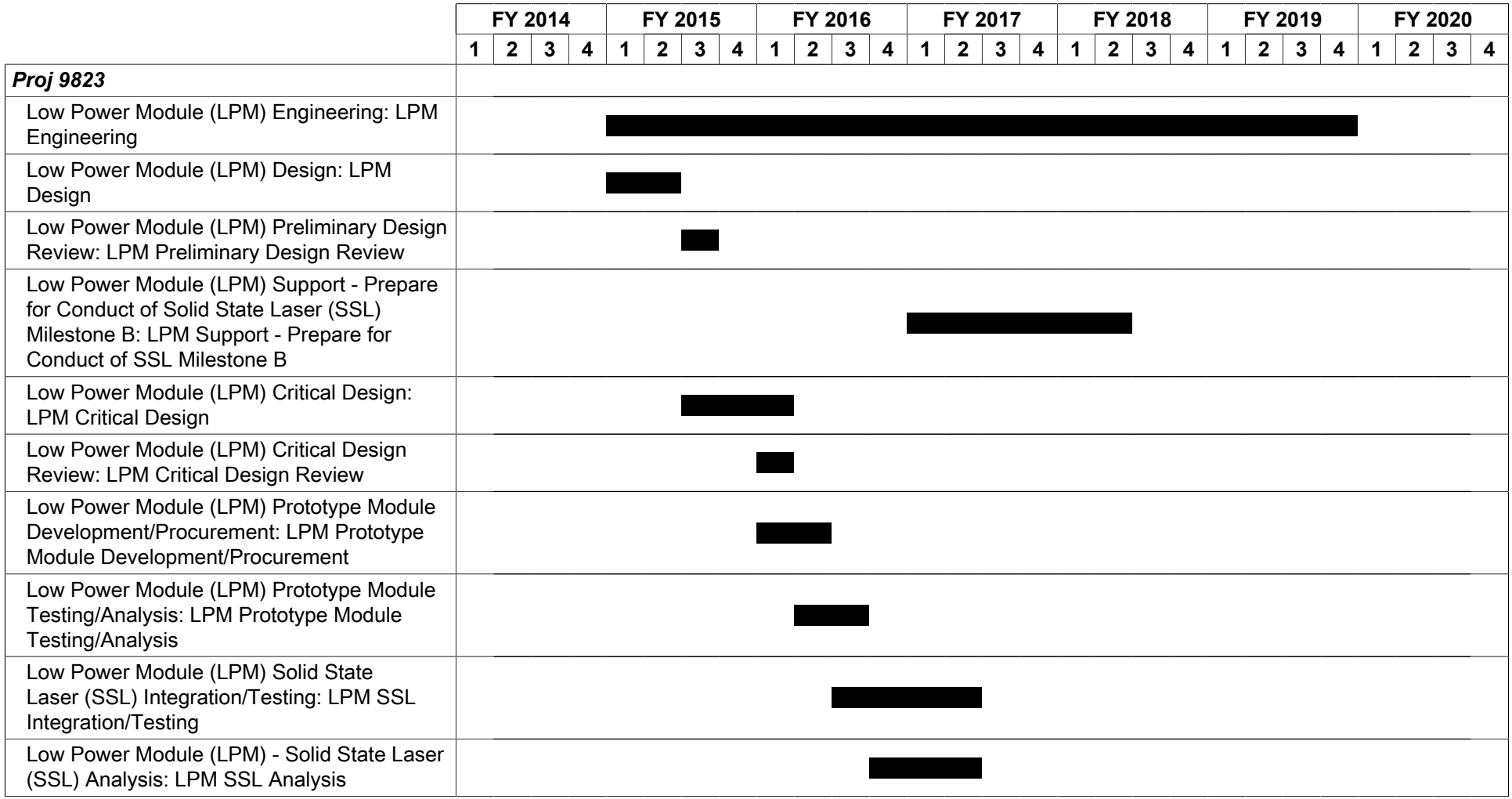
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Safety, Product Support, Security, Operations | WR | NSWC DD : DAHLGREN, VA | 0.000 | 0.189 | Jan 2015 | 0.400 | Feb 2015 | 0.449 | Jan 2016 | - | | 0.449 | Continuing | Continuing | Continuing |
| Safety, Product Support, Security, Operations | C/CPFF | NSWC DD : DAHGREN, VA | 0.000 | - | | 0.189 | Mar 2015 | 0.300 | Mar 2016 | - | | 0.300 | - | 0.489 | - |
| | | **Subtotal** | 0.000 | 0.189 | | 0.589 | | 0.749 | | - | | 0.749 | - | - | - |

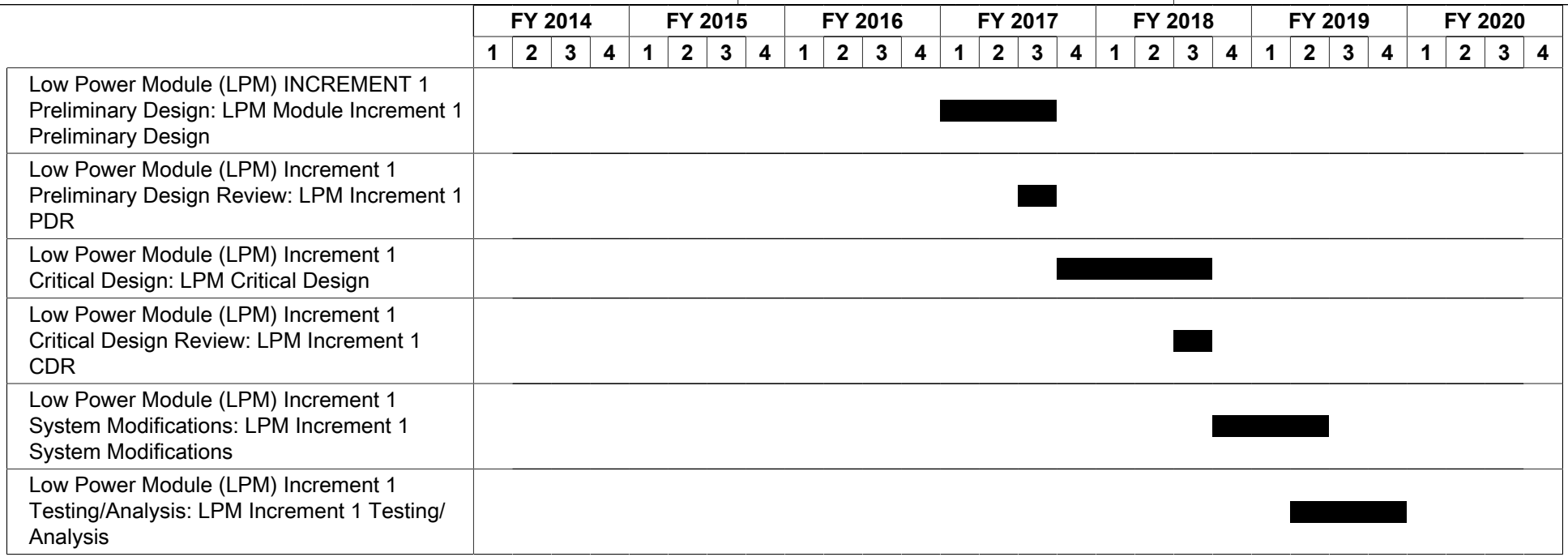
| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 4.349 | | 8.691 | | 9.464 | | - | | 9.464 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>9823 / *Lasers for Navy applicat* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>9823 / *Lasers for Navy applicat* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>9823 / *Lasers for Navy applicat* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9823*** | | | | |
| Low Power Module (LPM) Engineering: LPM Engineering | 1 | 2015 | 4 | 2019 |
| Low Power Module (LPM) Design: LPM Design | 1 | 2015 | 2 | 2015 |
| Low Power Module (LPM) Preliminary Design Review: LPM Preliminary Design Review | 3 | 2015 | 3 | 2015 |
| Low Power Module (LPM) Support - Prepare for Conduct of Solid State Laser (SSL) Milestone B: LPM Support - Prepare for Conduct of SSL Milestone B | 1 | 2017 | 2 | 2018 |
| Low Power Module (LPM) Critical Design: LPM Critical Design | 3 | 2015 | 1 | 2016 |
| Low Power Module (LPM) Critical Design Review: LPM Critical Design Review | 1 | 2016 | 1 | 2016 |
| Low Power Module (LPM) Prototype Module Development/Procurement: LPM Prototype Module Development/Procurement | 1 | 2016 | 2 | 2016 |
| Low Power Module (LPM) Prototype Module Testing/Analysis: LPM Prototype Module Testing/Analysis | 2 | 2016 | 3 | 2016 |
| Low Power Module (LPM) Solid State Laser (SSL) Integration/Testing: LPM SSL Integration/Testing | 3 | 2016 | 2 | 2017 |
| Low Power Module (LPM) - Solid State Laser (SSL) Analysis: LPM SSL Analysis | 4 | 2016 | 2 | 2017 |
| Low Power Module (LPM) INCREMENT 1 Preliminary Design: LPM Module Increment 1 Preliminary Design | 1 | 2017 | 3 | 2017 |
| Low Power Module (LPM) Increment 1 Preliminary Design Review: LPM Increment 1 PDR | 3 | 2017 | 3 | 2017 |
| Low Power Module (LPM) Increment 1 Critical Design: LPM Critical Design | 4 | 2017 | 3 | 2018 |
| Low Power Module (LPM) Increment 1 Critical Design Review: LPM Increment 1 CDR | 3 | 2018 | 3 | 2018 |
| Low Power Module (LPM) Increment 1 System Modifications: LPM Increment 1 System Modifications | 4 | 2018 | 2 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0603925N / *Directed Energy and Electric Weapon System* | **Project (Number/Name)**<br>9823 / *Lasers for Navy applicat* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Low Power Module (LPM) Increment 1 Testing/Analysis: LPM Increment 1 Testing/ Analysis | 2 | 2019 | 4 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604112N *I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | - | 43.613 | 48.105 | - | 48.105 | 45.386 | 33.890 | 25.418 | 25.951 | Continuing | Continuing |
| 2208: *CVN 21* | 0.000 | - | 35.392 | 35.613 | - | 35.613 | 35.386 | 33.890 | 25.418 | 25.951 | Continuing | Continuing |
| 4004: *EMALS* | 0.000 | - | 8.221 | 12.492 | - | 12.492 | 10.000 | - | - | - | - | 30.713 |
| **MDAP/MAIS Code:**<br>**Other MDAP/MAIS Code(s):** 223 | | | | | | | | | | | | |

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

This Navy program addresses unique technologies on Ford class carriers. The program includes:

- (2208) - Development of ship hull, mechanical, propulsion, electrical, aviation, and combat support systems, subsystems and components to significantly improve 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 existing and future aircraft carriers.

- (4004) - Development of an advanced technology aircraft launch system in support of the CVN 78 Class design and construction schedule. The Electro Magnetic Aircraft Launch System (EMALS) will replace the current steam catapult on CVN 78 Class ships. EMALS provides better control of applied forces, both peak and transient dynamic, improved
reliability and maintainability, increased operational availability and reduced operator and maintainer workload.

This Program Element (PE) and associated projects represent a continuation of efforts previously funded under PE 0603512N projects 2208 and 4004 in FY 2014 and earlier.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604112N *I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* |

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | - | 43.613 | 38.373 | - | 38.373 |
| Current President's Budget | - | 43.613 | 48.105 | - | 48.105 |
| Total Adjustments | - | - | 9.732 | - | 9.732 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | - | - | 10.000 | - | 10.000 |
| • Rate/Misc Adjustments | - | - | -0.268 | - | -0.268 |

**Change Summary Explanation**

PRJ 4004 (EMALS) Cost/Funding: Added additional funds in FY 16 to support EMALS test site software integration, correction of deficiencies and resolve component obsolescence

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | Project (Number/Name)<br>2208 / *CVN 21* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2208: *CVN 21* | - | - | 35.392 | 35.613 | - | 35.613 | 35.386 | 33.890 | 25.418 | 25.951 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**MDAP/MAIS Code:** 223

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

This project provides for the development of 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 transitions the most promising technologies from the Navy technology base, other government laboratories, and the private sector into specific advanced development efforts. 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 significantly improve 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 78 procurement, including, but not limited to engineering support, programmatic and program support, logistics support, modeling and simulation, test and evaluation, manpower and program related studies, and design support systems, such as the Integrated Digital Environment (IDE).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** CVN 78 Class Advanced Technology Design & Development | - | 18.166 | 10.141 | - | 10.141 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** CVN 78 Class Advanced Technology Design & Development: Continue development and transition of technologies to support CVN 78 Class Key Performance Parameters (KPPs): maintain sortie generation rate, reductions in manpower, and further recovery of weight and stability service life margins. Continue design activities to integrate the new technologies, such as the new propulsion plant and Electromagnetic Aircraft Launch System into the ship. | | | | | |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>Continue design, development and transition of key technologies to support CVN 21 (CVN 78 Class) KPPs which include | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>2208 / *CVN 21* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| sortie generation rate, reductions in manpower, and further recovery of weight and stability service life margins. Continue design activities to integrate new technologies, such as the new propulsion plant and EMALS into the ship. Continue existing studies and commence new studies required for integrated warfare system and C4I design, integration, test, and validation efforts. Continue review Pre-Planned Product Improvement (P3I) technical data packages. Continue CVN 78 class engineering and technical support of aircraft launch and recovery systems. Continue shipbuilder system and cost engineering support to assess ship impacts from selected Engineering Change Requests (ECRs) and changes to the GFE / CFE equipment split. Assess ship impacts and implement changes to the Class design.<br>***FY 2016 Base Plans:***<br>Continue transition of key technologies to support CVN 21 (CVN 78 Class) KPPs. Continue design activities to integrate new technologies into the ship. Continue to assess ship impacts and implement changes to the Class design. Continue existing studies and commence new studies required for integrated warfare system and C4I design, integration, test, and validation efforts. Continue review of P3I technical data packages. Continue CVN 78 class engineering and technical support of aircraft launch and recovery systems. Continue shipbuilder system and cost engineering support to assess ship impacts from selected ECRs and changes to the GFE / CFE equipment split. Plan and execute the acceptance and transition of CVN 78 CFE systems to Navy In-Service and Life Cycle Management. Identify and implement cost reduction measures for the CVN 78 Class.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** CVN 21 - Test & Evaluation (T&E) | - | 17.226 | 25.472 | - | 25.472 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>Increase the frequency of the Post Delivery Test and Trials (PDT&T) workshops from semi-annually to tri-annually and continue updating / maintaining the notional PDT&T schedule. Continue the Developmental Test Working Group (DTWG) efforts, focusing on the collection / analysis of the DT metrics. Continue the CVN 78 Integrated Test Team (CITT) efforts to coordinate Integrated Testing (IT) to achieve synergies among DT&E, OT&E, and LFT&E as applicable to optimize CVN 78 test-related costs, schedules, and requirements validation; and to maximize the practical use of test results by all participating test communities. Complete DT/IT-3 and commence DT/IT-4, which includes: (1) completing Sortie Generation Rate Assessment (SGRA) 14; DBR land- | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>2208 / *CVN 21* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| based testing using the production Multi-Function Radar; and DBR to TPX-42 land-based integration testing; (2) conducting Combat System Test (CST) Phase 2; TPX-42 shipboard testing; Operational Assessment Phase B4 (OT-B4); Advanced Weapons Elevator (AWE) Hazards of Electromagnetic Radiation to Ordnance (HERO) / Hazard of Electromagnetic Radiation to Personnel (HERP) / Electromagnetic Interference (EMI); and the Combat Systems Trial Rehearsal Review (CSTRR); and (3) continuing spiral development of the VCVN Model.<br>***FY 2016 Base Plans:***<br>Continue holding the tri-annual PDT&T workshops and updating / maintaining the notional PDT&T schedule. Continue the DTWG efforts, focusing on the collection / analysis of the DT metrics. Continue CITT efforts to coordinate Integrated Testing (IT) to achieve synergies among DT&E, OT&E, and LFT&E. Complete DT/IT-4, which includes: (1) completing SGRA 15 and; (2) conducting pre- and post-delivery DBR Shipboard Engineering Tests (SBETs); Combat Systems Shipboard Developmental Testing (SBDT); Special Performance Trials; Acoustic Trial; and Close-In Weapons System (CIWS) structural test firing; and (3) continuing spiral development of the VCVN Model.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 35.392 | 35.613 | - | 35.613 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN / 0604567N: *Project Units 3108, 3179, 4007* | 15.217 | 18.867 | 27.648 | - | 27.648 | 30.051 | 30.295 | 27.645 | 25.840 | Continuing | Continuing |
| • RDTEN / 0603512N: *Project Units 2208, 4004* | 72.734 | - | - | - | - | - | - | - | - | - | 1,709.131 |
| • SCN / 2001: *Carrier Replacement Program* | 917.553 | 1,219.425 | 2,509.359 | - | 2,509.359 | 2,955.056 | 3,530.762 | 2,075.957 | 873.334 | Continuing | Continuing |
| • SCN / 5300: *Completion of Prior Year Shipbuilding Programs* | 588.100 | 663.000 | 123.760 | - | 123.760 | - | - | - | - | - | 1,374.860 |
| • RDTEN / 0603570N: *Propulsion Plant Development (PU 2692)* | 57.499 | 60.459 | - | - | - | - | - | - | - | - | 1,526.813 |
| • OMN / 1B2B: *CVN 78 Ford Class Training (12BJ0)* | - | 4.907 | 38.389 | - | 38.389 | 35.600 | 3.878 | 3.880 | 3.956 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>2208 / *CVN 21* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**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, 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 development of TEMP 1610, Rev C and route for signature. Successfully complete all PEO C4I TIF testing. Successfully execute SGRA 12 and SGRA 13. Gain acceptance of the FSST Alternative Process as a technically-feasible and cost-effective alternative to the traditional FSST. Successfully complete the NAVAIR PIF testing and
the Consolidated Afloat Networks and Enterprise Services (CANES) testing. Successfully conduct and support feasibility and tradeoff studies and data packages on new and modified shipboard systems, technologies and proposed modification. Data packages shall include information to support program decisions to integrate these efforts into the whole ship design efforts. Successfully conduct IDC shock testing and reporting in order to finalize IDC R&D efforts. Successfully complete Advanced Weapons Elevator Shock and Electromagnetic Interference (EMI) Test qualifications. Successfully complete Plasma Arc Waste Destruction System (PAWDS) Land-Based Test. Successfully create and deliver 21 Decision
Memorandums (DM) for Bents/Bays 1-21.on the 03 Level (Gallery Deck) with Layer 31 information. Successfully develop the baseline Technical Data Packages for 39 systems and mature packages in preparation for final GFI arrival.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | Project (Number/Name)<br>2208 / *CVN 21* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Advanced Design & Development | C/CPAF | HII : VA | 0.000 | - | | 5.208 | Nov 2014 | 3.028 | Nov 2015 | - | | 3.028 | Continuing | Continuing | Continuing |
| Advanced Design & Development | WR | NSWC CARDEROCK : MD | 0.000 | - | | 5.000 | Oct 2014 | 1.400 | Nov 2015 | - | | 1.400 | Continuing | Continuing | Continuing |
| Advanced Design & Development | C/CPFF | SAIC: : NM | 0.000 | - | | 0.101 | Dec 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| Advanced Design & Development | WR | NAWCAD PATUXENT RIVER : MD | 0.000 | - | | 1.720 | Oct 2014 | 1.500 | Nov 2015 | - | | 1.500 | Continuing | Continuing | Continuing |
| Advanced Design & Development | WR | NSWC DAHLGREN : VA | 0.000 | - | | 1.622 | Oct 2014 | 0.650 | Nov 2015 | - | | 0.650 | Continuing | Continuing | Continuing |
| Advanced Design & Development | C/CPAF | RAYTHEON : VA | 0.000 | - | | 2.400 | Dec 2014 | 1.500 | Dec 2015 | - | | 1.500 | Continuing | Continuing | Continuing |
| Advanced Design & Development | C/CPFF | NAVSEA SEAPORT : DC | 0.000 | - | | 1.786 | Dec 2014 | 1.750 | Dec 2015 | - | | 1.750 | Continuing | Continuing | Continuing |
| Advanced Design & Development | Various | MISCELLANEOUS : VARIOUS | 0.000 | - | | 0.329 | Nov 2014 | 0.313 | Nov 2015 | - | | 0.313 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 18.166 | | 10.141 | | - | | 10.141 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | C/CPAF | HII : VA | 0.000 | - | | 0.790 | Nov 2014 | 2.797 | Nov 2015 | - | | 2.797 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | WR | NAWCAD PATUXENT RIVER : MD | 0.000 | - | | 3.530 | Oct 2014 | 3.819 | Nov 2015 | - | | 3.819 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | WR | NSWC DAHLGREN : VA | 0.000 | - | | 1.506 | Oct 2014 | 3.467 | Nov 2015 | - | | 3.467 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | WR | NSWC CARDEROCK : MD | 0.000 | - | | 4.000 | Oct 2014 | 0.749 | Nov 2015 | - | | 0.749 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>2208 / *CVN 21* |

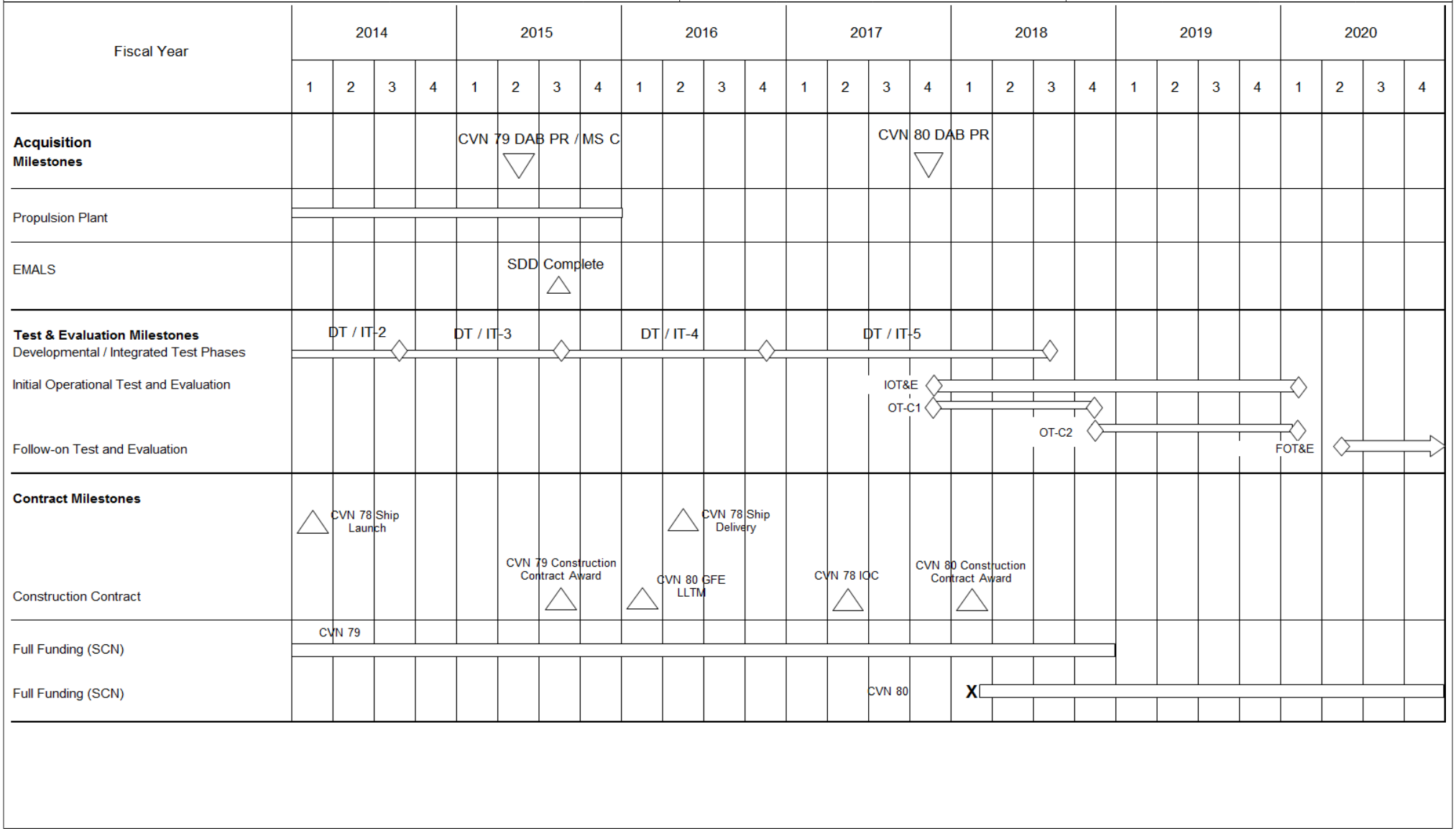
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | WR | SPAWAR : CA | 0.000 | - | | 1.500 | Nov 2014 | 0.874 | Nov 2015 | - | | 0.874 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | C/CPAF | RAYTHEON : VA | 0.000 | - | | 0.374 | Dec 2014 | 3.096 | Dec 2015 | - | | 3.096 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | WR | SSC ATLANTIC : SC | 0.000 | - | | 0.219 | Nov 2014 | 0.229 | Nov 2015 | - | | 0.229 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | Various | MISCELLANEOUS : VARIOUS | 0.000 | - | | 1.310 | Nov 2014 | 5.641 | Dec 2015 | - | | 5.641 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | C/CPFF | NAVSEA SEAPORT : DC | 0.000 | - | | - | | 0.433 | Dec 2015 | - | | 0.433 | Continuing | Continuing | Continuing |
| Operational Test & Evaluation | WR | COMOPTEVFOR : VA | 0.000 | - | | 3.997 | Dec 2014 | 4.367 | Dec 2015 | - | | 4.367 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 17.226 | | 25.472 | | - | | 25.472 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 35.392 | | 35.613 | | - | | 35.613 | - | - | - |

**Remarks**

| **Exhibit R-4, RDT&E Schedule Profile:** PB 2016 Navy | | **Date:** February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>2208 / *CVN 21* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>2208 / *CVN 21* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2208*** | | | | |
| CVN 79 DAB PR | 2 | 2015 | 2 | 2015 |
| CVN 80 DAB PR | 4 | 2017 | 4 | 2017 |
| Milestone C | 2 | 2015 | 2 | 2015 |
| Propulsion Plant | 1 | 2014 | 4 | 2015 |
| EMALS SDD Complete | 3 | 2015 | 3 | 2015 |
| DT/IT -2- Developmental Test / Integrated Test Phase 2 | 1 | 2014 | 3 | 2014 |
| DT/IT -3- Developmental Test / Integrated Test Phase 3 | 3 | 2014 | 3 | 2015 |
| DT/IT -4- Developmental Test / Integrated Test Phase 4 | 3 | 2015 | 4 | 2016 |
| DT/IT -5- Developmental Test / Integrated Test Phase 5 | 4 | 2016 | 3 | 2018 |
| Initial Operational Test & Evaluation | 4 | 2017 | 1 | 2020 |
| OT -C1 - Initial Operational Test & Evaluation - Phase C1 | 4 | 2017 | 4 | 2018 |
| OT -C2 - Initial Operational Test & Evaluation - Phase C2 | 4 | 2018 | 1 | 2020 |
| FOT&E - Follow-On Test & Evaluation | 2 | 2020 | 4 | 2020 |
| CVN 78 Ship Launch | 1 | 2014 | 1 | 2014 |
| CVN 78 Ship Delivery | 2 | 2016 | 2 | 2016 |
| CVN 78 Initial Operational Capability (IOC) | 2 | 2017 | 2 | 2017 |
| CVN 79 Construction Contract Award | 3 | 2015 | 3 | 2015 |
| CVN 80 GFE LLTM Contract Award | 1 | 2016 | 1 | 2016 |
| CVN 80 Construction Contract Award | 1 | 2018 | 1 | 2018 |
| CVN 79 SCN Full Funding | 1 | 2014 | 4 | 2018 |
| CVN 80 SCN Full Funding | 1 | 2018 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | Project (Number/Name)<br>4004 / *EMALS* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4004: *EMALS* | - | - | 8.221 | 12.492 | - | 12.492 | 10.000 | - | - | - | - | 30.713 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**MDAP/MAIS Code:** 223

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

This project provides for the development of an advanced technology aircraft launch system in support of the CVN 78 design and construction schedule, as well as Engineering and Life Cycle System (E&LCS) design. The Electromagnetic Aircraft Launch System (EMALS) will be the aircraft catapult for CVN 78 Class ships. EMALS provides better control of applied forces, both peak and transient dynamic, improved reliability and maintainability, increased operational availability, and reduced operator and maintainer workload.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** EMALS | - | 8.221 | 12.492 | - | 12.492 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** EMALS | | | | | |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>(1) EMALS SDD - Complete repeated deadload testing at the System Functional Demonstration (SFD) site to bring the EMALS system up to 4000 total deadload and aircraft launches as part of the reliability growth program. Complete planned component environmental qualification testing at various labs throughout the country.<br><br>(2) EMALS Basic Ordering Agreement (BOA) ILS Order - Continue the execution of the EMALS ILS Development Program. Conduct annual logistics reviews, training in-process review (IPR) and Organizational and Intermediate (O & I) Technical Manual (TM) IPRs. Based on the development and availability of engineering source data for each of the six (6) EMALS subsystems and allocated resources, update Failure Mode Effectiveness and Criticality Analyses (FMECAs), the Logistics Management Information (LMI) database, Calibration/Measurements Requirements Summary / Instrument Calibration Procedures (CMRS/ICP), manpower analyses, O&I maintenance plans, provisioning documentation, Post Production Support Planning / Diminishing Manufacturing Sources & Material Shortages (PPSP/DMSMS) screening and analyses, and support equipment | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>4004 / *EMALS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| identification and technical data. Continue to develop training documents and the Navy Formal Training Course. Conduct Pre-Commissioning Unit Training. Complete the Maintenance Demonstration (M-Demo) at the System Functional Demonstration (SFD) facility. Complete the Shipboard Shipboard Facility Requirements Document (FRD) and the Training FRD.<br>***FY 2016 Base Plans:***<br>(1) EMALS BOA ILS Order - Continue the execution of the EMALS ILS Development Program. Conduct annual logistics reviews, training IPR and O & I level Interactive Electronic Technical Manual (IETM) final system level IPR. Deliver the final EMALS O & I level IETM. Procure and deliver remaining quantity of Portable Electronic Maintenance Aids (PEMAs) to the CVN 78 for IETM use. Complete the Reliability Centered Maintenance (RCM) process and the development of Maintenance Requirement Cards (MRCs) and Quality Assurance (QA) cards.<br><br>(2) EMALS BOA Integrated Test & Evaluation (IT&E) Order - Maintain EMALS shore-based test site to support engineering investigations, software integration, deficiency resolution, component obsolescence, and cyber security vulnerability. Conduct EMALS land-based testing using deadloads and aircraft for the correction of deficiencies, critical reliability growth to achieve fleet operational requirements and to maintain test unit cycles above shipboard cycles. Conduct Environmental Qualification Testing (EQT) for Launch Control Subsystem (LCS) components deferred from SDD.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 8.221 | 12.492 | - | 12.492 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN / 0604567N: *Project Units 3108, 3179, 4007* | 15.217 | 18.867 | 27.648 | - | 27.648 | 30.051 | 30.295 | 27.645 | 25.840 | Continuing | Continuing |
| • RDTEN / 0603570N: *Propulsion Plant Development (PU 2692)* | 57.499 | 60.459 | - | - | - | - | - | - | - | - | 1,526.813 |
| • SCN / 2001: *Carrier Replacement Program* | 917.553 | 1,219.425 | 2,509.359 | - | 2,509.359 | 2,955.056 | 3,530.762 | 2,075.957 | 873.334 | Continuing | Continuing |
| • SCN / 5300: *Completion of Prior Year Shipbuilding Programs* | 588.100 | 663.000 | 123.760 | - | 123.760 | - | - | - | - | - | 1,374.860 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>4004 / *EMALS* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OMN / 1B2B: *CVN 78 Ford Class Training (12BJ0)* | - | 4.907 | 38.389 | - | 38.389 | 35.600 | 3.878 | 3.880 | 3.956 | Continuing | Continuing |
| • RDTEN / 0603512N: *Project Units 2208, 4004* | 72.734 | - | - | - | - | - | - | - | - | - | 1,709.131 |

**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.

**E. Performance Metrics**

Successfully complete Highly Accelerated Life Test (HALT) Phase II. Successfully complete System Functional Demonstration (SFD) testing. Successfully complete Environmental Qualification Testing (EQT). Successfully complete Shipset Controls Lab testing.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>4004 / *EMALS* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Launch, Recovery & Support | C/CPAF | General Atomics (SDD) : CA | 0.000 | - | | 4.292 | Nov 2014 | - | | - | | - | - | 4.292 | - |
| Aircraft Launch, Recovery & Support | C/CPFF | General Atomics (ILS BOA) : CA | 0.000 | - | | 3.529 | Nov 2014 | 2.492 | Nov 2015 | - | | 2.492 | - | 6.021 | - |
| Aircraft Launch, Recovery & Support | C/CPFF | General Atomics (IT&E BOA) : CA | 0.000 | - | | - | | 5.703 | Nov 2015 | - | | 5.703 | - | 5.703 | - |
| | | **Subtotal** | 0.000 | - | | 7.821 | | 8.195 | | - | | 8.195 | - | 16.016 | - |

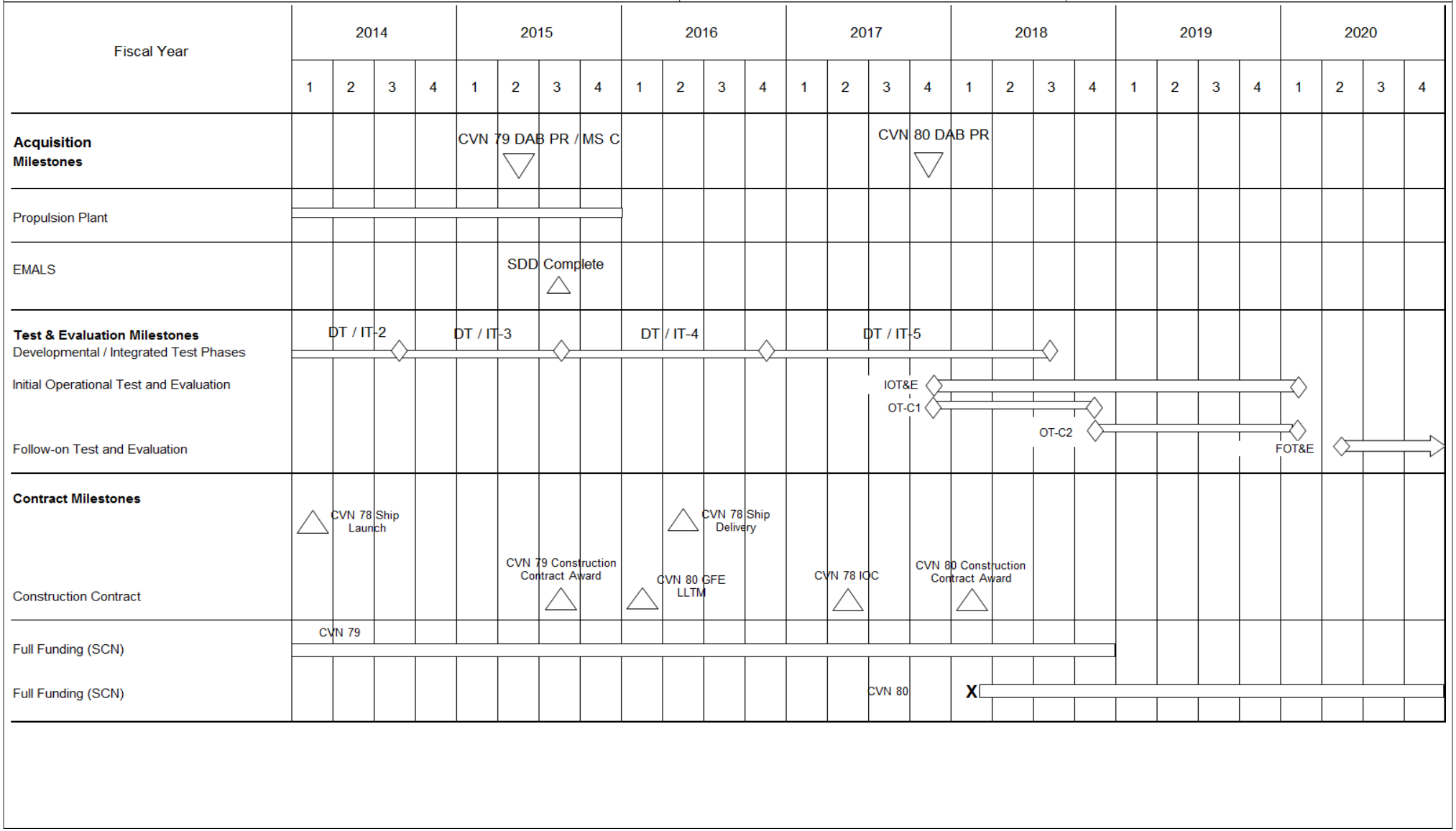
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Launch, Recovery & Support | WR | NAWC Lakehurst : NJ | 0.000 | - | | 0.400 | Dec 2014 | 4.297 | Nov 2015 | - | | 4.297 | - | 4.697 | - |
| | | **Subtotal** | 0.000 | - | | 0.400 | | 4.297 | | - | | 4.297 | - | 4.697 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 8.221 | | 12.492 | | - | | 12.492 | - | 20.713 | - |

**Remarks**

| **Exhibit R-4, RDT&E Schedule Profile:** PB 2016 Navy | | **Date:** February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>4004 / *EMALS* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604112N / *(U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80* | **Project (Number/Name)**<br>4004 / *EMALS* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4004*** | | | | |
| CVN 79 DAB PR | 2 | 2015 | 2 | 2015 |
| CVN 80 DAB PR | 4 | 2017 | 4 | 2017 |
| Milestone C | 2 | 2015 | 2 | 2015 |
| Propulsion Plant | 1 | 2014 | 4 | 2015 |
| EMALS SDD Complete | 3 | 2015 | 3 | 2015 |
| DT/IT -2- Developmental Test / Integrated Test Phase 2 | 1 | 2014 | 3 | 2014 |
| DT/IT -3- Developmental Test / Integrated Test Phase 3 | 3 | 2014 | 3 | 2015 |
| DT/IT -4- Developmental Test / Integrated Test Phase 4 | 3 | 2015 | 4 | 2016 |
| DT/IT -5- Developmental Test / Integrated Test Phase 5 | 4 | 2016 | 3 | 2018 |
| Initial Operational Test & Evaluation | 4 | 2017 | 1 | 2020 |
| OT -C1 - Initial Operational Test & Evaluation - Phase C1 | 4 | 2017 | 4 | 2018 |
| OT -C2 - Initial Operational Test & Evaluation - Phase C2 | 4 | 2018 | 1 | 2020 |
| FOT&E - Follow-On Test & Evaluation | 2 | 2020 | 4 | 2020 |
| CVN 78 Ship Launch | 1 | 2014 | 1 | 2014 |
| CVN 78 Ship Delivery | 2 | 2016 | 2 | 2016 |
| CVN 78 Initial Operational Capability (IOC) | 2 | 2017 | 2 | 2017 |
| CVN 79 Construction Contract Award | 3 | 2015 | 3 | 2015 |
| CVN 80 GFE LLTM Contract Award | 1 | 2016 | 1 | 2016 |
| CVN 80 Construction Contract Award | 1 | 2018 | 1 | 2018 |
| CVN 79 SCN Full Funding | 1 | 2014 | 4 | 2018 |
| CVN 80 SCN Full Funding | 1 | 2018 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604122N *I (U)Remote Minehunting System (RMS)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | - | 21.110 | 20.089 | - | 20.089 | 28.018 | 8.219 | 9.951 | 8.632 | Continuing | Continuing |
| 0260: *Remote Minehunting Systems* | 0.000 | - | 21.110 | 20.089 | - | 20.089 | 28.018 | 8.219 | 9.951 | 8.632 | Continuing | Continuing |

**MDAP/MAIS Code:**
**Other MDAP/MAIS Code(s):** 286

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

The AN/WLD-1(V)2 Remote Minehunting System (RMS) is a mine reconnaissance system designed for the detection, classification, identification, and localization of bottom and moored mines in shallow and deep water. This budget line supports the Remote Multi-Mission Vehicle (RMMV). The RMS will provide the Navy the capability to keep ships and sailors out of the minefield. The RMS is deployed from the Littoral Combat Ship (LCS) as part of the ships' Mine Countermeasure (MCM) Mission Package (MP). The RMS is a fully integrated system consisting of a semi-submersible RMMV towing a variable depth sensor, the AN/AQS-20A. The RMMV is a high-endurance, semi-autonomous, low-observable, unmanned, diesel-powered vehicle, operated and maintained from the LCS. Line-of-sight (LOS) and over-the-horizon (OTH) data links provide real time vehicle command and control and mine reconnaissance sensor data transmission to/from LCS.

The first RMMV Low Rate Initial Production (LRIP) units (LRIP 1) were used during the RMMV Reliability Growth Program (RGP) v4.2 configuration and are being upgraded to the version 6.0 (v6.0) configuration to support LCS integration.

This is not a new start. Acquisition Category (ACAT) 1D Transparency requirement realigned program funding from Project Element 0603502N/Project Unit 0260 beginning in FY15.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | - | 21.110 | 15.923 | - | 15.923 |
| Current President's Budget | - | 21.110 | 20.089 | - | 20.089 |
| Total Adjustments | - | - | 4.166 | - | 4.166 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | - | - | 4.300 | - | 4.300 |
| • Rate/Misc Adjustments | - | - | -0.134 | - | -0.134 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604122N *I (U)Remote Minehunting System (RMS)* |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604122N / *(U)Remote Minehunting System (RMS)* | Project (Number/Name)<br>0260 / *Remote Minehunting Systems* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0260: *Remote Minehunting Systems* | - | - | 21.110 | 20.089 | - | 20.089 | 28.018 | 8.219 | 9.951 | 8.632 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**MDAP/MAIS Code:** 286

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

The AN/WLD-1(V)2 Remote Minehunting System (RMS) is a mine reconnaissance system designed for the detection, classification, identification, and localization of bottom and moored mines in shallow and deep water. This budget line supports the Remote Multi-Mission Vehicle (RMMV). The RMS will provide the Navy the capability to keep ships and sailors out of the minefield. The RMS is deployed from the Littoral Combat Ship (LCS) as part of the ships' Mine Countermeasure (MCM) Mission Package (MP). The RMS is a fully integrated system consisting of a semi-submersible RMMV towing a variable depth sensor, the AN/AQS-20A. The RMMV is a high-endurance, semi-autonomous, low-observable, unmanned, diesel-powered vehicle, operated and maintained from the LCS. Line-of-sight (LOS) and over-the-horizon (OTH) data links provide real time vehicle command and control and mine reconnaissance sensor data transmission to/from LCS.

The RMMV Low Rate Initial Production (LRIP 1) will continue upgrades to version 6.0 (v6.0) configuration in FY15 and FY16. In FY15 a RMMV LRIP 1 integration/ maintenance contract will be awarded a RMMV Competitive Low Rate Initial Production (LRIP 2) contract will be awarded to procure the next LRIPs in FY16.

The Initial Operational Capability (IOC) has shifted to 2nd quarter FY16 to align with the LCS MCM MP IOC and will use LRIP 1 units.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | - | 15.572 | 12.179 | - | 12.179 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>- Cited in PE 0603502N | | | | | |
| ***FY 2015 Plans:***<br>- Implement hardware/software improvements identified during RMS Developmental Test (DT).<br>- Prepare vehicles for LCS MCM MP test events.<br>- Complete RMMV v6.0 Physical Configuration Audit (PCA), Technical Data Package (TDP), and Interactive Electronic Technical Manual (IETM).<br>- Incorporate v6.0 Engineering Change Proposals (ECPs) on additional v4.2 RMMVs for delivery to the LCS MCM MP. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604122N / *(U)Remote Minehunting System (RMS)* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Incorporate RMMV v6.0 ECPs on RMMV training assets to support Ready For Training (RFT) in FY16.<br>- Design and implement hardware/software changes to support integration of RMMV with LCS discovered during LCS MCM MP IOT&E.<br>- Award a RMMV LRIP 1 Integration/Maintenance contract.<br>- Implement Operational Availability (Ao) hardware/software improvements.<br>***FY 2016 Base Plans:***<br>- Upgrade Pre-Reliability Growth Program (RGP) vehicles (v4.0) to final v6.0 configuration including reliability upgrades and LCS Integration ECPs.<br>- SBIR transition to LRIP 1 for software.<br>- Design and implement hardware/software changes to support Freedom Class integration.<br>- Correction of deficiencies identified during LCS IOT&E.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Support | - | 2.550 | 5.380 | - | 5.380 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>- Cited in PE 0603502N<br>***FY 2015 Plans:***<br>- Provide support for RMMV v6.0 PCA, TDP, and IETM.<br>- Provide engineering, logistics, and programmatic support for v6.0 efforts.<br>- Provide engineering, logistics, and programmatic support for RMMV Integration/Maintenance contract.<br>- Conduct quality assurance audits at contractor facility.<br>- Provide on-site engineering support for RMMVs at contractor facility.<br>- Conduct RMMV Ready For Issue (RFI) Inspections.<br>- Provide support for v6.0 DT/IT.<br>***FY 2016 Base Plans:***<br>- Provide engineering, logistics, and programmatic support for v6.0 upgrade efforts.<br>- Conduct post-upgrade inspections.<br>- Provide engineering, logistics, and programmatic support for RMMV Integration/Maintenance contract.<br>- Support S&T transitions to LRIP 1 fleet. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604122N / *(U)Remote Minehunting System (RMS)* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Provide planning support for RMMV Tech Refresh and Overhaul efforts.<br>- Provide engineering support for correction of deficiencies efforts.<br>- Provide programmatic support for LRIP 2 contract.<br>- Support fleet introduction.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Test and Evaluation (T&E) | - | 2.300 | 1.842 | - | 1.842 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>- Prepare for and support LCS MCM MP TECHEVAL.<br>- Prepare for and support LCS MCM MP IOT&E.<br>- Prepare for and conduct v6.0 DT/IT.<br>***FY 2016 Base Plans:***<br>- Verify correction of deficiences identifed during IOT&E.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Management | - | 0.688 | 0.688 | - | 0.688 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A<br>***FY 2015 Plans:***<br>- Provide program management and oversight of RMMV v6.0 upgrades.<br>- Award LRIP 1 RMMV Integration/Maintenance contract.<br>- Provide program management support for and oversight of LRIP 1 Integration/Maintenance contract.<br>***FY 2016 Base Plans:***<br>- Provide program management and oversight of RMMV v6.0 upgrades. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604122N / *(U)Remote Minehunting System (RMS)* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Provide program management and oversight of RMMV Integration/Maintenance contract.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 21.110 | 20.089 | - | 20.089 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/1605: *Remote Minehunting System* | - | - | 87.627 | - | 87.627 | 68.409 | 58.457 | 58.003 | 37.371 | Continuing | Continuing |
| • RDT&E/0603502N: *Remote Minehunting System* | 33.799 | - | - | - | - | - | - | - | - | - | 524.188 |

**Remarks**

Five Year Defense Plan (FYDP) funding includes: funding for the RMMV units, RMMV Shipboard Stowage equipment, and production engineering support. The 1605 OPN line item is to award the RMMV Competitive LRIP 2/Full Rate Production (FRP) contract in FY16.

The LRIP 2/FRP procurement profile is quantity (2) in FY16 and (4) in each ensuing FY through FY27. The first (10) units are LRIPs and the remaining are FRP units. Award of LRIP 2 contract supports LCS MCM MP inventory requirements.

**D. Acquisition Strategy**

In FY15, conduct a Milestone (MS) C DAB in support of the LRIP 2 decision. An RMMV LRIP 1 Integration/Maintenance Contract will be awarded in FY15 to support the integration and maintenance activities of LRIP 1 systems, integration with the LCS Freedom Variant, incorporate Ao improvements, and address obsolescence changes. Award the RMMV Competitive LRIP 2/FRP contract in FY16. A Full Rate Production Decision Review (FRPDR) in FY20.

**E. Performance Metrics**

- Conduct a Milestone (MS) C DAB (FY15)
- Award RMMV LRIP 2 contract with Options for Full Rate Production (FY16)
- Support LCS MCM MP IOT&E (FY15)
- Initial Operational Capability (FY16)
- Complete RMMV IOT&E based on LRIP 2 (FY20)
- RMMV FRP Decision Review (FRPDR) (FY20)

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604122N / *(U)Remote Minehunting System (RMS)* | Project (Number/Name)<br>0260 / *Remote Minehunting Systems* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Development & Integration | SS/CPFF | LOCKHEED MARTIN : West Palm Beach, FL | 0.000 | - | | 13.894 | Nov 2014 | 10.579 | Nov 2015 | - | | 10.579 | Continuing | Continuing | Continuing |
| SBIR Transition | SS/CPFF | BOSTON ENGINEERING : Waltham, MA | 0.000 | - | | 0.678 | Nov 2014 | 1.600 | Dec 2015 | - | | 1.600 | - | 2.278 | - |
| Hardware Development & Integration | SS/CPIF | LOOKHEED MARTIN : West Palm Beach, FL | 0.000 | - | | 1.000 | Nov 2014 | - | | - | | - | - | 1.000 | - |
| | | **Subtotal** | 0.000 | - | | 15.572 | | 12.179 | | - | | 12.179 | - | - | - |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering/ILS | WR | NSWC/PCD : Panama City, FL | 0.000 | - | | 1.731 | Nov 2014 | 4.396 | Oct 2015 | - | | 4.396 | Continuing | Continuing | Continuing |
| Engineering Support | WR | NUWC/NPT : Newport, RI | 0.000 | - | | 0.511 | Nov 2014 | 0.549 | Nov 2015 | - | | 0.549 | Continuing | Continuing | Continuing |
| Engineering Support | WR | NUWC.KPT : Keyport, WA | 0.000 | - | | - | | 0.222 | Nov 2015 | - | | 0.222 | Continuing | Continuing | Continuing |
| Engineering Support | WR | PORTSMOUTH NSY : Portsmouth, NH | 0.000 | - | | 0.308 | Nov 2014 | 0.213 | Nov 2015 | - | | 0.213 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 2.550 | | 5.380 | | - | | 5.380 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LCS MCM MP Test Events | WR | NSWC/PCD : Panama City, FL | 0.000 | - | | 1.537 | Nov 2014 | 1.342 | Oct 2015 | - | | 1.342 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604122N / *(U)Remote Minehunting System (RMS)* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LCS MCM MP Test Events | SS/CPFF | LOCKHEED MARTIN : West Palm Beach, FL | 0.000 | - | | 0.763 | Nov 2014 | 0.500 | Nov 2015 | - | | 0.500 | - | 1.263 | - |
| | | **Subtotal** | 0.000 | - | | 2.300 | | 1.842 | | - | | 1.842 | - | - | - |

**Remarks**

LCS MCM MP Test Events will require contractor to groom vehicles prior to testing.
SFTF - South Florida Test Facility for the laying and recovery of mines for the DT/IT event.

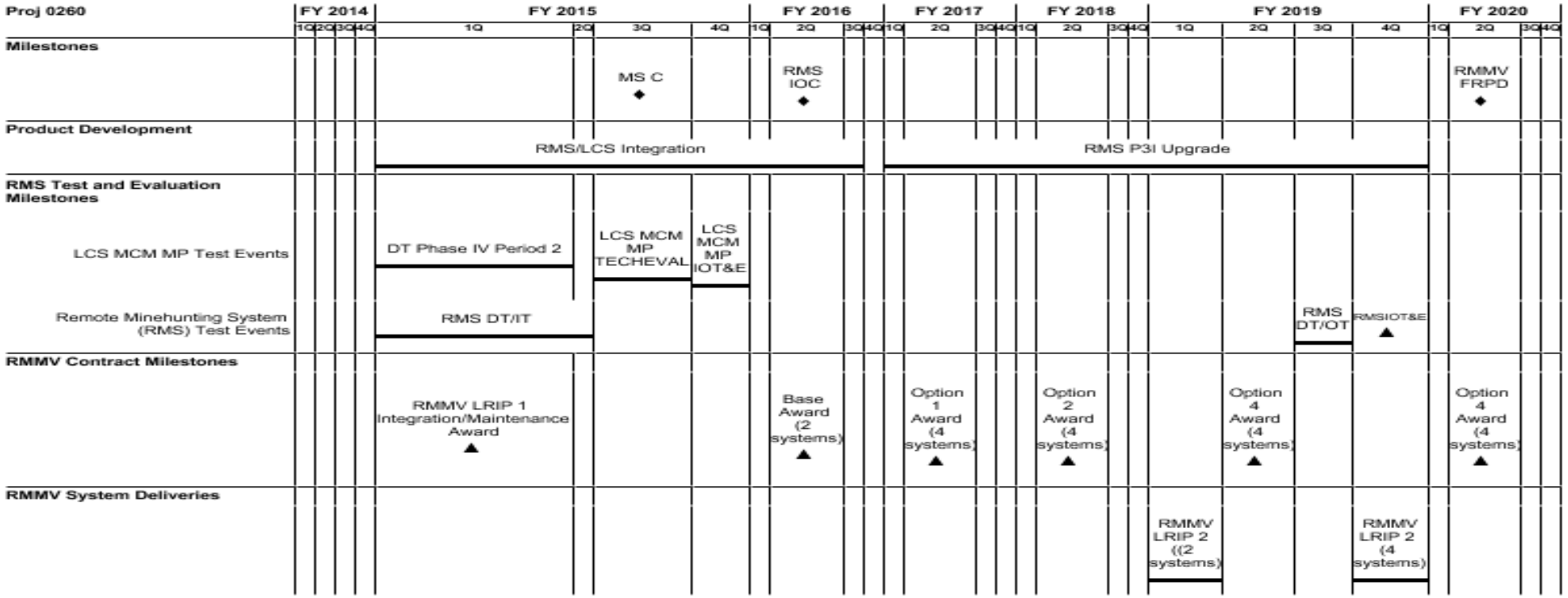
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Support | C/CPFF | TBD : TBD | 0.000 | - | | 0.647 | Dec 2014 | 0.647 | Dec 2015 | - | | 0.647 | Continuing | Continuing | Continuing |
| Travel | WR | NAVSEA : WNY, DC | 0.000 | - | | 0.041 | Jan 2015 | 0.041 | Jan 2016 | - | | 0.041 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 0.688 | | 0.688 | | - | | 0.688 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 21.110 | | 20.089 | | - | | 20.089 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604122N / *(U)Remote Minehunting System (RMS)* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |




2016PB - 0604122N - 0260

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604122N / *(U)Remote Minehunting System (RMS)* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0260*** | | | | |
| Milestones: Milestone (MS) C | 3 | 2015 | 3 | 2015 |
| Milestones: Initial Operating Capability (IOC) | 2 | 2016 | 2 | 2016 |
| Milestones: Full Rate Production Decision (FRPD) | 2 | 2020 | 2 | 2020 |
| Product Development: RMS/LCS Integration | 1 | 2015 | 3 | 2016 |
| Product Development: RMS P3I Upgrade (Ao Improvements & Parts Obsolescence) | 1 | 2017 | 4 | 2019 |
| RMS Test and Evaluation Milestones: LCS MCM MP Test Events: DT Phase IV Period 2 | 1 | 2015 | 1 | 2015 |
| RMS Test and Evaluation Milestones: LCS MCM MP Test Events: LCS MCM MP TECHEVAL | 3 | 2015 | 3 | 2015 |
| RMS Test and Evaluation Milestones: LCS MCM MP Test Events: LCS MCM MP IOT&E | 4 | 2015 | 4 | 2015 |
| RMS Test and Evaluation Milestones: Remote Minehunting System (RMS) Test Events: RMS v6.0 Developmental Testing (DT)/Integrated Testing (IT) | 1 | 2015 | 2 | 2015 |
| RMS Test and Evaluation Milestones: Remote Minehunting System (RMS) Test Events: RMS Developmental Testing (DT)/Operational Test (OT) | 3 | 2019 | 3 | 2019 |
| RMS Test and Evaluation Milestones: Remote Minehunting System (RMS) Test Events: RMS IOT&E | 4 | 2019 | 4 | 2019 |
| RMMV Contract Milestones: Base Production Award (2 systems) | 2 | 2016 | 2 | 2016 |
| RMMV Contract Milestones: Option 1 Production Award (4 systems) | 2 | 2017 | 2 | 2017 |
| RMMV Contract Milestones: Option 2 Production Award (4 systems) | 2 | 2018 | 2 | 2018 |
| RMMV Contract Milestones: Option 3 Production Award (4 systems) | 2 | 2019 | 2 | 2019 |
| RMMV Contract Milestones: Option 4 Production Award (4 systems) | 2 | 2020 | 2 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604122N / *(U)Remote Minehunting System (RMS)* | **Project (Number/Name)**<br>0260 / *Remote Minehunting Systems* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| RMMV Contract Milestones: RMMV LRIP 1 Integration/Maintenance (Legacy Configuration) Award | 1 | 2015 | 1 | 2015 |
| RMMV System Deliveries: 2 LRIPs | 1 | 2019 | 1 | 2019 |
| RMMV System Deliveries: 4 LRIPs | 4 | 2019 | 4 | 2019 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604272N *I Tact Air Dir Infrared CM (TADIRCM)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 186.141 | 24.562 | 5.556 | 18.969 | - | 18.969 | 42.013 | 38.413 | 39.236 | 24.835 | 274.593 | 654.318 |
| 3302: *JATAS* | 182.130 | 21.273 | - | - | - | - | - | - | - | - | - | 203.403 |
| 3304: *CIRCM* | 4.011 | 3.289 | 5.556 | 18.969 | - | 18.969 | 42.013 | 38.413 | 39.236 | 24.835 | 274.593 | 450.915 |

**Note**

There is a FY14 $20 million House Appropriations Committee (HAC), House Report 113-473, rescission and a FY14 $14 million Senate Appropriations Committee (SAC), Senate Report 113-211, rescission against the Joint and Allied Threat Awareness System (JATAS) Project Unit (PU) 3302. The JATAS project ends in FY14 in accordance with the Acquisition Decision Memorandum (ADM) dated 7 Feb 2014.

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

NOTE: The cost to complete on exhibit R2 and R2a for project unit 3304 should be $162.174 million. R-3 exhibit reflects the correct cost to complete and total cost.

This element includes development of electronic warfare systems for the United States Navy and United States Marine Corps assault aircraft. This includes the development and testing of advanced infrared countermeasures systems for emerging threats and emergency contingencies for Aircraft Self-Protection Equipement (ASE) suite integration. Realignment of project units from Tactical Aircraft Directed Infrared Countermeasures (TADIRCM) to JATAS began in FY11. Common infrared countermeasures was a new start for the Navy with efforts that began in FY13.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 33.906 | 5.657 | 43.440 | - | 43.440 |
| Current President's Budget | 24.562 | 5.556 | 18.969 | - | 18.969 |
| Total Adjustments | -9.344 | -0.101 | -24.471 | - | -24.471 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -0.101 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 5.374 | - | | | |
| • SBIR/STTR Transfer | -0.718 | - | | | |
| • Rate/Misc Adjustments | - | - | -24.471 | - | -24.471 |
| • Congressional Rescission Adjustments | -14.000 | - | - | - | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604272N *I Tact Air Dir Infrared CM (TADIRCM)* |

**Change Summary Explanation**

Schedule:

PU 3302 JATAS: Engineering Development Model (EDM) changed from 1st Qtr FY14 to 3rd Qtr FY14. The project ends in FY14 in accordance with the Acquisition Decision Memorandum (ADM). Remaining funds in FY15 will be realigned to CIRCM (PU 3304). All tasks after FY14 were removed from the schedule profile.

PU 3304 CIRCM: Changes made for Milestone B (MS-B) from 1st Qtr FY15 to 3rd Qtr FY15; Integrated Baseline Review Engineering Manufacturing Development (IBR EMD) from 2nd Qtr FY15 to 4th Qtr FY15; Critical Design Review (CDR) from 3rd Qtr FY15 to 1st Qtr FY16; Functional Configuration Audit (FCA) from 4th Qtr FY16 to 2nd Qtr FY17; Production Readiness Review (PRR) from 1st Qtr FY17 to 3rd Qtr FY17; Milestone C (MS-C) from 2nd Qtr FY17 to 4th Qtr FY17;Integrated Operational test & Evaluation (IOT&E) from 3rd Qtr FY17 through 4th Qtr FY18 to 4th Qtr FY18 through 4th Qtr FY19; Navy EMD Option from 2nd Qtr FY15 to 2nd Qtr FY16; Navy Development Test & Evaluation EMD (DT&E-EMD) from 2nd Qtr FY15 through 1st Qtr FY17 to 2nd Qtr FY16 through 2nd Qtr FY18; Navy Test Readiness Review (TRR) from 2nd Qtr FY16 to 2nd Qtr FY17; Navy EMD Test Articles from 1st Qtr FY16 to 2nd Qtr FY17. All tasks are on schedule and to be completed by the Army.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | Project (Number/Name)<br>3302 / *JATAS* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3302: *JATAS* | 182.130 | 21.273 | - | - | - | - | - | - | - | - | - | 203.403 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

There is a FY14 $20 million House Appropriations Committee (HAC), House Report 113-473, rescission and a FY14 $14 million Senate Appropriations Committee (SAC), Senate Report 113-211, rescission against the Joint and Allied Threat Awareness System (JATAS) Project Unit (PU) 3302. The JATAS project ends in FY14 in accordance with the Acquisition Decision Memorandum (ADM) dated 7 Feb 2014.

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

The JATAS AN/AAR-59 system is required to provide assault aircraft with a reliable and improved surface-to-air Infrared (IR) missile/Hostile Fire Indication (HFI) threat detection system. This capability must provide accurate and timely warning in all flight regimes, ambient light conditions, clutter backgrounds and weather conditions. It must be capable of providing countermeasure cueing to flares and/or a Directional Infrared Countermeasures (DIRCM). JATAS will enable assault Aircraft Survivability Equipment (ASE) to detect and provide countermeasure cueing for current and emerging threats. Lead department of the Navy platform for this capability is the MV-22. Project was previously funded by the Tactical Aircraft Directed Infrared Countermeasure (TADIRCM) project unit. JATAS has been designated an Aquisition Category (ACAT) IC program.

PU 3302 JATAS began in FY11. Prior year efforts (FY08 - FY10) were funded via PU 3040 TADIRCM.

In FY12, JATAS was assigned a system nomenclature of AN/AAR-59.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Joint and Allied Threat Awareness System (JATAS AN/AAR-59) Engineering and Manufacturing Development (EMD) | 19.779 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Engineering Manufacturing Development (EMD) phase and required program support for EMD phase. | | | | | |
| ***FY 2014 Accomplishments:***<br>Began Initial Test and Evaluation (IT&E). | | | | | |
| ***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3302 / *JATAS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Joint and Allied Threat Awareness System (JATAS AN/AAR-59) Integration | 1.494 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provide platform integration support and JATAS A-kit development.<br>***FY 2014 Accomplishments:***<br>Began Integrated Test and Evaluation (IT&E).<br>***FY 2015 Plans:***<br>The project ends in FY14 in accordance with the Acquisition Decision Memorandum (ADM).<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 21.273 | - | - | - | - |

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

N/A

**Remarks**

**D. Acquisition Strategy**

A JATAS Capabilities Development Document (CDD) was approved in a Joint Requirements Oversight Council Memorandum dated 18 February 2011. Per the CDD, the JATAS will be an advanced Missile Warning System (MWS) designed to replace the legacy AN/AAR-47(V) MWS and increase the survivability of Marine Corps and Navy tilt-rotor and rotary wing aircraft against infrared threats. Additionally, the system will provide aircrew with warnings of laser-enabled weapon systems such as range finders, illuminators, and beam riders. The JATAS will interface with existing AN/ALE-47 Countermeasures Dispensing System, existing AN/APR-39 Radar Warning Receiver, existing Department of the Navy Large Aircraft Infrared Countermeasure system, and other compatible directed infrared countermeasures systems as part of an integrated electronic countermeasures response to attacking infrared missiles. Additionally, the JATAS will provide Hostile Fire Indication (HFI) of small arms,

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3302 / *JATAS* |

rockets and other unguided threats and provide situational awareness in visually degraded environments. Per the CDD, JATAS was developed into two increments. Increment I (Phase I) includes the missile and laser warning capabilities and cueing of countermeasure systems. Increment I (Phase II) adds Hostile Fire Indication (HFI) capability against type I and III threats during the Engineering and Manufacturing Development (EMD) phase of this program. Increment II will develop HFI capability against type II threats. The Joint and Allied Threat Awareness System (JATAS) EMD phase is being executed via a Fixed Price Incentive Firm (FPIF) contract over an approximate 48-month period of performance, with one FPIF option for the low-rate initial production lot and Firm-Fixed Price (FFP) options for the first seven full-rate production lots. A JATAS technology development phase contract was awarded in FY09 and the EMD contract was awarded in 4th Quarter FY11. 8 test articles were developed for various test events in FY13. There is an FY14 $20 million House Appropriations Committee (HAC), House Report 113-473, rescission and a FY14 $14 million Senate Appropriations Committee (SAC), Senate Report 113-211, rescission against JATAS Project Unit (PU) 3302. The JATAS project ends in FY14 in accordance with the Acquisition Decision Memorandum (ADM) dated 7 Feb 2014.

**E. Performance Metrics**

JATAS EMD contract awarded in fourth quarter FY11.
JATAS Integrated Baseline Review (IBR) was approved 2nd Quarter FY12.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3302 / *JATAS* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hdw Dev JATAS II | C/FPIF | ATK : Clearwater, FL | 100.721 | - | Nov 2013 | - | | - | | - | | - | - | 100.721 | 113.991 |
| Aircraft Integration JATAS II | C/CPIF | Bell-Boeing : Philadelphia, PA | 15.727 | 1.229 | Feb 2014 | - | | - | | - | | - | - | 16.956 | 24.872 |
| Modeling/Simulation JATAS | WR | NAWCWD : Point Mugu, CA | 0.426 | - | | - | | - | | - | | - | - | 0.426 | - |
| Sys Eng Govt JATAS | WR | NAWCAD : Pax River, MD | 6.197 | 2.102 | Dec 2013 | - | | - | | - | | - | - | 8.299 | - |
| Sys Eng Govt JATAS | WR | FRC : Jacksonville, FL | 0.168 | 0.075 | Dec 2013 | - | | - | | - | | - | - | 0.243 | - |
| Prior years Prod Dev no longer funded in the FYDP | Various | Various : Various | 14.339 | - | | - | | - | | - | | - | - | 14.339 | - |
| JATAS cancelled | TBD | TBD : TBD | 0.000 | - | | - | | - | | - | | - | - | - | - |
| | | **Subtotal** | 137.578 | 3.406 | | - | | - | | - | | - | - | 140.984 | - |

**Remarks**

Target value of Bell-Boeing aircraft integration JATAS II contract is shared with another program office.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Configuration Mgmt JATAS | WR | NAWCAD : Pax River, MD | 0.244 | - | | - | | - | | - | | - | - | 0.244 | - |
| Integrated Logistics JATAS I | WR | Various : Various | 1.714 | 0.413 | Dec 2013 | - | | - | | - | | - | - | 2.127 | - |
| SW Dev JATAS | WR | NAWCWD : Point Mugu, CA | 2.268 | 0.937 | Dec 2013 | - | | - | | - | | - | - | 3.205 | - |
| | | **Subtotal** | 4.226 | 1.350 | | - | | - | | - | | - | - | 5.576 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3302 / *JATAS* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental T&E JATAS Govt | WR | Various : Various | 11.538 | 5.180 | Dec 2013 | - | | - | | - | | - | - | 16.718 | - |
| Operational T&E JATAS | WR | COTF : Norfolk, VA | 0.410 | 0.419 | Jan 2014 | - | | - | | - | | - | - | 0.829 | - |
| ENG & Eval JATAS | C/CPFF | Various : Various | 0.617 | 0.683 | Dec 2013 | - | | - | | - | | - | - | 1.300 | 1.300 |
| ENG & Eval Govt JATAS | WR | Various : Various | 2.749 | 3.401 | Jan 2014 | - | | - | | - | | - | - | 6.150 | - |
| Test Assets JATAS | WR | NAWCWD : China Lake, CA | 4.436 | - | | - | | - | | - | | - | - | 4.436 | - |
| Developmental T&E JATAS | C/CPFF | NRL : Washington, DC | 6.447 | 2.000 | Dec 2013 | - | | - | | - | | - | - | 8.447 | 8.447 |
| Developmental T&E JATAS Govt | WR | NAWCWD : China Lake, CA | 0.000 | 1.060 | Dec 2013 | - | | - | | - | | - | - | 1.060 | - |
| ENG & Eval Govt JATAS | WR | NRL : Washington, DC | 0.000 | 1.062 | Dec 2013 | - | | - | | - | | - | - | 1.062 | - |
| | | **Subtotal** | 26.197 | 13.805 | | - | | - | | - | | - | - | 40.002 | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Eng Supt JATAS | C/CPFF | Various : Various | 1.810 | 0.225 | Dec 2013 | - | | - | | - | | - | - | 2.035 | 2.035 |
| Govt Eng Supt JATAS | WR | NAWCWD : Point Mugu, CA | 5.048 | 0.717 | Dec 2013 | - | | - | | - | | - | - | 5.765 | - |
| Program Mgmt Supt JATAS | C/CPFF | Various : Various | 4.362 | 1.150 | Dec 2013 | - | | - | | - | | - | - | 5.512 | 5.512 |
| Travel JATAS | WR | NAVAIR : Various | 0.450 | 0.120 | Dec 2013 | - | | - | | - | | - | - | 0.570 | - |
| Cost Analysis Supt JATAS | WR | NAWCAD : Pax River, MD | 1.853 | 0.500 | Dec 2013 | - | | - | | - | | - | - | 2.353 | - |
| NAWCAD Pax Supt JATAS | WR | NAWCAD : Pax River, MD | 0.590 | - | | - | | - | | - | | - | - | 0.590 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3302 / *JATAS* |

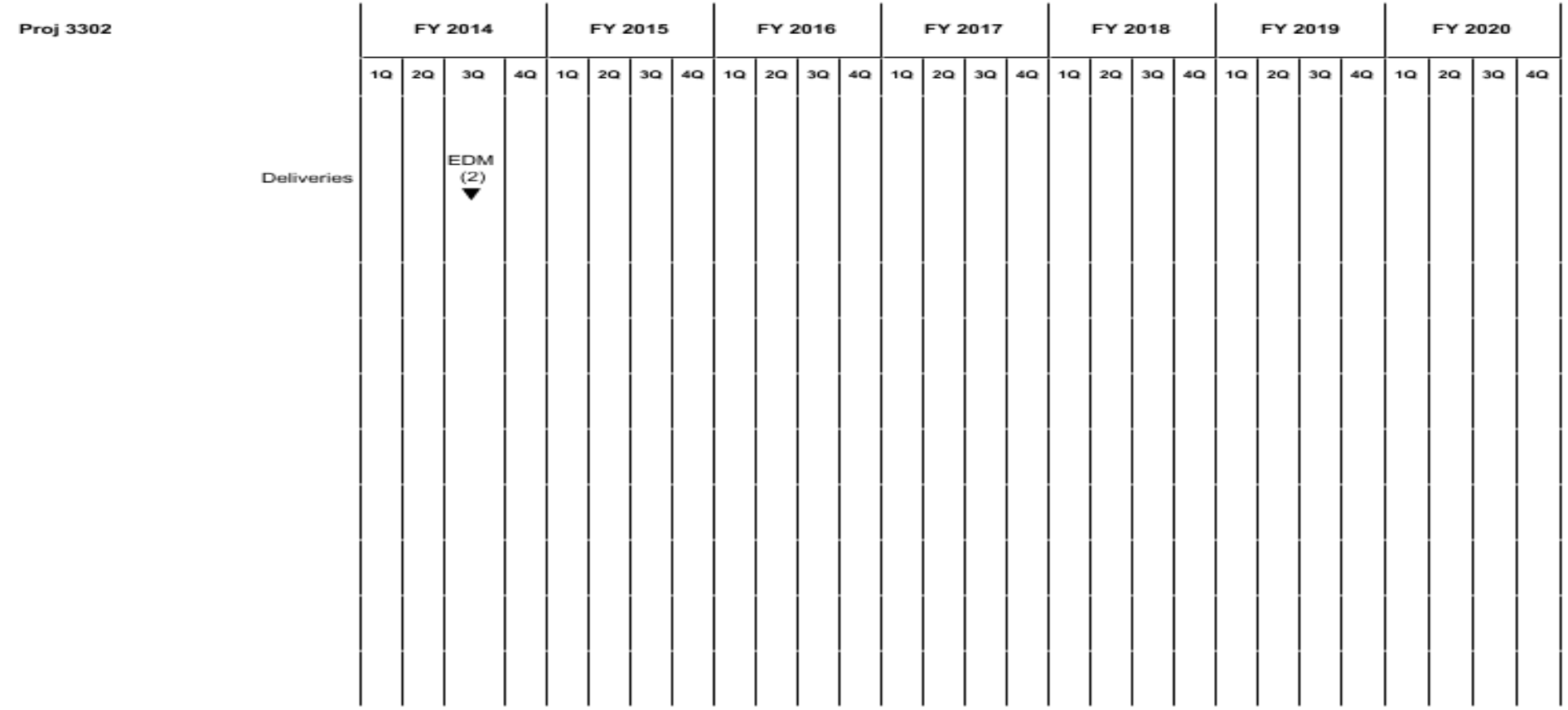
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year Mgmt Serv no longer funded in the FYDP | Various | Various : Various | 0.016 | - | | - | | - | | - | | - | - | 0.016 | - |
| | | **Subtotal** | 14.129 | 2.712 | | - | | - | | - | | - | - | 16.841 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 182.130 | 21.273 | | - | | - | | - | | - | - | 203.403 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3302 / *JATAS* |




*2016PB - 0604272N - 3302*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3302 / *JATAS* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3302*** | | | | |
| Deliveries: Engineering Development Model (EDM) Deliveries (2) | 3 | 2014 | 3 | 2014 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | Project (Number/Name)<br>3304 / *CIRCM* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3304: *CIRCM* | 4.011 | 3.289 | 5.556 | 18.969 | - | 18.969 | 42.013 | 38.413 | 39.236 | 24.835 | 274.593 | 450.915 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Common Infrared Countermeasures (CIRCM) was a new start for the Navy in FY13. This project includes the development, integration, and testing of a laser-based directed infrared countermeasure system for United States Navy and United States Marine Corps assault aircraft. This infrared countermeasure, when integrated with a missile warning detection system, will be capable of countering current and emerging infrared threats. An Under Secretary of Defense for Acquisition, Technology and Logistics (USD (AT&L)) Acquisition Decision Memorandum (ADM) dated 15 April 2009 designated the Army as the lead service for developing this capability for all rotary-wing, tilt-rotor, and small fixed-wing aircraft across the Department of Defense. It also designated the program as an Aquisition Category (ACAT) ID special interest program. The Army has designated the acquisition effort for this capability as the CIRCM program. Developmental activities in hardware and software will be pursued to reduce the size, weight and power required to achieve a missile warning detection system integrated with an infrared countermeasure. This project develops integrated hardware/software solutions that link on-board integrated Aircraft Survivability Equipment (iASE) that are compatible with mission planning information and stores sensor data for post mission threat analysis. This project also adopts future multi-band, networking capabilities to facilitate real-time transfer of threat information, and off-board queuing and control of onboard sensors.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** CIRCM Technology Development (TD) | 3.289 | 5.556 | 18.969 | - | 18.969 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continue to support TD phase and program support for CIRCM. | | | | | |
| ***FY 2015 Plans:***<br>Achieve MS-B; Engineering Manufacturing Development (EMD) contract award. | | | | | |
| ***FY 2016 Base Plans:***<br>Begin Development Test and Evaluation (DT&E) phase of the EMD. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.289 | 5.556 | 18.969 | - | 18.969 |

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

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3304 / *CIRCM* |

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

**Remarks**

**D. Acquisition Strategy**

Common Infrared Countermeasures (CIRCM) was a new start for the Navy in FY13. CIRCM is an Aquisition Category (ACAT) ID Army lead acquisition program for the development, integration and production of an infrared countermeasure for US Army, US Navy, and US Marine Corps assault aircraft. The Army conducted a 21 month competitive prototyping Technology Development (TD) phase with two contractors. During the TD phase the contractors developed TD test articles for various test events with emphasis placed on reliability. Contractors concurrently developed preliminary designs for the CIRCM system; conducted systems requirements review, system functional review, and preliminary design review systems engineering technical review events at appropriate times in the schedule. Upon completion of TD, the Army conducted a competition for award of Engineering Manufacturing Development (EMD) contract(s). The EMD phase will be no more than 26 months and will include critical design reviews, test readiness reviews, 5 EMD test articles and extensive testing. Following EMD there will be Low Rate Initial Production (LRIP) phase where full qualification testing is conducted to support an Army first unit equipped date of FY18. There will be 8 Navy LRIP units delivered in FY18. The Navy's Initial Operational Capability (IOC) will be in FY20.

**E. Performance Metrics**

FY15:
Successful critical design reviews. Successful EMD contract award by US Army.
FY16:
Successful exercise of Navy option on Army EMD contract for EMD test assets.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3304 / *CIRCM* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HDW Dev CIRCM | C/CPIF | Bell-Boeing : Philadelphia, PA | 0.000 | 0.985 | Dec 2013 | - | | 15.181 | Dec 2015 | - | | 15.181 | 248.202 | 264.368 | 264.561 |
| Sys Eng Govt CIRCM | WR | NAWCAD : Pax River, MD | 2.000 | 0.847 | Dec 2013 | - | | 0.871 | Dec 2015 | - | | 0.871 | 18.304 | 22.022 | - |
| Contractor Eng Supt CIRCM | C/CPFF | Various : Various | 0.000 | - | | 2.904 | Mar 2015 | - | | - | | - | - | 2.904 | 2.904 |
| | | **Subtotal** | 2.000 | 1.832 | | 2.904 | | 16.052 | | - | | 16.052 | 266.506 | 289.294 | - |

**Remarks**

Target value of Bell-Boeing primary hardware development contract is shared with Army.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics CIRCM I | WR | Various : Various | 0.310 | 0.210 | Dec 2013 | 0.210 | Dec 2014 | 0.316 | Dec 2015 | - | | 0.316 | 4.184 | 5.230 | - |
| Integrated Logistics CIRCM II | C/CPFF | Wyle Labs : Huntsville, AL | 0.163 | 0.100 | Jun 2014 | 0.100 | Dec 2014 | 0.102 | Mar 2016 | - | | 0.102 | 4.398 | 4.863 | 4.863 |
| SW Dev CIRCM | WR | NAWCWD : Various | 0.118 | 0.120 | Dec 2013 | 0.143 | Dec 2014 | 0.146 | Dec 2015 | - | | 0.146 | 5.366 | 5.893 | - |
| | | **Subtotal** | 0.591 | 0.430 | | 0.453 | | 0.564 | | - | | 0.564 | 13.948 | 15.986 | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eng & Eval CIRCM | C/CPFF | Various : Various | 0.206 | 0.110 | Dec 2013 | - | | 0.112 | Dec 2015 | - | | 0.112 | 2.286 | 2.714 | 2.714 |
| Eng & Eval Govt CIRCM | WR | Various : Various | 0.489 | 0.375 | Jan 2014 | 1.000 | Dec 2014 | 1.019 | Jan 2016 | - | | 1.019 | 8.012 | 10.895 | - |
| | | **Subtotal** | 0.695 | 0.485 | | 1.000 | | 1.131 | | - | | 1.131 | 10.298 | 13.609 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | Project (Number/Name)<br>3304 / *CIRCM* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

Target value of CIRCM systems engineering and evaluation contract is shared with Army.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Eng Supt CIRCM | C/CPFF | Various : Various | 0.318 | 0.240 | Dec 2013 | 0.245 | Mar 2015 | 0.250 | Mar 2016 | - | | 0.250 | 2.316 | 3.369 | 3.369 |
| Govt Eng Supt CIRCM | WR | NAWCWD : Point Mugu, CA | 0.118 | 0.125 | Dec 2013 | 0.523 | Dec 2014 | 0.533 | Dec 2015 | - | | 0.533 | 9.717 | 11.016 | - |
| Travel CIRCM | WR | NAVAIR : Various | 0.063 | 0.027 | Dec 2013 | 0.200 | Dec 2014 | 0.204 | Dec 2015 | - | | 0.204 | 0.871 | 1.365 | - |
| Cost Analysis Supt CIRCM | WR | NAWCAD : Pax River, MD | 0.226 | 0.150 | Dec 2013 | 0.231 | Dec 2014 | 0.235 | Dec 2015 | - | | 0.235 | 3.015 | 3.857 | - |
| | | **Subtotal** | 0.725 | 0.542 | | 1.199 | | 1.222 | | - | | 1.222 | 15.919 | 19.607 | - |

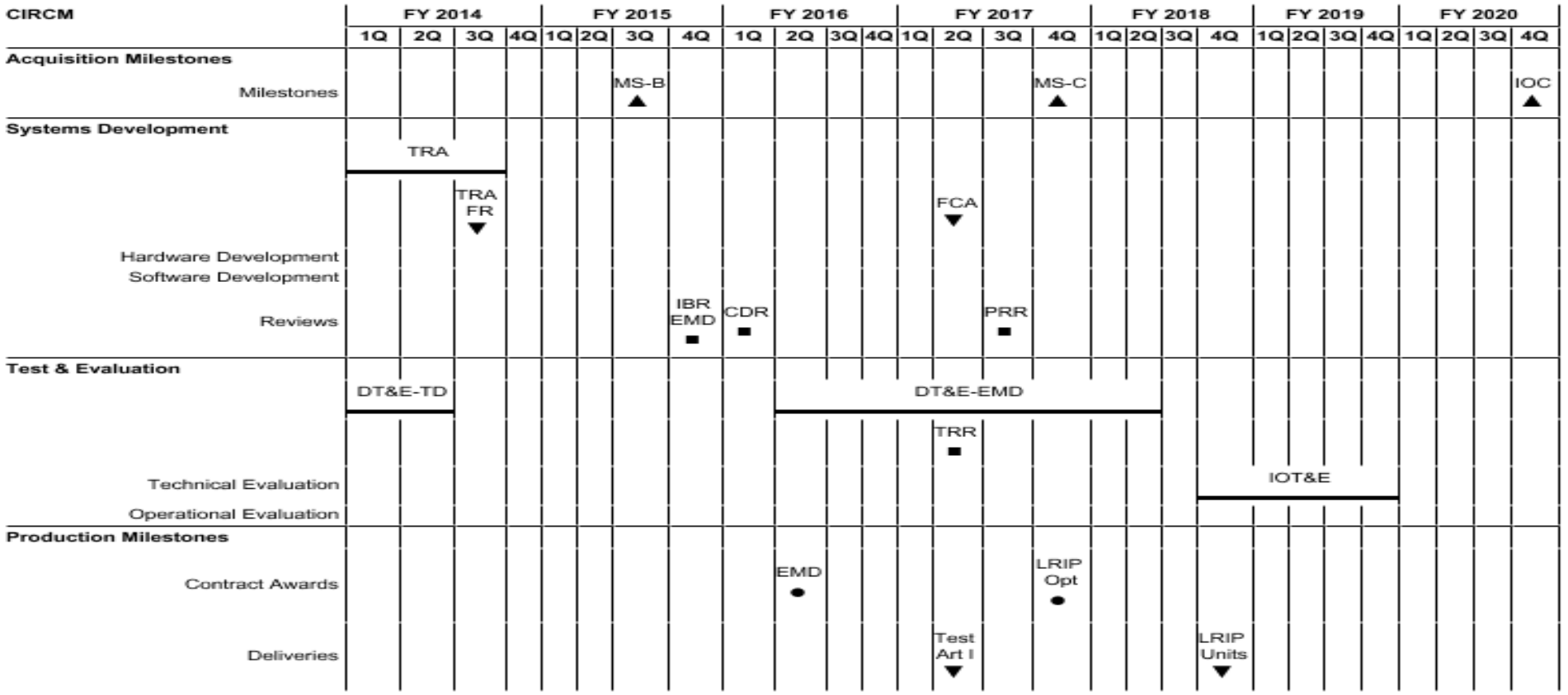
**Remarks**

Target value of CIRCM contractor engineering support contract is shared with Army.

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 4.011 | 3.289 | | 5.556 | | 18.969 | | - | | 18.969 | 306.671 | 338.496 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3304 / *CIRCM* |




*2016DON - 0604272N - 3304*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604272N / *Tact Air Dir Infrared CM (TADIRCM)* | **Project (Number/Name)**<br>3304 / *CIRCM* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***CIRCM*** | | | | |
| Acquisition Milestones: Milestones: Milestone B (MS-B) | 3 | 2015 | 3 | 2015 |
| Acquisition Milestones: Milestones: Milestone C (MS-C) | 4 | 2017 | 4 | 2017 |
| Acquisition Milestones: Milestones: Common Infrared Countermeasures (CIRCM) Initial Operational Capability (IOC) | 4 | 2020 | 4 | 2020 |
| Systems Development: Technical Readiness Assessment (TRA) | 1 | 2014 | 3 | 2014 |
| Systems Development: Technical Readiness Assessment Final Report (TRA FR) | 3 | 2014 | 3 | 2014 |
| Systems Development: Functional Configuration Audit (FCA) | 2 | 2017 | 2 | 2017 |
| Systems Development: Reviews: Integrated Baseline Review (IBR EMD) | 4 | 2015 | 4 | 2015 |
| Systems Development: Reviews: Critical Design Review (CDR) | 1 | 2016 | 1 | 2016 |
| Systems Development: Reviews: Production Readiness Review (PRR) | 3 | 2017 | 3 | 2017 |
| Test & Evaluation: Developmental Test & Evaluation - TD (DT&E-TD) | 1 | 2014 | 2 | 2014 |
| Test & Evaluation: Developmental Test & Evaluation - EMD (DT&E-EMD) | 2 | 2016 | 2 | 2018 |
| Test & Evaluation: Navy Test Readiness Review (TRR) | 2 | 2017 | 2 | 2017 |
| Test & Evaluation: Technical Evaluation: Integrated Operational Test & Evaluation (IOT&E) | 4 | 2018 | 4 | 2019 |
| Production Milestones: Contract Awards: Navy EMD Option Contract Award | 2 | 2016 | 2 | 2016 |
| Production Milestones: Contract Awards: Navy LRIP Option | 4 | 2017 | 4 | 2017 |
| Production Milestones: Deliveries: EMD Test Article Deliveries | 2 | 2017 | 2 | 2017 |
| Production Milestones: Deliveries: Navy LRIP Units | 4 | 2018 | 4 | 2018 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604279N *I (U)ASE Self Protection Optimization* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 12.621 | 0.169 | 3.921 | 7.874 | - | 7.874 | 6.157 | 3.554 | 7.901 | 8.044 | Continuing | Continuing |
| 3308: *Technology Development* | 1.324 | 0.080 | 1.498 | 2.438 | - | 2.438 | 2.571 | 2.665 | 7.024 | 7.164 | Continuing | Continuing |
| 3309: *Assault Survivability Optimization* | 11.297 | 0.089 | 2.423 | 5.436 | - | 5.436 | 3.586 | 0.889 | 0.877 | 0.880 | Continuing | Continuing |

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

This element includes development of Aircraft Survivability Equipment (ASE) and Electronic Warfare (EW)/countermeasures solutions for the United States Navy, United States Marine Corps 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.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.169 | 8.033 | 7.951 | - | 7.951 |
| Current President's Budget | 0.169 | 3.921 | 7.874 | - | 7.874 |
| Total Adjustments | - | -4.112 | -0.077 | - | -0.077 |
| • Congressional General Reductions | - | -0.002 | | | |
| • Congressional Directed Reductions | - | -4.110 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Rate/Misc Adjustments | - | - | -0.077 | - | -0.077 |

**Change Summary Explanation**

Technical:

PU 3309 Assault Survivability Optimization: Advanced threat system capability for seeker vans delayed until FY16. Application of advanced countermeasures for increased aircraft survivability delayed until FY17 for four DoN aircraft, UH-1Y, UH-1Z, CH-53K and KC-130J.

Cost:

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604279N *I (U)ASE Self Protection Optimization* |

Project Unit (PU) 3309 Assault Survivability Optimization: FY2015 $2.110M Senate Appropriations Committee mark for unjustified request for test assets and $1.106M House Appropriations Committee mark for program growth. Congressional marks delay procurement of advanced countermeasures for flight effectiveness testing and capability upgrades to seeker vans and delays fielding of survivability improvements to DoN aircraft.

Schedule:
PU 3309 Assault Survivability Optimization: Program was established by OPNAV N98 to fill USN and USMC aircraft survivability gaps against current and future threat systems using current and advanced technology expendable countermeasures as well as improvements in Aircraft Survivability Equipment (ASE) systems. Changes to R-3, R-4, and R-4A from previous budget submission are in response to proliferation changes of threat systems and fielding of additional ASE capability. The current schedule is developed to meet these emerging threat changes by optimizing countermeasure techniques using this additional ASE capability in accordance with Air Expendable Countermeasures (AECM) ORD: #512-88-89 dated 28 May 99 to provide operationally effective countermeasures and countermeasures techniques. It is anticipated that PU 3309 will continue to change in response to this requirement when similar threat proliferation, advances in countermeasures technology and ASE capability advancements are accomplished. Procurement of advanced countermeasures delayed until 2nd quarter FY16 thereby delaying flight effectiveness test until FY17 and seeker test van capability upgrades delayed until FY16 due to PB-15 Congressional marks.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604279N / *(U)ASE Self Protection Optimization* | Project (Number/Name)<br>3308 / *Technology Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3308: *Technology Development* | 1.324 | 0.080 | 1.498 | 2.438 | - | 2.438 | 2.571 | 2.665 | 7.024 | 7.164 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Project Unit (PU) 3308 Technology Development: Funds efforts that focus on the quick reaction prototyping of tactical Electronic Warfare (EW)/countermeasures solutions for increased survivability providing friendly forces the self protection necessary for successful mission accomplishment. This program directly addresses the operational requirement of strike platforms for optimization of EW/countermeasure solutions across the Department of the Navy. Improved countermeasure capabilities and techniques through modeling and simulation, validated in subsequent field testing to address new and emerging threats, capitalize upon upgrades to Aircraft Survivability Equipment systems capabilities for strike platforms and evaluate new radio frequency countermeasure and infra red countermeasure technologies.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Technology Development | 0.080 | 1.498 | 2.438 | - | 2.438 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued EW vulnerability studies/analysis, product development and test conducted for strike aircraft across the FYDP. | | | | | |
| ***FY 2015 Plans:***<br>Continue EW vulnerability studies/analysis, product development and test conducted for strike aircraft across the FYDP. | | | | | |
| ***FY 2016 Base Plans:***<br>Continue EW vulnerability studies/analysis, product development and test conducted for strike aircraft across the FYDP. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.080 | 1.498 | 2.438 | - | 2.438 |

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

N/A

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3308 / *Technology Development* |

**D. Acquisition Strategy**

EW vulnerability studies/analysis, product development and test conducted for strike aircraft across the FYDP.

**E. Performance Metrics**

Electronic Warfare (EW) vulnerability studies/analysis, product development and test conducted for strike aircraft across the FYDP.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3308 / *Technology Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Analysis | C/CPFF | GTRI : Atlanta, GA | 0.404 | - | | - | | - | | - | | - | - | 0.404 | 0.404 |
| | | **Subtotal** | 0.404 | - | | - | | - | | - | | - | - | 0.404 | 0.404 |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Dev-ALQ-214 SW Dev | WR | NAWCWD : Point Mugu, CA | 0.387 | 0.080 | Nov 2013 | 0.964 | Nov 2014 | 1.174 | Nov 2015 | - | | 1.174 | Continuing | Continuing | Continuing |
| Software Dev-ALQ-214 SW Dev | WR | Various : Various | 0.000 | - | | 0.234 | Oct 2014 | 0.644 | Nov 2015 | - | | 0.644 | Continuing | Continuing | Continuing |
| Prior costs no longer in FYDP | Various | Various : Various | 0.072 | - | | - | | - | | - | | - | - | 0.072 | 0.072 |
| | | **Subtotal** | 0.459 | 0.080 | | 1.198 | | 1.818 | | - | | 1.818 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering & Evaluation | WR | NAWCWD : Point Mugu, CA | 0.000 | - | | 0.250 | Oct 2014 | 0.260 | Nov 2015 | - | | 0.260 | Continuing | Continuing | Continuing |
| Engineering & Evaluation | WR | NAWCWD : China Lake, CA | 0.000 | - | | - | | 0.310 | Nov 2015 | - | | 0.310 | Continuing | Continuing | Continuing |
| Prior years T&E no longer funded in the FYDP | Various | Various : Various | 0.461 | - | | - | | - | | - | | - | - | 0.461 | - |
| | | **Subtotal** | 0.461 | - | | 0.250 | | 0.570 | | - | | 0.570 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604279N / *(U)ASE Self Protection Optimization* | Project (Number/Name)<br>3308 / *Technology Development* | |

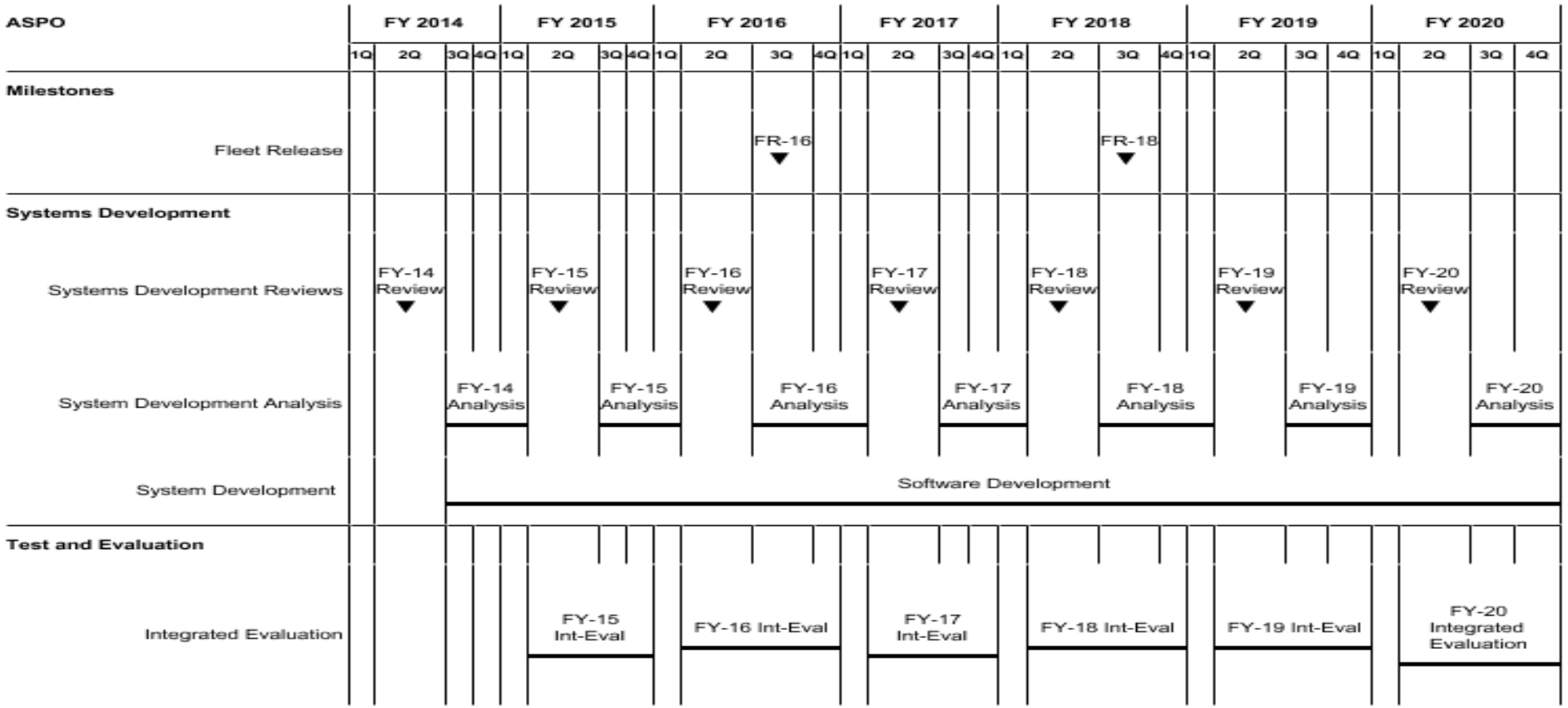
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | NAWCAD : Pax River, MD | 0.000 | - | | 0.050 | Oct 2014 | 0.050 | Oct 2015 | - | | 0.050 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 0.050 | | 0.050 | | - | | 0.050 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1.324 | 0.080 | | 1.498 | | 2.438 | | - | | 2.438 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3308 / *Technology Development* |




*2016PB - 0604279N - 3308*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3308 / *Technology Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***ASPO*** | | | | |
| Milestones: Fleet Release: Fleet Release - 16 | 3 | 2016 | 3 | 2016 |
| Milestones: Fleet Release: Fleet Release - 18 | 3 | 2018 | 3 | 2018 |
| Systems Development: Systems Development Reviews: FY-14 Review | 2 | 2014 | 2 | 2014 |
| Systems Development: Systems Development Reviews: FY-15 Review | 2 | 2015 | 2 | 2015 |
| Systems Development: Systems Development Reviews: FY-16 Review | 2 | 2016 | 2 | 2016 |
| Systems Development: Systems Development Reviews: FY-17 Review | 2 | 2017 | 2 | 2017 |
| Systems Development: Systems Development Reviews: FY-18 Review | 2 | 2018 | 2 | 2018 |
| Systems Development: Systems Development Reviews: FY-19 Review | 2 | 2019 | 2 | 2019 |
| Systems Development: Systems Development Reviews: FY-20 Review | 2 | 2020 | 2 | 2020 |
| Systems Development: System Development Analysis: FY-14 Analysis | 3 | 2014 | 1 | 2015 |
| Systems Development: System Development Analysis: FY-15 Analysis | 3 | 2015 | 1 | 2016 |
| Systems Development: System Development Analysis: FY-16 Analysis | 3 | 2016 | 1 | 2017 |
| Systems Development: System Development Analysis: FY-17 Analysis | 3 | 2017 | 1 | 2018 |
| Systems Development: System Development Analysis: FY-18 Analysis | 3 | 2018 | 1 | 2019 |
| Systems Development: System Development Analysis: FY-19 Analysis | 3 | 2019 | 4 | 2019 |
| Systems Development: System Development Analysis: FY-20 Analysis | 3 | 2020 | 4 | 2020 |
| Systems Development: System Development: Software Development | 3 | 2014 | 4 | 2020 |
| Test and Evaluation: Integrated Evaluation: FY-15 Integrated Evaluation | 2 | 2015 | 4 | 2015 |
| Test and Evaluation: Integrated Evaluation: FY-16 Integrated Evaluation | 2 | 2016 | 4 | 2016 |
| Test and Evaluation: Integrated Evaluation: FY-17 Integrated Evaluation | 2 | 2017 | 4 | 2017 |
| Test and Evaluation: Integrated Evaluation: FY-18 Integrated Evaluation | 2 | 2018 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3308 / *Technology Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test and Evaluation: Integrated Evaluation: FY-19 Integrated Evaluation | 2 | 2019 | 4 | 2019 |
| Test and Evaluation: Integrated Evaluation: FY-20 Integrated Evaluation | 2 | 2020 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604279N / *(U)ASE Self Protection Optimization* | Project (Number/Name)<br>3309 / *Assault Survivability Optimization* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3309: *Assault Survivability Optimization* | 11.297 | 0.089 | 2.423 | 5.436 | - | 5.436 | 3.586 | 0.889 | 0.877 | 0.880 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | 1,500 | - | 1,500 | - | - | - | - | | |

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

This project funds the development, testing, and rapid fielding of advanced countermeasures and enhanced employment techniques needed to support current and future operations for USN and USMC aircraft. Incorporates capability advancements in Aircraft Survivability Equipment (ASE) and expendable countermeasures to develop and deploy countermeasure responses resulting in increased platform survivability. Resources will be applied to the following areas: 1) studies and evaluations to optimize current countermeasures and ASE capabilities, 2) development and demonstration of advanced expendable countermeasures and countermeasure techniques, 3) testing and evaluation of advanced countermeasures, 4) development of system software for the testing and deployment of advanced countermeasure techniques, and 5) development of and upgrades to modeling tools and specialized equipment required to conduct evaluation of advanced countermeasures.

FY16 flight test effectiveness testing to be conducted using Non-Combat Expenditure Allowance (NCEA) of current countermeasures. Advanced countermeasures procured in FY16 will support flight test for optimized/advanced countermeasures techniques in FY17. The quantity is required by Air Expendable Countermeasures Test and Evaluation Master Plan #1480 to complete the flight testing for test Mission Data Files (MDF) and optimized/advanced countermeasures techniques.

(RDT&E Articles are advanced air expendable countermeasures.)

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Analysis and Development of Advanced Countermeasures and Countermeasure Techniques | 0.089 | 2.423 | 5.436 | - | 5.436 |
| ***Articles:*** | - | - | 1,500 | - | 1,500 |
| ***FY 2014 Accomplishments:***<br>Performed modeling, simulation and integration for advanced countermeasure measurement equipment. | | | | | |
| ***FY 2015 Plans:***<br>Conduct modeling and simulation, develop countermeasure techniques and perform flight effectiveness for evaluation of advanced countermeasures. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Continue development and testing of advanced countermeasure techniques and upgrade specialized evaluation equipment for advancing threat systems. 1,500 test articles procured in FY16 are advanced expendable countermeasures for flight effectives testing /optimization flight tests in FY17.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.089 | 2.423 | 5.436 | - | 5.436 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

During the FY15 budget cycle OPNAV N98 performed zero sum realignment from PANMC PE 0204162N BLI 0182 to Assault Survivability Optimization PE 0604279N PU 3309: FY15 $5.4M, FY16 $5.3M, FY17 $3.4M, FY18 $0.7M, FY19 $0.7M and FY20 $0.7M. The reason for this realignment was demonstrated return on investment during Helo Survivability Task Force funded efforts during FY11 and FY12. Strategy will continue to: leverage improvements in air expendable countermeasures technology and in Aircraft Survivability Equipment (ASE) integration to enhance platform survivability on USN and USMC platforms through more effective dispense techniques, invest in enhancements to modeling and simulation tools to better evaluate countermeasure effectiveness, upgrade test and evaluation equipment to incorporate current and future threats for effectiveness tests and develop and demonstrate advanced concept countermeasures for future threats. Advanced countermeasures procured in FY16 will support flight test for optimized/advanced countermeasure techniques in FY17. R-3 cost analysis and R-4 schedule updated from PB15 budget submission to leverage modeling and simulation and enhanced test capability in order to counter new and emerging threats. New advanced countermeasures are transitioned to PANMC PE 0204162N for procurement and fielding. New optimized and advanced countermeasure techniques are delivered to government software support activities for fleet release to increase aircraft/aircrew survivability.

**E. Performance Metrics**

Maintain Air Expendable Countermeasures (AECM) ORD: #512-88-89 dated 28 May 99 requirement to provide operationally effective mixture of countermeasures that can be employed to degrade and/or neutralize the effectiveness of current and projected threats at or above aircraft key performance parameters for survivability. Continued development of optimized/advanced countermeasure techniques and advance countermeasures by ongoing analysis and test flight efforts related to aircraft platform survivability based on threat development and proliferation.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Expendable Countermeasure Technique Modeling and Simulation | WR | NSWC CRANE : Crane, IN | 5.819 | 0.089 | Oct 2013 | 1.475 | Nov 2014 | 1.746 | Nov 2015 | - | | 1.746 | Continuing | Continuing | Continuing |
| Expendable Countermeasure Technique Modeling and Simulation | SS/CPFF | Georgia Tech Research Institute : Atlanta, GA | 0.000 | - | | - | | 0.100 | Dec 2015 | - | | 0.100 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 5.819 | 0.089 | | 1.475 | | 1.846 | | - | | 1.846 | - | - | - |

**Remarks**

Modeling and simulation to develop advanced countermeasure techniques prior to flight test.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Mission Data File Software Development | WR | FRCSE : Jacksonville, FL | 0.585 | - | | 0.200 | Jan 2015 | 0.360 | Nov 2015 | - | | 0.360 | Continuing | Continuing | Continuing |
| Prior year Support costs no longer funded in the FYDP | Various | Various : Various | 2.610 | - | | - | | - | | - | | - | - | 2.610 | - |
| | | **Subtotal** | 3.195 | - | | 0.200 | | 0.360 | | - | | 0.360 | - | - | - |

**Remarks**

Software development to create Mission Data Files (MDF) and enhanced operational flight program algorithms for flight effectiveness testing.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental T&E Flight Tests | WR | Various : Various | 0.000 | - | | 0.748 | Apr 2015 | 0.800 | Nov 2015 | - | | 0.800 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **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 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Advanced Countermeasures for Flight Tests | SS/FP | Esterline Inc. : Camden AR | 0.000 | - | | - | | 0.419 | Mar 2016 | - | | 0.419 | Continuing | Continuing | Continuing |
| Engineering and Evaluation for Technology Insertion | WR | NAWCWD : China Lake, CA | 0.000 | - | | - | | 0.231 | Oct 2015 | - | | 0.231 | Continuing | Continuing | Continuing |
| Prior year T&E no longer funded in the FYDP | Various | Various : Various | 2.283 | - | | - | | - | | - | | - | - | 2.283 | - |
| Seeker Test Van Advanced Threat Capability | TBD | TBD : TBD | 0.000 | - | | - | | 1.680 | Jan 2016 | - | | 1.680 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.283 | - | | 0.748 | | 3.130 | | - | | 3.130 | - | - | - |

**Remarks**

Developmental T&E flight test following modeling and simulation evaluation in FY15 are at Eglin AFB (May/September 2015 for UH-1Y, MH-60R and CH-53E) and Edwards AFB (July 2015 for F/A-18E/F). FY15 Congressional mark delays advanced countermeasure procurement until FY16 and flight effectiveness testing/optimization of advanced countermeasures until FY17. FY15 flight effectiveness testing to be performed utilizing Non-Combat Expenditure Allowance (NCEA) of current countermeasures. Advanced expendable countermeasures procured in FY16 will support flight effectives testing /optimization flight tests in FY17. FY15 Seeker Test Van (STV) advanced threat capability item was eliminated due to congressional marks thereby delaying critical threat capability upgrades to Smart Dispense Van (SDV), STV, and Expeditionary Smart Dispense Van (ESDV). Equipment procurement required to evaluate advanced countermeasure techniques and integrate new threat systems into SDV, STV, and ESDV for evaluation capability will commence in FY16.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | FRCSE : Jacksonville, FL | 0.000 | - | | - | | 0.010 | Oct 2015 | - | | 0.010 | Continuing | Continuing | Continuing |
| Project Management | WR | FRCSE : Jacksonville, FL | 0.000 | - | | - | | 0.090 | Nov 2015 | - | | 0.090 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | - | | 0.100 | | - | | 0.100 | - | - | - |

**Remarks**

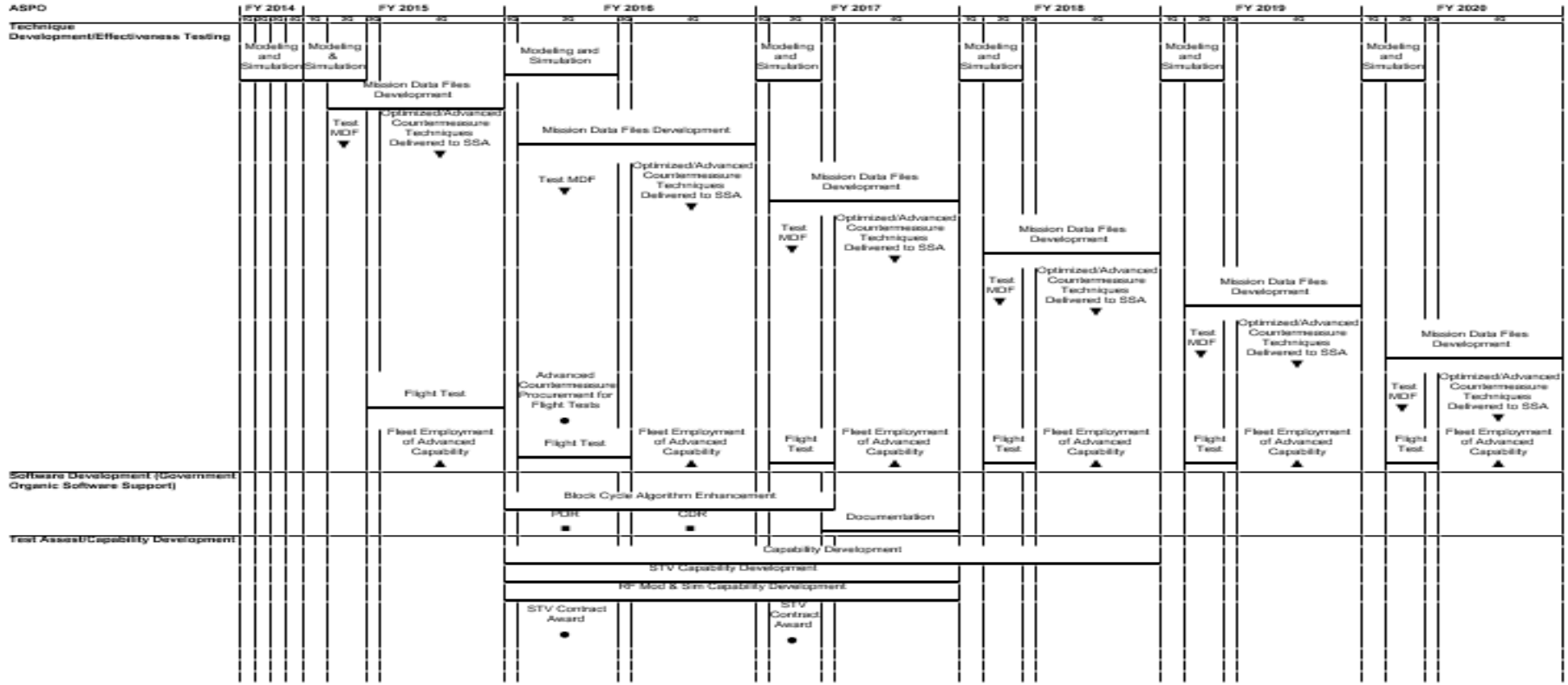
Travel reduced. Project management line added from previous budget submission to coordinate increased development activities.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604279N / *(U)ASE Self Protection Optimization* | Project (Number/Name)<br>3309 / *Assault Survivability Optimization* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 11.297 | 0.089 | | 2.423 | | 5.436 | | - | | 5.436 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***ASPO*** | | | | |
| Technique Development/Effectiveness Testing: FY14 Modeling and Simulation | 1 | 2014 | 4 | 2014 |
| Technique Development/Effectiveness Testing: FY15 Modeling and Simulation | 1 | 2015 | 2 | 2015 |
| Technique Development/Effectiveness Testing: FY16 Modeling and Simulation | 1 | 2016 | 2 | 2016 |
| Technique Development/Effectiveness Testing: FY17 Modeling and Simulation | 1 | 2017 | 2 | 2017 |
| Technique Development/Effectiveness Testing: FY18 Modeling and Simulation | 1 | 2018 | 2 | 2018 |
| Technique Development/Effectiveness Testing: FY19 Modeling and Simulation | 1 | 2019 | 2 | 2019 |
| Technique Development/Effectiveness Testing: FY20 Modeling and Simulation | 1 | 2020 | 2 | 2020 |
| Technique Development/Effectiveness Testing: FY15 Mission Data Files (MDF) Development | 2 | 2015 | 4 | 2015 |
| Technique Development/Effectiveness Testing: FY15 Test MDF | 2 | 2015 | 2 | 2015 |
| Technique Development/Effectiveness Testing: FY15 Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity (SSA) for fleet release | 4 | 2015 | 4 | 2015 |
| Technique Development/Effectiveness Testing: FY16 Mission Data Files Development | 2 | 2016 | 4 | 2016 |
| Technique Development/Effectiveness Testing: FY16 Test MDF | 2 | 2016 | 2 | 2016 |
| Technique Development/Effectiveness Testing: FY16 Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity (SSA) for fleet release | 4 | 2016 | 4 | 2016 |
| Technique Development/Effectiveness Testing: FY17 Mission Data Files Development | 2 | 2017 | 4 | 2017 |
| Technique Development/Effectiveness Testing: FY17 Test MDF | 2 | 2017 | 2 | 2017 |
| Technique Development/Effectiveness Testing: FY17 Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity (SSA) for fleet release | 4 | 2017 | 4 | 2017 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Technique Development/Effectiveness Testing: FY18 Mission Data Files Development | 2 | 2018 | 4 | 2018 |
| Technique Development/Effectiveness Testing: FY18 Test MDF | 2 | 2018 | 2 | 2018 |
| Technique Development/Effectiveness Testing: FY18 Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity (SSA) for fleet release | 4 | 2018 | 4 | 2018 |
| Technique Development/Effectiveness Testing: FY19 Mission Data Files Development | 2 | 2019 | 4 | 2019 |
| Technique Development/Effectiveness Testing: FY19 Test MDF | 2 | 2019 | 2 | 2019 |
| Technique Development/Effectiveness Testing: FY19 Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity (SSA) for fleet release | 4 | 2019 | 4 | 2019 |
| Technique Development/Effectiveness Testing: FY20 Mission Data Files Development | 2 | 2020 | 4 | 2020 |
| Technique Development/Effectiveness Testing: FY20 Test MDF | 2 | 2020 | 2 | 2020 |
| Technique Development/Effectiveness Testing: FY20 Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity (SSA) for fleet release | 4 | 2020 | 4 | 2020 |
| Technique Development/Effectiveness Testing: Advanced Countermeasure Procurement for Flight Tests | 2 | 2016 | 2 | 2016 |
| Technique Development/Effectiveness Testing: FY15 Flight Test | 3 | 2015 | 4 | 2015 |
| Technique Development/Effectiveness Testing: FY16 Flight Test | 2 | 2016 | 3 | 2016 |
| Technique Development/Effectiveness Testing: FY17 Flight Test | 2 | 2017 | 3 | 2017 |
| Technique Development/Effectiveness Testing: FY18 Flight Test | 2 | 2018 | 3 | 2018 |
| Technique Development/Effectiveness Testing: FY19 Flight Test | 2 | 2019 | 3 | 2019 |
| Technique Development/Effectiveness Testing: FY20 Flight Test | 2 | 2020 | 3 | 2020 |
| Technique Development/Effectiveness Testing: FY15 Fleet Employment of Advanced Capability | 4 | 2015 | 4 | 2015 |
| Technique Development/Effectiveness Testing: FY16 Fleet Employment of Advanced Capability | 4 | 2016 | 4 | 2016 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604279N / *(U)ASE Self Protection Optimization* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Technique Development/Effectiveness Testing: FY17 Fleet Employment of Advanced Capability | 4 | 2017 | 4 | 2017 |
| Technique Development/Effectiveness Testing: FY18 Fleet Employment of Advanced Capability | 4 | 2018 | 4 | 2018 |
| Technique Development/Effectiveness Testing: FY19 Fleet Employment of Advanced Capability | 4 | 2019 | 4 | 2019 |
| Technique Development/Effectiveness Testing: FY20 Fleet Employment of Advanced Capability | 4 | 2020 | 4 | 2020 |
| Software Development (Government Organic Software Support): Block Cycle 10 Algorithm Enhancement | 1 | 2016 | 3 | 2017 |
| Software Development (Government Organic Software Support): PDR | 2 | 2016 | 2 | 2016 |
| Software Development (Government Organic Software Support): CDR | 4 | 2016 | 4 | 2016 |
| Software Development (Government Organic Software Support): Documentation | 3 | 2017 | 4 | 2017 |
| Test Assest/Capability Development: SDV/ESDV Capability Development | 1 | 2016 | 4 | 2018 |
| Test Assest/Capability Development: STV Capability Development | 1 | 2016 | 4 | 2017 |
| Test Assest/Capability Development: RF Mod & Sim Capability Development | 1 | 2016 | 4 | 2017 |
| Test Assest/Capability Development: FY16 STV Contract Award | 2 | 2016 | 2 | 2016 |
| Test Assest/Capability Development: FY17 STV Contract Award | 2 | 2017 | 2 | 2017 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604292N / *MH-XX* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | - | 3.055 | 5.298 | - | 5.298 | 1.715 | 1.616 | 1.655 | 1.690 | Continuing | Continuing |
| 2934: *MH-XX* | 0.000 | - | 3.055 | 5.298 | - | 5.298 | 1.715 | 1.616 | 1.655 | 1.690 | Continuing | Continuing |

**Note**

Proj: 2934 MH-XX has been moved from 0604212N per request of congress.

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

The MH-XX project directs Naval Aviation developmental activities in support of the replacement of the Navy H-60 series helicopters, multi-mission medium lift helicopter capability, in the 2028 timeframe. These aircraft will be used extensively to protect Joint assets from airborne, surface, and sub-surface threats. Other supported mission areas will include Combat Search and Rescue, Naval Special Warfare, Humanitarian Assistance/Disaster Relief, Logistics, and Medical Evacuation. Specific developmental activities will include: capability requirements definition supporting Initial Capabilities Document (ICD) approval; support to the Joint Multi-Role Technology Demonstrator (JMR TD) to explore key maritime enablers including Future Airborne Capability Environment (FACE), mission system interoperability, and shipboard compatibility; and affordability studies. These activities will result in completion of all pre-system acquisition documentation required for a Material Development Decision in first quarter FY 2017. These efforts will enable timely development of a system which provides best value to the Joint Warfighter and Naval Aviation while maintaining effective and efficient war fighting capability in support of the Navy's 30-year Aviation Plan.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | - | - | - | - | - |
| Current President's Budget | - | 3.055 | 5.298 | - | 5.298 |
| Total Adjustments | - | 3.055 | 5.298 | - | 5.298 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | 3.055 | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Rate/Misc Adjustments | - | - | 5.298 | - | 5.298 |

**Change Summary Explanation**

Technical: Not applicable.
Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604292N / *MH-XX* | Project (Number/Name)<br>2934 / *MH-XX* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2934: *MH-XX* | - | - | 3.055 | 5.298 | - | 5.298 | 1.715 | 1.616 | 1.655 | 1.690 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The MH-XX project directs Naval Aviation developmental activities in support of the replacement of the Navy H-60 series helicopters, multi-mission medium lift helicopter capability, in the 2028 timeframe. These aircraft will be used extensively to protect Joint assets from airborne, surface, and sub-surface threats. Other supported mission areas will include Combat Search and Rescue, Naval Special Warfare, Humanitarian Assistance/Disaster Relief, Logistics, and Medical Evacuation. Specific developmental activities will include: capability requirements definition supporting Initial Capabilities Document (ICD) approval; support to the Joint Multi-Role Technology Demonstrator (JMR TD) to explore key maritime enablers including Future Airborne Capability Environment (FACE), mission system interoperability, and shipboard compatibility; and affordability studies. These activities will result in completion of all pre-system acquisition documentation required for a Material Development Decision in first quarter FY 2017. These efforts will enable timely development of a system which provides best value to the Joint Warfighter and Naval Aviation while maintaining effective and efficient war fighting capability in support of the Navy's 30-year Aviation Plan.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** MH-XX Development Engineering Support | - | 3.055 | 5.298 | - | 5.298 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>Continue modeling and simulation; provide support for developmental activities which include capability requirements definition and development of the Initial Capabilities Document, Analysis of Alternatives (AOA) Study Guidance and AOA Study Plan. | | | | | |
| ***FY 2016 Base Plans:***<br>Support to the Joint Multi-Role Technology Demonstrator (JMR TD) program to identify key maritime technologies; completion of pre-system acquisition activities which include Joint Requirement Capabilities Board (JROC) approval of the Initial Capabilities Document and Cost Assessment and Program Evaluation (CAPE) | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604292N / *MH-XX* | **Project (Number/Name)**<br>2934 / *MH-XX* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| approval of the Analysis of Alternatives (AOA) Study Guidance and AOA Study Plan leading to a Material Development Decision in 1QTR FY17.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 3.055 | 5.298 | - | 5.298 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Provide research and development support for Pre-Milestone A activities, predominantly government, to enable replacement of the Navy H-60 series helicopters, multi-mission medium lift helicopter capability, in the 2028 timeframe.

**E. Performance Metrics**

Completion of Capability Requirements and Milestone Documentation.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604292N / *MH-XX* | Project (Number/Name)<br>2934 / *MH-XX* | |

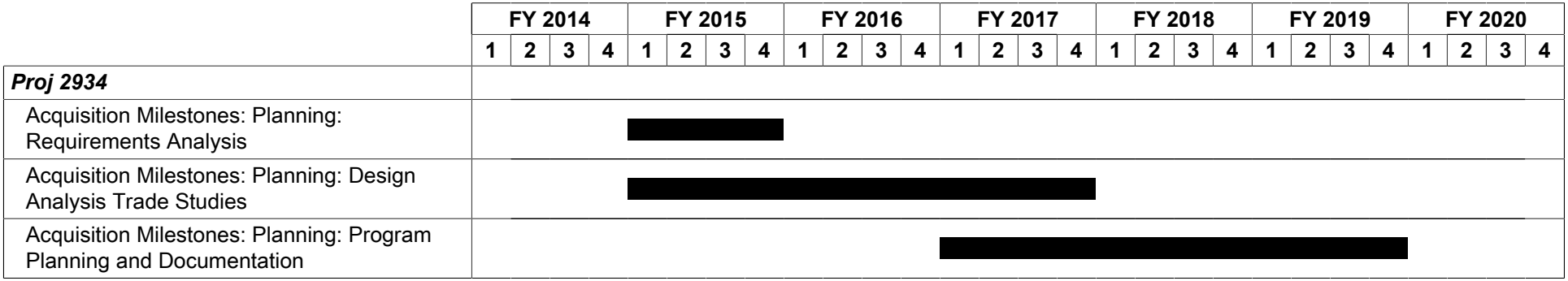
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gov't Engineering Support | WR | NAWCAD : Patuxent River, MD | 0.000 | - | | 1.111 | Feb 2015 | 2.270 | Nov 2015 | - | | 2.270 | Continuing | Continuing | Continuing |
| Contractor Engineering Support | TBD | Various : Patuxent River, MD | 0.000 | - | | 1.450 | Mar 2015 | 1.744 | Dec 2015 | - | | 1.744 | Continuing | Continuing | Continuing |
| Program Management | WR | NAWCAD : Patuxent River, MD | 0.000 | - | | 0.444 | Feb 2015 | 1.244 | Nov 2015 | - | | 1.244 | Continuing | Continuing | Continuing |
| Travel | Various | Various : Various | 0.000 | - | | 0.050 | Jan 2015 | 0.040 | Oct 2015 | - | | 0.040 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 3.055 | | 5.298 | | - | | 5.298 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 3.055 | | 5.298 | | - | | 5.298 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604292N / *MH-XX* | **Project (Number/Name)**<br>2934 / *MH-XX* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604292N / *MH-XX* | **Project (Number/Name)**<br>2934 / *MH-XX* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2934*** | | | | |
| Acquisition Milestones: Planning: Requirements Analysis | 1 | 2015 | 4 | 2015 |
| Acquisition Milestones: Planning: Design Analysis Trade Studies | 1 | 2015 | 4 | 2017 |
| Acquisition Milestones: Planning: Program Planning and Documentation | 1 | 2017 | 4 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604454N *I (U)LX (R)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | - | 36.859 | 46.486 | - | 46.486 | 28.690 | 12.410 | 9.470 | 9.703 | Continuing | Continuing |
| 2474: *LX(R) Design & Total Ship Integration* | 0.000 | - | 36.859 | 46.486 | - | 46.486 | 28.690 | 12.410 | 9.470 | 9.703 | Continuing | Continuing |
| **MDAP/MAIS Code:** 461 | | | | | | | | | | | | |

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

2474 - LX(R) is expected to functionally replace LSD-41 Class ships and LSD-49 Class ships for embark, transport, control, insert, sustainment, and extract of Marine Air-Ground Task Force elements and supporting forces by helicopters, landing craft, and amphibious vehicles. Efforts are required to identify viable alternatives, including examining a reduced cost variant of LPD-17 Class. Efforts include all Gate and Milestone (MS) documentation, Capabilities Development Documentation (CDD), Indicative/Preliminary/Contract Design (ID/PD/CD), and development of all logistics and Test & Evaluation documentation. Program is on track to support FY26 retirement of LSDs.

FY12-FY14 LX(R) efforts previously budgeted in PE 0603564N.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | - | 36.859 | 56.901 | - | 56.901 |
| Current President's Budget | - | 36.859 | 46.486 | - | 46.486 |
| Total Adjustments | - | - | -10.415 | - | -10.415 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | - | - | -10.000 | - | -10.000 |
| • Rate/Misc Adjustments | - | - | -0.415 | - | -0.415 |

**Change Summary Explanation**

FY 2016 changes reflect program pricing and rate/misc adjustments.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604454N / *(U)LX (R)* | Project (Number/Name)<br>2474 / *LX(R) Design & Total Ship Integration* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2474: *LX(R) Design & Total Ship Integration* | - | - | 36.859 | 46.486 | - | 46.486 | 28.690 | 12.410 | 9.470 | 9.703 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

2474 - LX(R) is expected to functionally replace LSD-41 Class ships and LSD-49 Class ships for embark, transport, control, insert, sustainment, and extract of Marine Air-Ground Task Force elements and supporting forces by helicopters, landing craft, and amphibious vehicles. Efforts are required to identify viable alternatives, including examining a reduced cost variant of LPD-17 Class. Efforts include all Gate and Milestone (MS) documentation, Capabilities Development Documentation (CDD), Indicative/Preliminary/Contract Design (ID/PD/CD), and development of all logistics and Test & Evaluation documentation. Program is on track to support FY26 retirement of LSDs. Previously, LX(R) efforts, in FY12-FY14, were budgeted in PE 0603564N.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** LX(R) DESIGN/TOTAL SHIP INTEGRATION | - | 36.859 | 46.486 | - | 46.486 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>The concept design will transition into Preliminary Design where systems are distributed and equipment and topside arrangements are identified. Core design team members will be collocated to improve communication and enhance efficiency, as the level of participation from shipbuilders, ship design agents, Naval Warfare Centers, PEO C4I, PEO IWS, NAVAIR, and Marine Corps intensifies. Acquisition and life cycle affordability trade-off analysis studies will continue as the design is developed to meet the draft Capabilities Development Document (CDD). A Milestone A decision or DAE Review will be achieved. The Navy will carry one concept coming out of the Gate 2 (Dec 18, 2014). SECNAV, CNO, CMC, and ASNRD&A determined that a derivative of the LPD 17 Hull form is the preferred alternative to meet LX(R) operational requirements (Decision Memo Oct 14, 2014). There is a significant level of planning and design maturation required to support a Milestone A or DAE Review, including the Acquisition Strategy (AS), Engineering Management Plan (EMP), Test and Evaluation Master Plan (TEMP) and a sustainment strategy. The Capabilities Development Document (CDD) will be submitted for Navy approval and Joint Requirements Oversight Council (JROC) approval. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604454N / *(U)LX (R)* | **Project (Number/Name)**<br>2474 / *LX(R) Design & Total Ship Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Transitioning from Preliminary Design into Contract Design, requires sub system level of detail and most significantly a design that supports the development of a specification for a Gate 4, Requirement Decision Point (RDP), and System Functional Review (SFR). As a planned ACAT 1 program, the design development phase requires the stand up and frequent meeting/support to OSD Integrated Product Teams including systems engineering, acquisition, test, logistics and cost in preparation for MS B. The Capabilities Development Document (CDD) will be approved by the Requirements Oversight Council (JROC) in early FY 2016, which will further inform the development of the ship specification. The contract design effort will explore innovative and cost saving concepts such as flexible infrastructure, incorporation of commonality products, and a common design environment. Continue participation by Shipbuilders to support affordability trade-offs and informing a producible design. Milestone B documents will be developed and refined.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | 36.859 | 46.486 | - | 46.486 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0603564N: *Amphibious Ship Replacement LX(R)* | 15.356 | - | - | - | - | - | - | - | - | - | 23.279 |
| • SCN/3010: *Amphibious Ship Replacement LX(R)* | - | - | - | - | - | - | - | 170.751 | 1,624.107 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Predecisional, expect competition will be part of the acquisition strategy after MS A or DAE Review.

**E. Performance Metrics**

Predecisional, performance metrics will be developed in parallel with the CDD.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604454N / *(U)LX (R)* | Project (Number/Name)<br>2474 / *LX(R) Design & Total Ship Integration* | |

**Product Development ($ in Millions)**

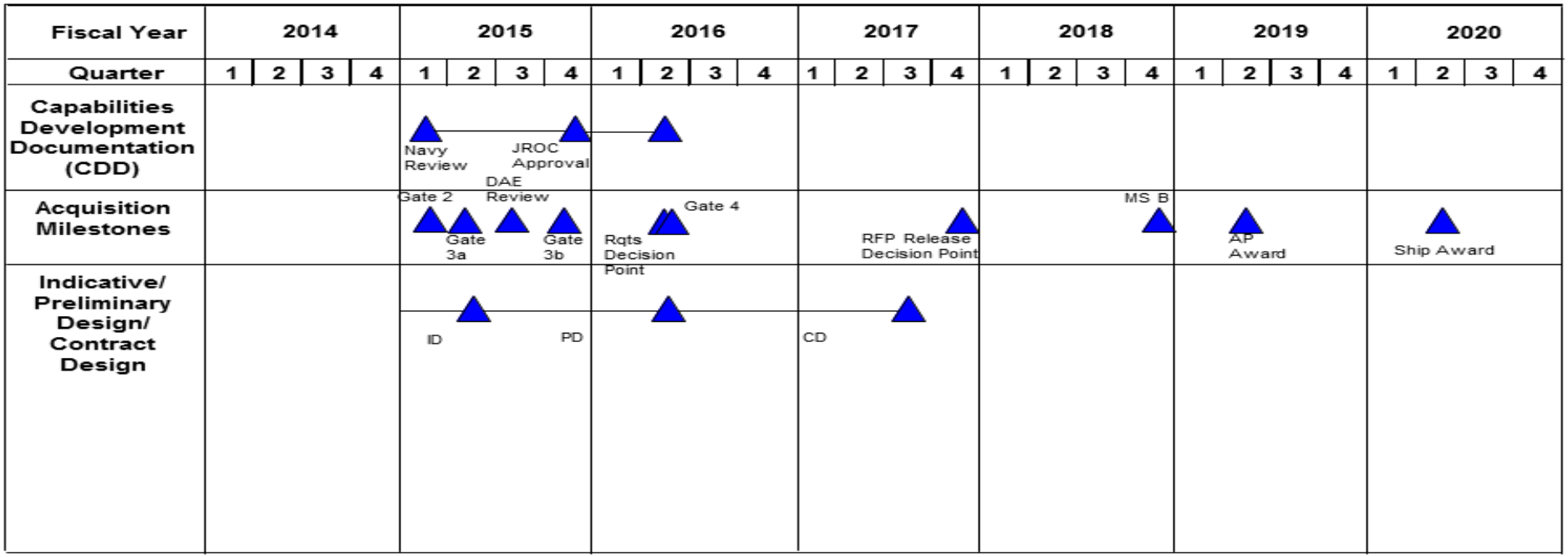
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Systems Integration | C/CPIF | CSC, Alion, ICI : Washington, DC | 0.000 | - | | 12.269 | Jan 2015 | 17.857 | Dec 2015 | - | | 17.857 | Continuing | Continuing | Continuing |
| Design/Systems Integration | WR | NSWC Carderock : NSWC Beth, MD | 0.000 | - | | 6.082 | Jan 2015 | 8.308 | Nov 2015 | - | | 8.308 | Continuing | Continuing | Continuing |
| Design/Systems Integration | WR | NSWC Dahlgren : Dahlgren, VA | 0.000 | - | | 1.497 | Jan 2015 | 0.602 | Nov 2015 | - | | 0.602 | Continuing | Continuing | Continuing |
| Design/Systems Integration | WR | PEO C4I, PEO IWS : Washington, DC | 0.000 | - | | 4.287 | Jan 2015 | 5.544 | Nov 2015 | - | | 5.544 | Continuing | Continuing | Continuing |
| Design/Systems Integration | WR | NAWC Lakehurst : Lakehurst, NJ | 0.000 | - | | 0.761 | Jan 2015 | 1.057 | Nov 2015 | - | | 1.057 | Continuing | Continuing | Continuing |
| Design/Systems Integration | C/BA | NSWC, Panama City : Panama City, FL | 0.000 | - | | 0.483 | Jan 2015 | 0.617 | Nov 2015 | - | | 0.617 | - | 1.100 | - |
| Design/Systems Integration | WR | NSWC, Port Hueneme : Port Hueneme, CA | 0.000 | - | | 0.360 | Jan 2015 | 0.576 | Nov 2015 | - | | 0.576 | Continuing | Continuing | Continuing |
| Design/Systems Integration | C/CPFF | HII, General Dynamics : Various | 0.000 | - | | 11.120 | Feb 2015 | 11.925 | Dec 2015 | - | | 11.925 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | - | | 36.859 | | 46.486 | | - | | 46.486 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | 36.859 | | 46.486 | | - | | 46.486 | - | - | - |

**Remarks**

*The growth in the LX (R) program from FY15 to FY16 is driven by the transition from Preliminary Design (PD) to Contract Design (CD) efforts. CD efforts translate the engineering findings and decisions from the PD into a biddable technical package, including specifications and contract/guidance drawings, which will allow the shipbuilders to develop competitive bids once the Request for Proposal (RFP) is released. Additionally, the FY16 Product Development funds will support the Test & Evaluation planning efforts needed in order to meet an Early Operational Assessment and Live Fire Evaluation in FY17.

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604454N / *(U)LX (R)* | **Project (Number/Name)**<br>2474 / *LX(R) Design & Total Ship Integration* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604454N / *(U)LX (R)* | **Project (Number/Name)**<br>2474 / *LX(R) Design & Total Ship Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2474*** | | | | |
| Capabilities Development Documentation (CDD) | 1 | 2015 | 2 | 2016 |
| Joint Requirements Oversight Council (JROC) CDD Approval | 4 | 2015 | 2 | 2016 |
| Gate 2 | 1 | 2015 | 1 | 2015 |
| Gate 3a | 2 | 2015 | 2 | 2015 |
| DAE Review | 3 | 2015 | 3 | 2015 |
| Gate 3b | 4 | 2015 | 4 | 2015 |
| Indicative/Preliminary Design/Contract Design | 1 | 2015 | 3 | 2017 |
| Requirements Decision Point (RDP) | 2 | 2016 | 2 | 2016 |
| Gate 4 | 2 | 2016 | 2 | 2016 |
| RFP Release Decision Point | 4 | 2017 | 4 | 2017 |
| Milestone B | 4 | 2018 | 4 | 2018 |
| Ship Award | 2 | 2020 | 2 | 2020 |
| AP Award | 2 | 2019 | 2 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604653N *I JT Cntr Radio Controlled IED Elec War (JCREW)* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 214.562 | 15.582 | 15.197 | 3.817 | - | 3.817 | 5.444 | 5.311 | 5.115 | 5.217 | Continuing | Continuing |
| 3177: *Joint Counter Radio-Controlled IED Elec Warfare* | 214.562 | 15.582 | 15.197 | 3.817 | - | 3.817 | 5.444 | 5.311 | 5.115 | 5.217 | Continuing | Continuing |

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

Provides for the research and development of EW systems, equipment, procedures, and tactical aids for all military services against the threat posed by Radio-Controlled Improvised Explosive Devices (RCIEDs) and to prevent initiation of RCIEDs across the spectrum of Joint military operations. Utilize Joint requirements to provide a system of systems approach for a suite of equipment for mounted, dismounted, and fixed site operations; provide Joint CREW development of equipment, procedures, and tactical aids to make rapid improvements to performance, supportability and affordability, while maintaining pace with a migrating global threat.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 15.874 | 15.227 | 4.790 | - | 4.790 |
| Current President's Budget | 15.582 | 15.197 | 3.817 | - | 3.817 |
| Total Adjustments | -0.292 | -0.030 | -0.973 | - | -0.973 |
| • Congressional General Reductions | - | -0.030 | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.292 | - | | | |
| • Rate/Misc Adjustments | - | - | -0.973 | - | -0.973 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $1 million to account for the availability of prior year execution balances.

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604653N / *JT Cntr Radio Controlled IED Elec War (JCREW)* | Project (Number/Name)<br>3177 / *Joint Counter Radio-Controlled IED Elec Warfare* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3177: *Joint Counter Radio-Controlled IED Elec Warfare* | 214.562 | 15.582 | 15.197 | 3.817 | - | 3.817 | 5.444 | 5.311 | 5.115 | 5.217 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Provides for the research and development of EW systems, equipment, procedures, and tactical aids for all military services against the threat posed by Radio-Controlled Improvised Explosive Devices (RCIEDs) and to prevent initiation of RCIEDs across the spectrum of Joint military operations. Utilizes Joint requirements to provide a System of Systems (SoS) approach for a suite of equipment for mounted, dismounted, and fixed site operations; provides for Joint Counter Radio Controlled Improvised Explosive Device Electronic Warfare (JCREW) system development and equipment, procedures, and tactical aids to make rapid improvements to performance, supportability and affordability, while maintaining pace with a migrating global threat.

The JCREW system, increment 1 block 1 (I1B1) is the next generation of counter RCIED systems. This family of systems includes fixed site, mounted and dismounted units, which provide countermeasures against the global RCIED threat. Key system design features include significant performance increases over current legacy systems, a modular open-architecture system to address current and future advanced threats, robust information assurance and security, and is net-capable for improved C2. JCREW I1B1 supports global deployment and sustainment for all combatant commands providing increased protection to Warfighter against the evolving worldwide RCIED threats.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Joint Counter Radio-Controlled IED Elec Warfare | 15.582 | 15.197 | 3.817 | - | 3.817 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Supports the effort required for the design, engineering, development, fabrication and test of contractor's development models for in-house verification and validation for governmental developmental testing for JCREW System of Systems (SoS) to include the Engineering Manufacturing and Development (EMD) Phase. The JCREW SoS approach includes three distinct capabilities that shall be developed and will utilize common component, software, and hardware solutions for an open, flexible, and compatible system design approach that is modular. These capabilities are: mobile dismounted operations, mobile ground, and waterborne transport and combat systems (mounted) and semi-permanent geographical area (fixed) systems. All capabilities will have coalition sharing capabilities. | | | | | |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604653N / *JT Cntr Radio Controlled IED Elec War (JCREW)* | **Project (Number/Name)**<br>3177 / *Joint Counter Radio-Controlled IED Elec Warfare* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Successfully complete initial delivery of Mounted, Fixed Site, and Dismounted EDM systems to the government with completed Factory Qualification Test (FQT) of hardware, software, and firmware. Complete Government Development Testing. Successfully complete MS C. Initiate productionization effort to prepare for LRIP.<br>***FY 2015 Plans:***<br>Conduct Initial Operational Test and Evaluation (IOT&E) and complete productionization Engineering Change Proposal (ECP).<br>***FY 2016 Base Plans:***<br>Initiate Technology Refresh and transition of technologies developed under ONR Technology Transition Agreements (TTAs).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 15.582 | 15.197 | 3.817 | - | 3.817 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/5509: *Explosive Ordnance Disposal Equip* | 103.930 | 107.466 | 2.929 | - | 2.929 | 0.821 | 0.844 | 0.943 | 0.944 | - | 217.877 |

**Remarks**

**D. Acquisition Strategy**

SDD Phase: Two contractors to CDR - Single contractor CDR to MS C. FY15 LRIP will support IOC, setup and maintain warm Production Line and OEM Depot Line until FRP decision in FY16, FRP Production Line Start Up and Ramp Up and FRP Organic Depot Line Startup and Ramp Up. Spares support and OEM Depot will be utilized during LRIP phase. Establishment of Organic Depot capability during LRIP phase in support of FRP Decision Review with Weapons System Support Center Mechanicsburg as Primary Inventory Control Activity (PICA). Full Rate Production contract will be full and open competition using LRIP final Tech Data Package (TDP) with Government Purpose Rights (GPR).

**E. Performance Metrics**

Gate 6 Milestone B complete 10 Jul 2009; Contract for Preliminary Design Review (PDR) awarded 01 Oct 2009; achieved successful Preliminary Design Reviews (PDRs) April 2010; achieved successful Critical Design Review (CDR) Oct 2012; Milestone C Sep 2014.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604653N / *JT Cntr Radio Controlled IED Elec War (JCREW)* | Project (Number/Name)<br>3177 / *Joint Counter Radio-Controlled IED Elec Warfare* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | Various | Exelis : NJ | 12.137 | - | | - | | - | | - | | - | - | 12.137 | Continuing |
| Software Development | Various | Exelis : NJ | 10.515 | - | | - | | - | | - | | - | - | 10.515 | Continuing |
| Systems Engineering | Various | Exelis : NJ | 7.200 | - | | - | | - | | - | | - | - | 7.200 | Continuing |
| System Integration | Various | Exelis : NJ | 3.965 | - | | - | | - | | - | | - | - | 3.965 | Continuing |
| Primary Hardware Development | Various | NGC : CA | 26.973 | 2.730 | Nov 2013 | 1.015 | Nov 2014 | - | | - | | - | - | 30.718 | Continuing |
| Software Development | Various | NGC : CA | 14.634 | 1.495 | Nov 2013 | 0.505 | Nov 2014 | - | | - | | - | - | 16.634 | Continuing |
| Systems Engineering | Various | NGC : CA | 14.365 | 0.858 | Nov 2013 | 0.379 | Nov 2014 | - | | - | | - | - | 15.602 | Continuing |
| ILS | Various | NGC : CA | 7.029 | 0.597 | Nov 2013 | - | | - | | - | | - | - | 7.626 | Continuing |
| System Integration | Various | NGC : CA | 7.468 | 1.348 | Nov 2013 | 0.468 | Nov 2014 | - | | - | | - | - | 9.284 | Continuing |
| Loadset Development | Various | NGC : CA | 4.822 | 0.460 | Nov 2013 | - | | - | | - | | - | - | 5.282 | Continuing |
| Primary Hardware Development | Various | TBD : TBD | 0.000 | - | | - | | 0.303 | Nov 2015 | - | | 0.303 | - | 0.303 | Continuing |
| Systems Enginnering | Various | TBD : TBD | 0.000 | - | | - | | 0.152 | Nov 2015 | - | | 0.152 | - | 0.152 | Continuing |
| Software Development | Various | TBD : TBD | 0.000 | - | | - | | 0.152 | Nov 2015 | - | | 0.152 | - | 0.152 | Continuing |
| System Integration | Various | TBD : TBD | 0.000 | - | | - | | 0.152 | Nov 2015 | - | | 0.152 | - | 0.152 | Continuing |
| | | **Subtotal** | 109.108 | 7.488 | | 2.367 | | 0.759 | | - | | 0.759 | - | 119.722 | - |

**Remarks**

Contract type is hybrid CPIF and CPAF.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Loadset Development | FFRDC | JHU/APL, MITRE : Laurel, MD | 3.932 | 0.280 | Nov 2013 | 0.922 | Nov 2014 | 0.500 | Nov 2015 | - | | 0.500 | - | 5.634 | Continuing |
| Systems Engineering | WR | NSWC : Various | 5.399 | 0.563 | Nov 2013 | 1.854 | Nov 2014 | 1.606 | Nov 2015 | - | | 1.606 | - | 9.422 | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604653N / *JT Cntr Radio Controlled IED Elec War (JCREW)* | **Project (Number/Name)**<br>3177 / *Joint Counter Radio-Controlled IED Elec Warfare* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | IHEODTD : Indian Head, MD | 12.046 | 0.400 | Nov 2013 | 1.317 | Nov 2014 | 0.431 | Nov 2015 | - | | 0.431 | - | 14.194 | Continuing |
| System Integration | WR | NSWC : Various | 2.093 | 0.220 | Nov 2013 | 0.724 | Nov 2014 | - | | - | | - | - | 3.037 | Continuing |
| Training Development | C/CPFF | SDI, GOV'T SOLUTIONS : LaPlata, MD | 4.403 | - | | - | | - | | - | | - | - | 4.403 | Continuing |
| Integrated Logistics Support | WR | NSWC : Various | 9.832 | 0.600 | Nov 2013 | 1.976 | Nov 2014 | - | | - | | - | - | 12.408 | Continuing |
| Configuration Management | WR | NSWC : Various | 3.791 | 0.180 | Nov 2013 | 0.593 | Nov 2014 | - | | - | | - | - | 4.564 | Continuing |
| Technical Data | WR | NSWC : Various | 5.886 | 0.270 | Nov 2013 | 0.889 | Nov 2014 | - | | - | | - | Continuing | Continuing | Continuing |
| | | **Subtotal** | 47.382 | 2.513 | | 8.275 | | 2.537 | | - | | 2.537 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | WR | NSWC : Various | 29.105 | 4.028 | Nov 2013 | - | Dec 2014 | - | | - | | - | - | 33.133 | Continuing |
| Operational Test & Evaluation | MIPR | Various : Various | 8.154 | 0.521 | Nov 2013 | 3.553 | Dec 2014 | - | | - | | - | - | 12.228 | Continuing |
| | | **Subtotal** | 37.259 | 4.549 | | 3.553 | | - | | - | | - | - | 45.361 | - |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | TBD : TBD | 0.000 | - | | 0.732 | Nov 2014 | 0.250 | Nov 2015 | - | | 0.250 | - | 0.982 | Continuing |
| Program Management Support | C/CPFF | CACI : Fairfax, VA | 15.808 | 0.732 | Nov 2013 | - | Nov 2014 | - | Nov 2015 | - | | - | - | 16.540 | Continuing |
| Miscellaneous | WR | NSWC : Various | 5.005 | 0.300 | Nov 2013 | 0.270 | Nov 2014 | 0.271 | Nov 2015 | - | | 0.271 | - | 5.846 | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604653N / *JT Cntr Radio Controlled IED Elec War (JCREW)* | **Project (Number/Name)**<br>3177 / *Joint Counter Radio-Controlled IED Elec Warfare* |

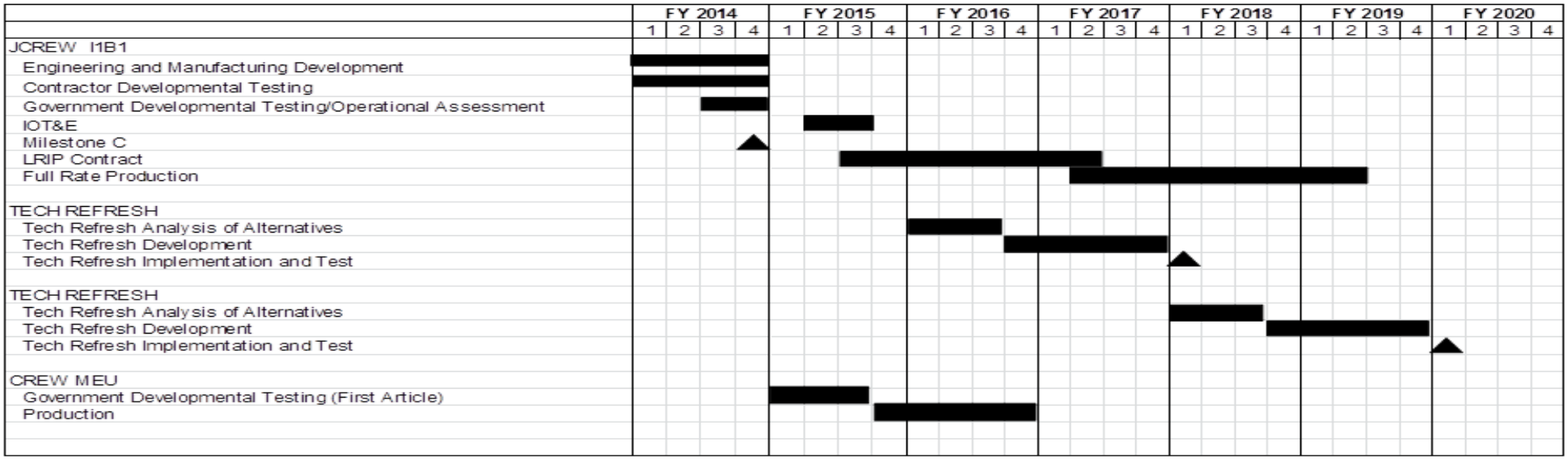
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 20.813 | 1.032 | | 1.002 | | 0.521 | | - | | 0.521 | - | 23.368 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 214.562 | 15.582 | | 15.197 | | 3.817 | | - | | 3.817 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604653N / *JT Cntr Radio Controlled IED Elec War (JCREW)* | **Project (Number/Name)**<br>3177 / *Joint Counter Radio-Controlled IED Elec Warfare* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604653N / *JT Cntr Radio Controlled IED Elec War (JCREW)* | **Project (Number/Name)**<br>3177 / *Joint Counter Radio-Controlled IED Elec Warfare* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3177*** | | | | |
| JCREW I1B1 | 1 | 2014 | 1 | 2018 |
| Engineering and Manufacturing Development | 1 | 2014 | 4 | 2014 |
| Contractor Developmental Testing | 1 | 2014 | 4 | 2014 |
| Government Developmental Testing/Operational Assessment | 3 | 2014 | 4 | 2014 |
| IOT&E | 2 | 2015 | 3 | 2015 |
| Milestone C | 4 | 2014 | 4 | 2014 |
| LRIP Contract | 3 | 2015 | 2 | 2017 |
| Full Rate Production | 2 | 2017 | 2 | 2019 |
| TECHNOLOGY REFRESH (I) | 1 | 2016 | 1 | 2018 |
| Tech Refresh Analysis of Alternatives (I) | 1 | 2016 | 3 | 2016 |
| Tech Refresh Development (I) | 4 | 2016 | 4 | 2017 |
| Tech Refresh Implementation and Test (I) | 1 | 2018 | 1 | 2018 |
| TECHNOLOGY REFRESH (II) | 1 | 2016 | 1 | 2020 |
| Tech Refresh Analysis of Alternatives (II) | 1 | 2018 | 3 | 2018 |
| Tech Refresh Development (II) | 4 | 2018 | 4 | 2018 |
| Tech Refresh Implementation and Test (II) | 1 | 2020 | 1 | 2020 |
| CREW MEU | 1 | 2015 | 4 | 2016 |
| Government Developmental Testing (First Article) | 1 | 2015 | 3 | 2015 |
| Production | 4 | 2015 | 4 | 2016 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604659N *I (U)Precision Strike Weapons Development Program* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 37.934 | 2.191 | - | 9.595 | - | 9.595 | 65.243 | 132.162 | 150.000 | 152.899 | Continuing | Continuing |
| 3214: *Fuze Development Program* | 37.934 | 2.191 | - | - | - | - | - | - | - | - | - | 40.125 |
| 3378: *Next Generation Land Attack Weapon (NGLAW)* | 0.000 | - | - | 9.595 | - | 9.595 | 65.243 | 132.162 | 150.000 | 152.899 | Continuing | Continuing |

**Note**

FY16 and later funding for the Next Generation Land Attack Weapon has moved from Program Element 0204229N (Tomahawk Mission Planning Center) to 0604659N (Precision Strike Weapons Development Program) under the same Project Unit of 3378.

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

Initial and continuing development of strike weapons consisting of armament, munitions, and weapon subsystems to allow for the horizontal integration among current and future weapon system capabilities to provide enhanced anti-surface and land strike capabilities in a demanding Anti-Access Area-Denial environment. This program provides for the development of weapon and weapon system technologies to address future requirements for enhanced and alternative weapon system capability requirements that include selectable output weapons, low collateral damage weapons, precision lethality weapons, area weapons, alternative warhead technology, Insenstive Munitions (IM), scaled munitions, DoD fuzing systems, sensors, extended range weapons and precision guided training round technology.

The Precision Strike Weapons Development Program Element (PE) provides funding for the Next Generation Strike Capability (NGSC) that includes a survivable, long range, multi-mission, multi-platform conventional strike capability by 2024. NGSC will combine the current maritime (OASuW Increment II under PE 0604786N and Project 3343) and Land Attack (NGLAW under PE 0204229N and Project 3378) projects into a single, Multi-Mission development effort as the acquisition follow-on program to the current maritime (OASuW Increment I/LRASM) and Land Strike (Tomahawk Modernization) investments. NGSC will focus on assessing, maturing and incorporating emergent technologies to determine the best path for the follow-on improved land/maritime strike capability effort.

This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | Date: February 2015 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | R-1 Program Element (Number/Name)<br>PE 0604659N *I (U)Precision Strike Weapons Development Program* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** |
| Previous President's Budget | 2.257 | - | - | - | - |
| Current President's Budget | 2.191 | - | 9.595 | - | 9.595 |
| Total Adjustments | -0.066 | - | 9.595 | - | 9.595 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.066 | - | | | |
| • Program Adjustments | - | - | 10.000 | - | 10.000 |
| • Rate/Misc Adjustments | - | - | -0.405 | - | -0.405 |

**Change Summary Explanation**

Schedule: PU 3378
System Readiness Review acquisition milestone added 3Q 2017
Material Solution Analysis added 1Q 2016-4Q 2018
Milestone B moved to 4th Qtr FY18
Preliminary Design Review moved to 2nd Qtr FY19
Critical Design Review acquisition milestone added 2Q 2018
Engineering, Manufacturing, and Development Phase acquisition milestone added 1Q FY19 to 4Q FY20

Schedule: PU 3214 MS C is now planned for 2nd QTR FY15 due to delays in the Air Force testing.
Technical: Not applicable

The FY 2016 funding request was reduced by $405 thousand to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | Project (Number/Name)<br>3214 / *Fuze Development Program* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3214: *Fuze Development Program* | 37.934 | 2.191 | - | - | - | - | - | - | - | - | - | 40.125 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Fuze Development Program provides for the development of alternative and innovative fuze system and fuze sensor technologies to improve the reliability, capability and production characteristics of fuze products. This program also provides for emerging technology insertion to improve the performance and maintainability characteristics of current and future fuze and fuze sensor technologies.

The Hard Target Void Sensing Fuze (HTVSF) is an FY08 Joint Capability Technology Demonstration (JCTD) sponsored by United States Strategic Command in coordination with the United States Air Force and United States Navy. The JCTD was a 27 month risk reduction program that was awarded to two Contractors in 3rd QTR FY08 to perform design, test, and manufacturing activities leading to a down-select to a single Contractor for Engineering Manufacturing Development (EMD) and production. The JCTD was completed in 3rd QTR FY10 and the EMD contract was awarded to a single Contractor in 2nd QTR FY11. HTVSF is designed to prosecute harder, deeper, and more complex targets that exceeded design parameters of existing conventional kinetic strike capabilities. HTVSF will be used only with BLU-109 Joint Direct Attack Munitions.

Note: First test article quantity for HTVSF includes FY 12-Quantity 26 , FY13-Quantity 3, FY14-Quantity 3

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Hard Target Void Sensing Fuze (HTVSF) Hardware Development | 2.191 | - | - | - | - |
| ***Articles:*** | 3 | - | - | - | - |
| ***Description:*** HTVSF hardware development funding will be used to qualify the fuze booster as part of the BLU-109 explosive train and begin F/A-18E/F software OFP development. | | | | | |
| ***FY 2014 Accomplishments:***<br>Completed F/A-18 E/F integration and mission planning software efforts. | | | | | |
| ***FY 2015 Plans:***<br>N/A | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | **Project (Number/Name)**<br>3214 / *Fuze Development Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.191 | - | - | - | - |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PANMC/01450: *General Purpose Bombs* | - | 1.044 | 8.772 | - | 8.772 | - | - | - | - | - | 9.816 |
| • RDTE/ PE 064635F: *Air Force (SDD)* | 21.175 | 7.808 | 2.218 | - | 2.218 | - | - | - | - | - | 97.591 |
| • Proc/PE 020803: *Air Force* | 19.280 | 38.500 | 39.510 | - | 39.510 | 41.700 | - | - | - | - | 139.120 |

**Remarks**

Due to MS C slipped the contract award slipped from FY14 to FY15 and will increase the FY16 procurement.

**D. Acquisition Strategy**

The Hard Target Void Sensing Fuze (HTVSF) Joint Capability Technology Demonstration (JCTD) is a risk reduction effort. The JCTD supported two competitively selected sources for development and testing of initial prototyping. Following the JCTD, a down select to a single source occurred, awarding a contract to ATK in FY11. Engineering Manufacturing Development phase is complete with production contract awards planned for FY15.

**E. Performance Metrics**

MS C is now planned for 2nd QTR FY15.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | **Project (Number/Name)**<br>3214 / *Fuze Development Program* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | C/FPIF | ATK : Keyser, WV | 2.567 | 0.053 | Feb 2014 | - | | - | | - | | - | - | 2.620 | 2.620 |
| | | **Subtotal** | 2.567 | 0.053 | | - | | - | | - | | - | - | 2.620 | 2.620 |

**Remarks**

Primary Hardware (H/W) development testing requirements on the HTVSF were decreased in FY14 at the contractor facility due to change in 40ft drop test requirements.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development HTVSF | WR | NAWC WD : China Lake, CA | 4.177 | 0.313 | Dec 2013 | - | | - | | - | | - | - | 4.490 | - |
| Software Development HTVSF | C/CPIF | Boeing : St. Louis, MO | 2.455 | 0.005 | Dec 2013 | - | | - | | - | | - | - | 2.460 | 2.460 |
| Prior years support no longer funded in the FYDP | Various | Various : Various | 3.984 | - | | - | | - | | - | | - | - | 3.984 | - |
| | | **Subtotal** | 10.616 | 0.318 | | - | | - | | - | | - | - | 10.934 | - |

**Remarks**

FY14 software requirements at NAWC WD were updated for actuals.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation HTVSF | WR | OPTVFOR : Norfolk, VA | 0.080 | 0.268 | Nov 2013 | - | | - | | - | | - | - | 0.348 | - |
| Development Test & Evaluation HTVSF | MIPR | Air Force : Eglin AFB, FL | 0.000 | 0.256 | Nov 2013 | - | | - | | - | | - | - | 0.256 | - |
| Development Test & Evaluation HTVSF | WR | NAWC WD : China Lake, CA | 1.400 | 0.300 | Nov 2013 | - | | - | | - | | - | - | 1.700 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | Project (Number/Name)<br>3214 / *Fuze Development Program* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Test & Evaluation HTVSF | WR | Various : Various | 0.100 | 0.111 | Nov 2013 | - | | - | | - | | - | - | 0.211 | - |
| Prior years T&E no longer funded in the FYDP | Various | Various : Various | 10.898 | - | | - | | - | | - | | - | - | 10.898 | - |
| | | **Subtotal** | 12.478 | 0.935 | | - | | - | | - | | - | - | 13.413 | - |

**Remarks**

FY14 Development Test & Evaluation for HTVSF was added at Eglin AFB, FL due to a change in testing location.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Support HTVSF | WR | NAWC WD : China Lake, CA | 3.199 | 0.636 | Nov 2013 | - | | - | | - | | - | - | 3.835 | - |
| Government Support HTVSF | WR | NAWC AD : Patuxent River, MD | 1.298 | 0.249 | Nov 2013 | - | | - | | - | | - | - | 1.547 | - |
| Prior years Mgmt Svcs no longer funded in the FYDP | WR | NAWC WD : China Lake, CA | 7.776 | - | | - | | - | | - | | - | - | 7.776 | - |
| | | **Subtotal** | 12.273 | 0.885 | | - | | - | | - | | - | - | 13.158 | - |

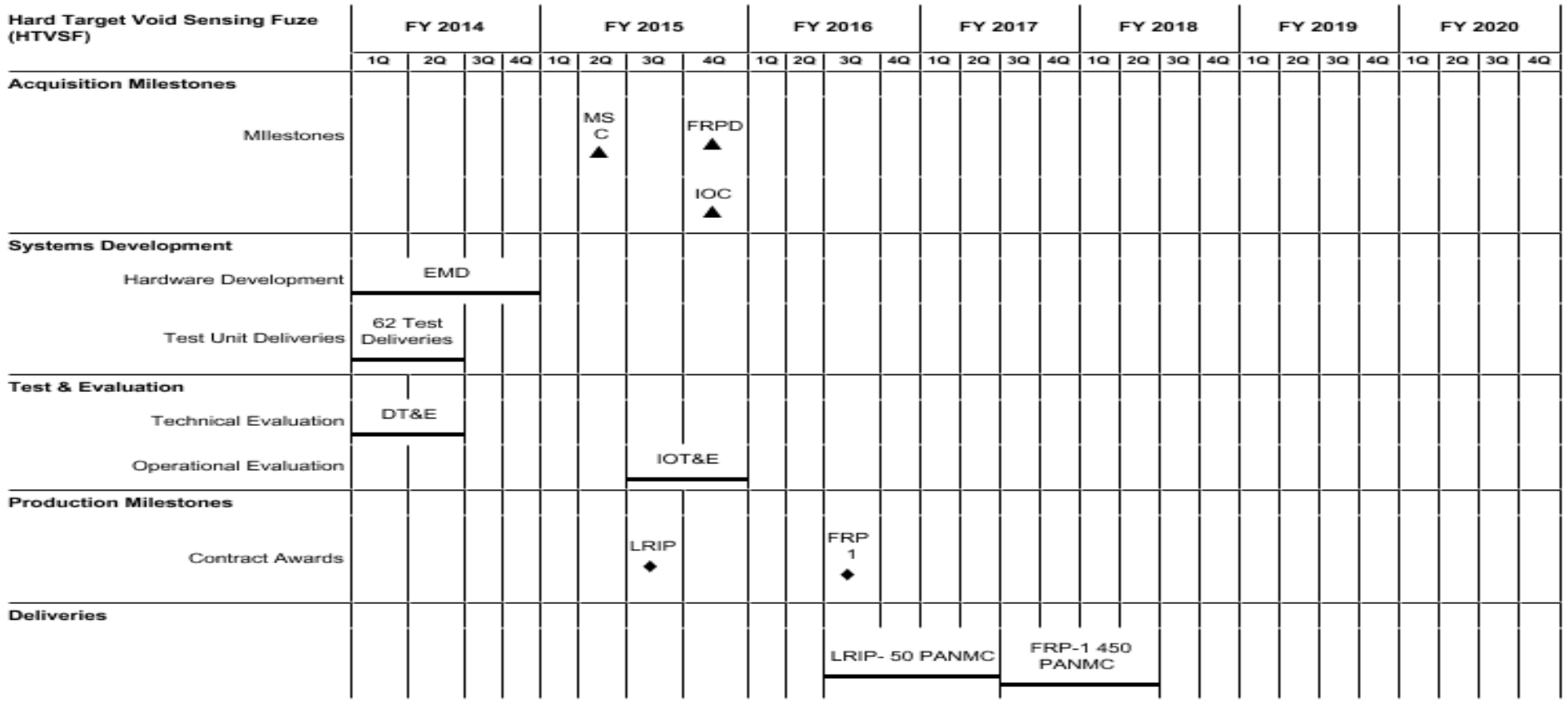
**Remarks**

The development and transitioning of the Safe Separation/Integration Flight Testing at NAWCAD was updated to reflect actuals in FY14.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 37.934 | 2.191 | | - | | - | | - | | - | - | 40.125 | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | **Project (Number/Name)**<br>3214 / *Fuze Development Program* |




*2016PB - 0604659N - 3214*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | **Project (Number/Name)**<br>3214 / *Fuze Development Program* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Hard Target Void Sensing Fuze (HTVSF)*** | | | | |
| Acquisition Milestones: MIlestones: Full Rate Production Decision | 4 | 2015 | 4 | 2015 |
| Acquisition Milestones: MIlestones: Milestone C | 2 | 2015 | 2 | 2015 |
| Acquisition Milestones: MIlestones: IOC | 4 | 2015 | 4 | 2015 |
| Systems Development: Hardware Development: Engineering, Manufacturing, and Development Phase | 1 | 2014 | 4 | 2014 |
| Systems Development: Test Unit Deliveries: 62 Test Deliveries | 1 | 2014 | 2 | 2014 |
| Test & Evaluation: Technical Evaluation: Developmental Test and Evaluation | 1 | 2014 | 2 | 2014 |
| Test & Evaluation: Operational Evaluation: Intergrational Operational Test and Evaluation | 3 | 2015 | 4 | 2015 |
| Production Milestones: Contract Awards: Full Rate Production-1 Award (PANMC) | 3 | 2016 | 3 | 2016 |
| Production Milestones: Contract Awards: Low-Rate Initial Production Award (PANMC) | 3 | 2015 | 3 | 2015 |
| Deliveries: LRIP Deliveries 50 (PANMC) | 3 | 2016 | 2 | 2017 |
| Deliveries: FRP 1 Deliveries 450 (PANMC) | 3 | 2017 | 2 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | Project (Number/Name)<br>3378 / *Next Generation Land Attack Weapon (NGLAW)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3378: *Next Generation Land Attack Weapon (NGLAW)* | - | - | - | 9.595 | - | 9.595 | 65.243 | 132.162 | 150.000 | 152.899 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Funding is provided for the Next Generation Strike Capability (NGSC) that includes a survivable, long range, multi-mission, multi-platform conventional strike capability by 2024. NGSC will combine the current maritime (OASuW Increment II under PE 0604786N and Project 3343) and Land Attack (NGLAW under PE 0204229N and Project 3378) projects into a single, Multi-Mission development effort as the acquisition follow-on program to the current maritime (OASuW Increment I/LRASM) and Land Strike (Tomahawk Modernization) investments. NGSC will focus on assessing, maturing and incorporating emergent technologies to determine the best path for the follow-on improved land/maritime strike capability effort.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Next Generation Strike Capability | - | - | 9.595 | - | 9.595 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>N/A | | | | | |
| ***FY 2015 Plans:***<br>N/A | | | | | |
| ***FY 2016 Base Plans:***<br>Conduct NGSC AoA assessing weapons systems, emergent technologies, and industry Internal Research and Development (IRAD) activities/proposals that can be used across multiple mission areas to reduce risk, development time and cost. Conduct threat assessments based on current and future scenarios and environments to inform performance requirements and relevant technology. Additionally, these technologies will be assessed for their maturity and applicability to fielded and future weapons to address expanded target sets to include mobile and moving land/maritime targets. Results of the analysis will inform the requirement and acquisition approach to deliver an affordable, long term Strike Weapon. | | | | | |
| ***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | - | 9.595 | - | 9.595 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | **Project (Number/Name)**<br>3378 / *Next Generation Land Attack Weapon (NGLAW)* |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Acquisition strategy will be influenced by the output of the AoA and the Material Development Decision (MDD).

**E. Performance Metrics**

Conduct NGSC AoA.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | Project (Number/Name)<br>3378 / *Next Generation Land Attack Weapon (NGLAW)* | |

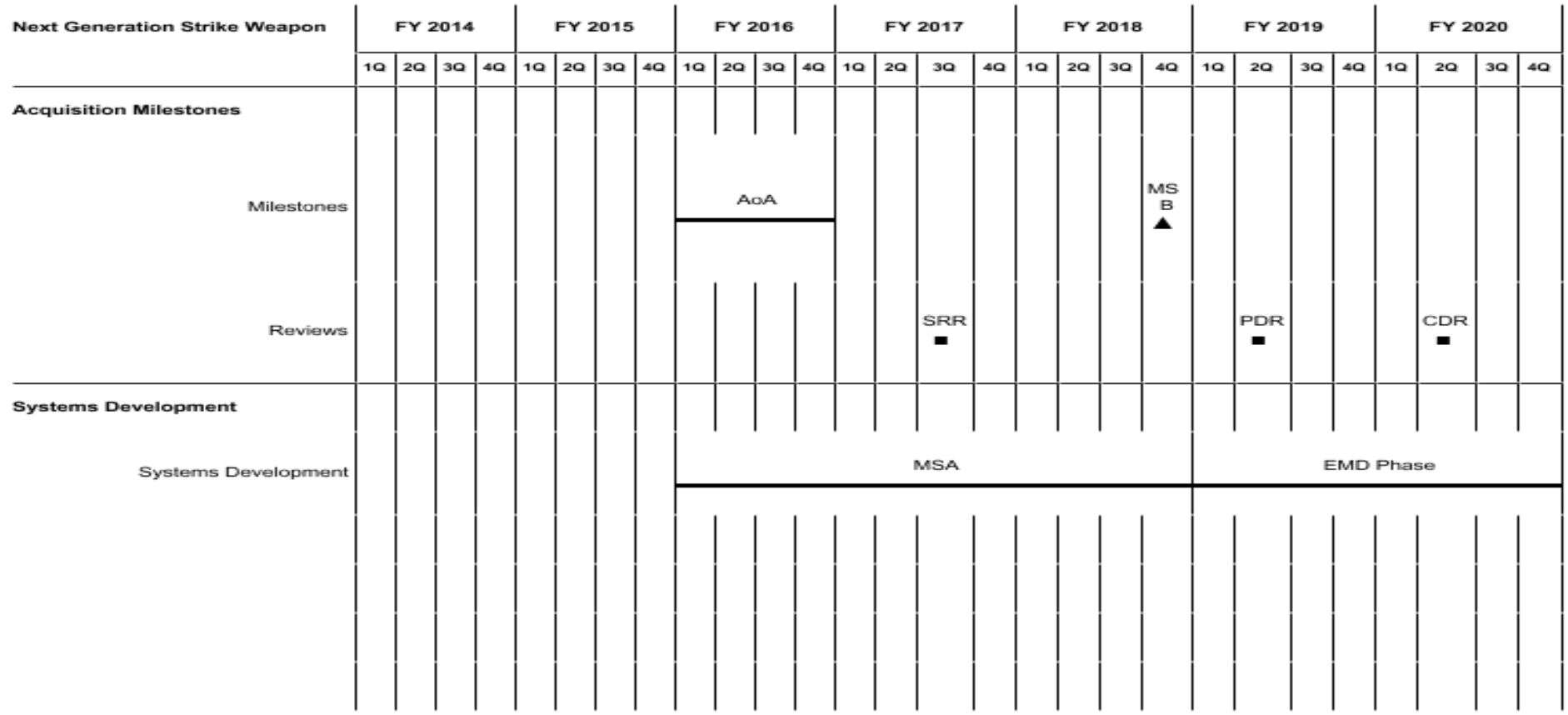
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | WR | NAWC-WD : China Lake, CA | 0.000 | - | | - | | 3.838 | Nov 2015 | - | | 3.838 | Continuing | Continuing | Continuing |
| Development Support- AIR 4.10 | WR | NAWC-AD : Patuxent River, MD | 0.000 | - | | - | | 3.838 | Nov 2015 | - | | 3.838 | - | 3.838 | - |
| Development Support | WR | JHU/APL : Patuxent River, MD | 0.000 | - | | - | | 1.919 | Nov 2015 | - | | 1.919 | - | 1.919 | - |
| | | **Subtotal** | 0.000 | - | | - | | 9.595 | | - | | 9.595 | - | - | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | - | | 9.595 | | - | | 9.595 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | **Project (Number/Name)**<br>3378 / *Next Generation Land Attack Weapon (NGLAW)* |




*2016PB - 0604659N - 3378*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604659N / *(U)Precision Strike Weapons Development Program* | **Project (Number/Name)**<br>3378 / *Next Generation Land Attack Weapon (NGLAW)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Next Generation Strike Weapon*** | | | | |
| Acquisition Milestones: Milestones: Analysis of Alternatives | 1 | 2016 | 4 | 2016 |
| Acquisition Milestones: Milestones: Milestone B | 4 | 2018 | 4 | 2018 |
| Acquisition Milestones: Reviews: System Readiness Review | 3 | 2017 | 3 | 2017 |
| Acquisition Milestones: Reviews: Preliminary Design Review | 2 | 2019 | 2 | 2019 |
| Acquisition Milestones: Reviews: Critical Design Review | 2 | 2020 | 2 | 2020 |
| Systems Development: Systems Development: Material Solution Analysis | 1 | 2016 | 4 | 2018 |
| Systems Development: Systems Development: Engineering, Manufacturing and Development Phase | 1 | 2019 | 4 | 2020 |

THIS PAGE INTENTIONALLY LEFT BLANK

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 249.014 | 30.378 | 18.749 | 29.581 | - | 29.581 | 34.251 | 34.764 | 33.693 | 34.393 | Continuing | Continuing |
| 0798: *Allied/Coalition Interoperability and Information Dominance (ACIID)* | 30.466 | 0.770 | 0.737 | 0.651 | - | 0.651 | 0.810 | 0.806 | 0.787 | 0.804 | Continuing | Continuing |
| 2140: *CNO Rapid Innovation Cell (CRIC)* | 0.000 | - | - | 4.335 | - | 4.335 | 4.421 | 4.516 | 4.614 | 4.710 | Continuing | Continuing |
| 2144: *Space & Elec Warfare Engineering* | 180.418 | 7.943 | 7.508 | 7.341 | - | 7.341 | 8.942 | 8.954 | 7.972 | 8.135 | Continuing | Continuing |
| 2356: *Maritime Concept Generation & Development* | 4.191 | 9.789 | 5.346 | 8.390 | - | 8.390 | 8.668 | 8.829 | 9.012 | 9.200 | Continuing | Continuing |
| 3319: *Fleet Experimentation* | 33.939 | 11.876 | 5.158 | 8.864 | - | 8.864 | 11.410 | 11.659 | 11.308 | 11.544 | Continuing | Continuing |

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

This Program Element (PE) contains four projects: Maritime Concept Generation and Development (CGCD), Fleet Experimentation , Allied/Coalition Interoperability and Information Dominance (ACIID), and Space and Electronic Warfare (SEW) Engineering.

The CGCD project (2356) focuses on the generation, development and validation of warfighting concepts, Concept of Operations (CONOPS) and doctrine in order to eliminate war fighting gaps. Beginning in FY 2014, the CGCD project also includes funding for the CNO's Rapid Innovation Cell (CRIC), a small group of disruptive thinkers managed by the Navy Warfare Development Command (NWDC) to identify and quickly test in an operational environment, innovative ideas and technologies that are outside the traditional development and acquisition processes. NWDC also manages the Fleet Experimentation program (formerly Sea Trial) under the guidance of Commander USFF and COMPACFLT.

The FLEX project (3319) (formerly Sea Trial) develops new or improved warfighter capabilities through the experimentation of high payoff initiatives, technologies and concepts, Fleet Concepts of Operations (CONOPS), doctrine, and new tactics, techniques and procedures (TTP). The objective of FLEX is to produce recommended changes in doctrine, organization, training, materiel, leadership development, personnel, facilities, and policy (DOTMLPF-P) actions, with an emphasis on non-materiel solutions. Focusing on war fighting capability improvement through experimentation aimed at delivering potential solutions in support of current Operations Plans (OPLANs), FLEX spans both operational and tactical levels of warfare and reaches across the full range of military operations to enhance war fighting capabilities or fill current or future capability gaps.

The ACIID and SEW Engineering projects (0798 and 2144 respectively) are systems engineering non-acquisition programs to develop, test, implement technical authority, and validate naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) architectures to support naval missions in the Joint and Coalition Theater. The mission of these projects are carried out by multiple tasks that are used to ensure naval C4ISR Command and Control

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* |

Warfare (C2W) components of SEW are effectively integrated into service-oriented architecture delivering net-centric warfare capability. Additionally, these projects ensure that (1) the composite operational capabilities of SEW systems (not the individual component systems) conform to the naval C4ISR architecture and enhance war fighting capability as related to the objectives of National Defense Strategy, evolving joint visions and direction, such as net centric capability, and are guided by warfighter requirements; (2) that SEW systems and systems integration efforts involve leading-edge technology transfer of information processing technologies primarily through integration of government and commercial off-the-shelf (GOTS/COTS) products to enhance the Navy's operational capability, interoperability, warfighter effectiveness, flexible reconfiguration, as well as reduce costs; and (3) that SEW systems integration efforts promote the delivery of Information Dominance and the Navy's contribution to the Global Information Grid (GIG).

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 31.256 | 22.393 | 27.558 | - | 27.558 |
| Current President's Budget | 30.378 | 18.749 | 29.581 | - | 29.581 |
| Total Adjustments | -0.878 | -3.644 | 2.023 | - | 2.023 |
| • Congressional General Reductions | - | -0.049 | | | |
| • Congressional Directed Reductions | - | -3.595 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.008 | - | | | |
| • SBIR/STTR Transfer | -0.871 | - | | | |
| • Program Adjustments | - | - | -9.205 | - | -9.205 |
| • Rate/Misc Adjustments | 0.001 | - | 11.228 | - | 11.228 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $2.9 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>0798 / *Allied/Coalition Interoperability and Information Dominance (ACIID)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0798: *Allied/Coalition Interoperability and Information Dominance (ACIID)* | 30.466 | 0.770 | 0.737 | 0.651 | - | 0.651 | 0.810 | 0.806 | 0.787 | 0.804 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Allied/Coalition Interoperability and Information Dominance (ACIID) program advances Information Warfare (IW) (to include Command, Control, Communications, Computers; Intelligence, Surveillance and Reconnaissance (C4ISR); Electronic Warfare (EW); and Cyber Warfare), interoperability with Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS), North Atlantic Treaty Organization (NATO) and other Allied and Coalition partners. The program determines maritime operational gaps with our allies, identifies Doctrine, Organization, Training, Material, Leadership, Personnel, and Facilities (DOTMLPF) solutions with the potential to fill those gaps, and assesses these solutions and associated concepts of operation in laboratory and at-sea environments. The ACIID program includes integration and testing in support of joint and Allied war fighting capabilities, including interoperability testing of IW equipment. Allied and joint interoperability is critical for future maritime operations, especially as the United States Navy expands Internet Protocol (IP) networking throughout the fleet via Consolidated Afloat Networks and Enterprise Services (CANES), Next Generation Networks (NGEN), Multi-National Information Sharing (MNIS) and with the Global Information Grid (GiG). Currently, IP connectivity with AUSCANNZUKUS and other Allied/Coalition forces are limited, requiring extensive backhaul through ashore infrastructure. Higher bandwidth solutions suitable for use over tactical networks require development and assessment for emerging coalition and joint interoperability requirements, such as Network Operations Without Shore (NOWS), Maritime Domain Awareness (MDA), and the defeat of Anti-Access Area Denial (A2/AD). Increases in data throughput are required for the effective exchange of rich Information Dominance (ID) data sets and services via Service Oriented Architectures (SOA) within the limitations of High Frequency (HF), Ultra-High Frequency (UHF) and other portions of the radio frequency spectrum, coupled with appropriate Information Assurance and Computer Network Defense (IA/CND) mechanisms. Development and assessment of potential solutions will integrate improved IP capabilities with the Advanced Digital Network Systems (ADNS) and existing international standards (e.g. Allied Communications Publication 200, NATO Standardization Agreements 5066 and 4691). The continued development and refinement of advanced tactical networking technologies and protocols, as well as automatic link establishment (ALE) standards, will provide for a significant improvement in data sharing within, and between, coalition maritime elements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Advanced Relay Capabilities | 0.770 | 0.737 | 0.651 | - | 0.651 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Continued the development and refinement of advanced networking and communication capabilities that promote Allied interoperability, task group-centric operations in Satellite Communications (SATCOM)-Restricted | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>0798 / *Allied/Coalition Interoperability and Information Dominance (ACIID)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| and SATCOM-Denied environments, NOWS, and support the defeat of A2/AD. Solutions addressed higher bandwidth technologies, such as wide-band HF, UHF and 3G/4G wireless.<br>-Secured routing architectures incorporating High Assurance Internet Protocol Encryptor (HAIPE) devices that support tactical networking and Anti-Access Area Denial (A2/AD) were developed along with distributed Service Oriented Architectures (SOA) applications and services architectures and advanced Information Assurance and Computer Network Defense (IA/CND) solutions. The overarching goal was to maximize interoperability and network efficiency using multiple, dissimilar bearers and integrate these advanced solutions into a task group-centric Allied/Coalition tactical networking environment that would defeat A2/AD and include capabilities such as Network Operations Without Shore (NOWS) and tactical data links, such as Link-22.<br>-Assessed Information Warfare interoperability gaps with Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS) nations, to include Intelligence, Surveillance and Reconnaissance (ISR), Electronic Warfare (EW) and Cyber, in appropriate venues.<br>-Continued to progress North Atlantic Treaty Organization (NATO) standardization of Maritime Relayed Line of Sight Network Standardization Agreements (STANAG 4691) and High Frequency Internet Protocol (STANAG 5066 Edition 3).<br>-Progressed Allied Information Warfare (IW) interoperability with other joint and maritime multi-national forums, such as the Combined Communications Electronics Board (CCEB), Multinational Maritime Internet Protocol (IP) Interoperability Steering Group (M2I2) and the Multinational Information Sharing program (MNIS).<br>-Venues of opportunity, such as Fleet Experimentation (FLEX), were exploited to assess and validate the individual technologies, integrated solutions, and associated Doctrine, Organization, Training, Material, Leadership, Personnel, and Facilities (DOTMLPF) through experimentation, trials and demonstrations with AUSCANNZUKUS and other Allied/Coalition partners. | | | | | |
| ***FY 2015 Plans:***<br>-Continue the development and refinement of advanced networking and communication capabilities that promote Allied interoperability and support the defeat of A2/AD via task group-centric tactical networking in Satellite Communications (SATCOM)-Restricted and SATCOM-Denied environments and NOWS. Solutions will address higher bandwidth technologies across the Radio Frequency (RF) and Optical spectrum, such as wide-band High Frequency (HF), High Data Rate Ultra-High Frequency (UHF) and other high-data rate wireless technologies.<br>-Develop and assess secure and interoperable multi-bearer routing, distributed application and service architectures and advanced IA/CND solutions that support tactical networking and A2/AD requirements. The overarching goal is to maximize interoperability and network efficiency using multiple, dissimilar bearers and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>0798 / *Allied/Coalition Interoperability and Information Dominance (ACIID)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| integrate these advanced solutions into an A2/AD/NOWS Allied/Coalition tactical networking environment that can also include tactical data links, such as Link-22.<br>-Assess Information Warfare interoperability gaps with AUSCANNZUKUS nations, to include ISR, Position, Navigation and Timing (PNT), EW and Cyber, in appropriate venues. This will include assured PNT and Unmanned aerial vehicle (UAV) interoperability and IA/CND Blue/Red Teaming in SATCOM-Denied environments.<br>-Continue to progress the standardization and operationalization of North Atlantic Treaty Organization (NATO) Maritime Relayed Line of Sight Network Standardization Agreements (STANAG 4691) and High Frequency Internet Protocol (STANAG 5066 Edition 3).<br>-Progress Allied Information Warfare (IW) interoperability with other joint and maritime multi-national forums, such as the Combined Communications Electronics Board (CCEB), Multinational Maritime Information-system Interoperability Steering Group (M2I2), and the Multinational Information Sharing program (MNIS).<br>-Venues of opportunity, such as Fleet Experimentation (FLEX), will be exploited to assess and validate the individual technologies, integrated solutions, and associated Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities (DOTMLPF) through experimentation, trials and demonstrations with Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS) and other Allied/Coalition partners. | | | | | |
| ***FY 2016 Base Plans:***<br>-Continue the development and refinement of advanced networking and communication capabilities that promote Allied interoperability, task group-centric operations in Satellite Communications (SATCOM)-Restricted and SATCOM-Denied environments, and support the defeat of Anti-Access Area Denial (A2/AD). Solutions will address higher bandwidth technologies across the Radio Frequency (RF) and Optical spectrum, such as wide-band High Frequency (HF), High Data Rate Ultra-High Frequency (UHF) and other high-data rate wireless technologies.<br>-Develop and assess secure and interoperable multi-bearer routing, distributed application and service architectures and advanced Information Assurance and Computer Network Defense (IA/CND) solutions that support tactical networking and A2/AD requirements. The overarching goal is to maximize interoperability and network efficiency using multiple, dissimilar bearers and integrate these advanced solutions into an Allied/ Coalition tactical networking environment that will defeat A2/AD.<br>-Continue to progress the standardization and operationalization of NATO Maritime Relayed Line of Sight Network Standardization Agreements (STANAG 4691) and High Frequency Internet Protocol (STANAG 5066 Edition 3). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>0798 / *Allied/Coalition Interoperability and Information Dominance (ACIID)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Progress Allied IW interoperability with other joint and maritime multi-national forums, such as the CCEB, M2I2, and the MNIS.<br>-Venues of opportunity, such as FLEX, will be exploited to assess and validate the individual technologies, integrated solutions, and associated DOTMLPF through limited experimentation, trials and demonstrations with AUSCANNZUKUS and other Allied/Coalition partners.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.770 | 0.737 | 0.651 | - | 0.651 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Allied/Coalition Interoperability and Information Dominance (ACIID) is a non-acquisition program that promotes United States Navy (USN) interoperability with allied and coalition forces to achieve the Chief of Naval Operations (CNO) vision by facilitating maritime interoperability in both processes and communications systems, including emerging capabilities, to counter growing high-end asymmetric threats, and is a key enabler of the force multiplying benefits achieved through cooperation among the Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS), North Atlantic Treaty Organization (NATO) and other partner nations. Activities include acquiring intellectual capital in emerging technical areas through contracts providing technical engineering expertise and surge capacity for emerging tasks.

**E. Performance Metrics**

Advanced Relay Capabilities: The ACIID program will employ laboratory testing and at-sea demonstrations to assess specific technologies, operational concepts, and integrated Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities (DOTMLPF) solutions pertaining to Anti-Access Area Denial (A2/AD), Network Operations Without Shore (NOWS), Maritime Domain Awareness (MDA) and other aspects of Information Dominance (ID). These assessments will report on identified capability gaps, link capability gaps to technology/DOTMLPF gaps, identify technologies and DOTMLPF solutions considered ready for deployment, transition to a program of record to enhance Fleet war fighting capability and enhance Allied interoperability.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>0798 / *Allied/Coalition Interoperability and Information Dominance (ACIID)* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Advanced Relay Capabilities | Various | Various : Various | 12.129 | 0.097 | Jan 2014 | 0.092 | Jan 2015 | 0.081 | Jan 2016 | - | | 0.081 | Continuing | Continuing | Continuing |
| Advanced Relay Capabilities | WR | SSC PAC : San Diego | 2.312 | 0.583 | Jan 2014 | 0.560 | Jan 2015 | 0.495 | Jan 2016 | - | | 0.495 | Continuing | Continuing | Continuing |
| Advanced Relay Capabilities | C/CPFF | SAIC : McLean, VA | 0.000 | 0.090 | Jan 2014 | 0.085 | Jan 2015 | 0.075 | Jan 2016 | - | | 0.075 | Continuing | Continuing | Continuing |
| Interoperability Requirements | Various | Various : Various | 3.266 | - | | - | | - | | - | | - | - | 3.266 | - |
| T & E Tools Development | Various | Various : Various | 0.429 | - | | - | | - | | - | | - | - | 0.429 | - |
| Systems Int. & Interop. Testing (LBTN) | Various | Various : Various | 3.862 | - | | - | | - | | - | | - | - | 3.862 | - |
| Interoperability Validation | Various | Various : Various | 2.748 | - | | - | | - | | - | | - | - | 2.748 | - |
| Joint Interoperability | Various | Various : Various | 1.174 | - | | - | | - | | - | | - | - | 1.174 | - |
| Testing OTH-T Systems | Various | Various : Various | 3.069 | - | | - | | - | | - | | - | - | 3.069 | - |
| | | **Subtotal** | 28.989 | 0.770 | | 0.737 | | 0.651 | | - | | 0.651 | - | - | - |

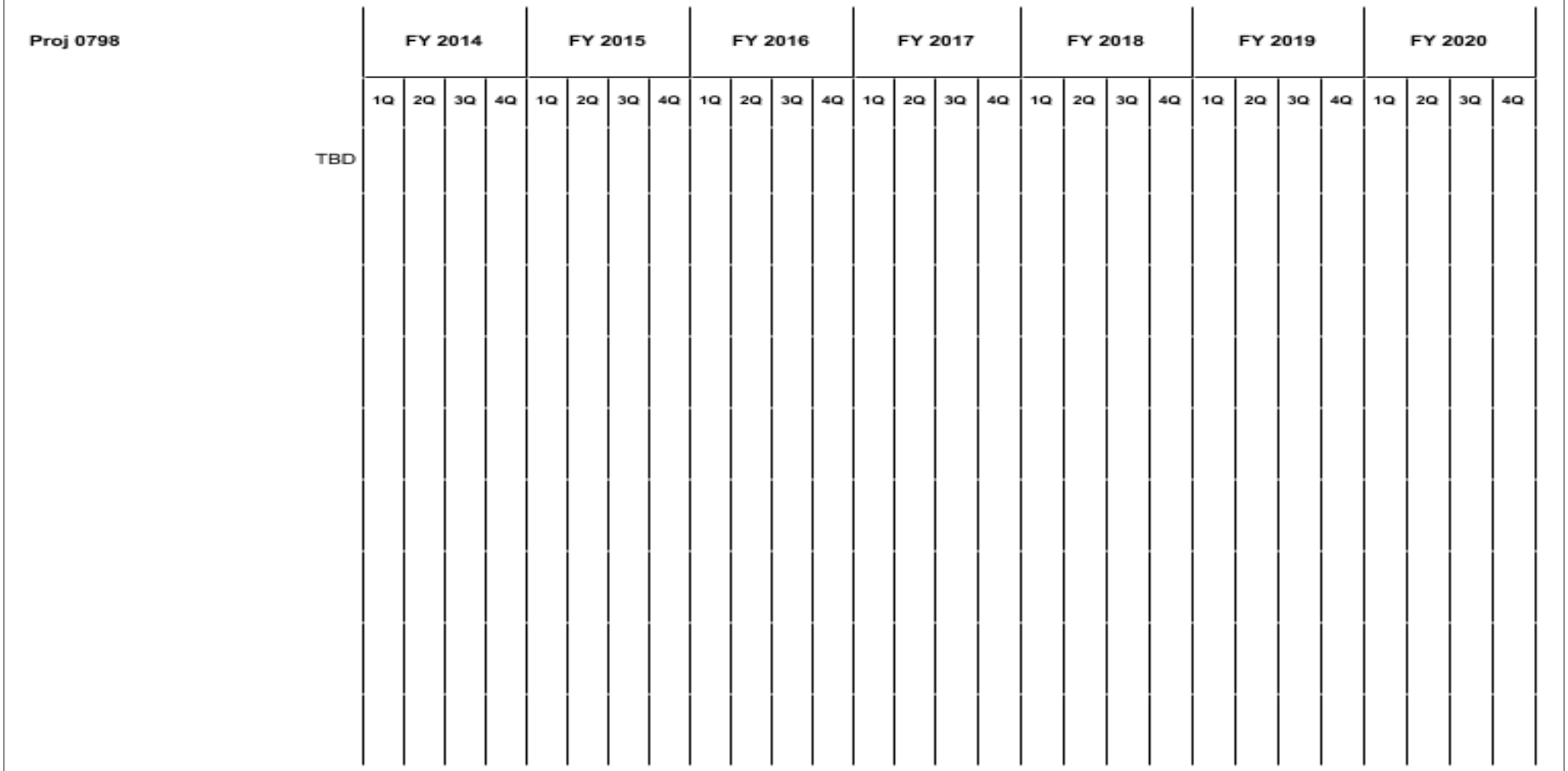
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | Various | Various : Various | 1.468 | - | | - | | - | | - | | - | - | 1.468 | - |
| ACQ Workforce Fund | Various | Various : Various | 0.009 | - | | - | | - | | - | | - | - | 0.009 | - |
| | | **Subtotal** | 1.477 | - | | - | | - | | - | | - | - | 1.477 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 30.466 | 0.770 | | 0.737 | | 0.651 | | - | | 0.651 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>0798 / *Allied/Coalition Interoperability and Information Dominance (ACIID)* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>0798 / *Allied/Coalition Interoperability and Information Dominance (ACIID)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0798*** | | | | |
| Allied/Coalition Interoperability and Information Dominance (ACIID): TBD | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>2140 / *CNO Rapid Innovation Cell (CRIC)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2140: *CNO Rapid Innovation Cell (CRIC)* | - | - | - | 4.335 | - | 4.335 | 4.421 | 4.516 | 4.614 | 4.710 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Beginning in FY 2016 funding for the CNO's Rapid Innovation Cell (CRIC) is being moved from Project 2356 (Maritime Concept Generation and Concept Development) to Project 2140.

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

The CNO's Rapid Innovation Cell (CRIC), created at the CNO's direction in 2013, is a group of junior officers and mid-grade enlisted personnel charged with identifying and developing disruptive and innovative solutions to warfighting problems, and to spread a culture of deckplate innovation througout the Fleet. The intent is to look for innovative ideas, technologies or opportunities outside the normal development and acquisition areas. The CRIC is not a full-time job for these young innovators but a collateral duty in addition to their normally assigned duties. There are no orders detailing them to the CRIC - just an informal agreement between themselves, their Commanding Officers and the Commander Navy Warfare Development Command (NWDC) that allows them to spend a portion of their time working on their innovative project. NWDC manages the CRIC for the CNO and reports directly to the CNO on CRIC issues.

Interested junior officers/mid-grade enlisted personnel who are passionate about a particular idea/technology/opportunity apply to the program in Q2 for membership the following FY. Their application package identifies their proposed project and how they think it should be approached. The application packages are reviewed and 8-10 are selected for further consideration based on the background/experience of the individual and the potential of the proposed project. The basic criteria for project selection is something that can be brought to a prototype stage within 12-18 months with a small amount of seed money. The average project will have a total cost in the $800K to $1.2M range (spread over two FYs), with an upper limit of $2M. Potential projects are reviewed for technical feasibility by Office of Naval Research (ONR) scientists and engineers during Q3, briefed by the CRIC member to a Flag Officer panel (CNWDC, CNR, and OPNAV N81) for interim approval and prioritization, and then approved by the CNO in Q4. The funding plan for the following FY starts to take shape during the Q3 feasibility review and Flag Officer interim approval. Approved projects are developed and executed in partnership with other Navy organizations, labs, academic institutions, and industry, typically within that 12-18 month timeframe. CRIC projects are not focused on addressing today's capability gaps (although some do) but rather to investigate potential solutions or opportunities outside the typical development/acquisition process. The CNO's guidance was that CRIC members not work from a list of "gaps to address" but rather use their imaginations to work on something of interest to them that could possibly provide value to the Navy. This process does not allow for building spend plans years in advance - it very much reacts to the interests of the junior officers/mid-grade enlisted personnel chosen for their innovative spirit and ability to "sell" flag officers on their ideas.

An example of one of the early projects is 3 dimensional(3D) printing, which has the potential to dramatically alter afloat maintenance and logistics by providing the ability to fabricate some types of spare parts on board vice waiting weeks for them to be shipped from a warehouse. Another is Suspended Underwater Raw Fiber (SURF), a very thin fiber-optic cable suspended beneath the surface of the water that can be deployed from a ship and used for high speed transport of data over tens or hundreds of miles.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2140 / *CNO Rapid Innovation Cell (CRIC)* |

Some future projects under consideration address issues such as energy conservation, maintenance cost reduction, and unmanned systems.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** New Accomplishment/Planned Program Entry | - | - | 4.335 | - | 4.335 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** Funding for the CNO's Rapid Innovation Cell (CRIC) was added to Project 2356 (Maritime Concept Generation and Concept Development) in FY 2014 and FY 2015. In FY 2016 through the FYDP CRIC funding is realigned to Project Code 2140. The CRIC, managed by NWDC and supported by the ONR, is intended to identify new, innovative ideas and technologies outside the mainstream Navy development and acquisition process, and get them to the Fleet for rapid testing and evaluation.

***FY 2014 Accomplishments:***
During FY 2014 and FY 2015 the CNO's Rapid Innovation Cell (CRIC) was funded under Project 2356 - for FY 2016 and beyond Project 2140 has been created for CRIC funding. For traceability purposes this data appears under both projects.
FY 2014 CRIC accomplishments included:
* Completed the Additive Manufacturing (3D Printing) project started in FY 2013 and transitioned it to OPNAV N4. This project placed a 3D printer at Dam Neck and another on board a forward deployed amphibious ship where data was gathered on the various ways sailors were able to use it to make themselves more productive and their jobs easier. 3D printing has the potential to dramatically alter afloat maintenance and logistics by providing the ability to fabricate some types of spare parts on board vice waiting weeks for them to be shipped from a warehouse.
* Completed the Electronic Warfare Battle Management (EWBM) project that was kick-started in FY 2013 with a small amount of internally re-prioritized NWDC funding. This project attempted to integrate meteorological data into an EW battlefield visualization system being developed by ONR. It showed promise but more work is required beyond the capability of the CRIC, and the project has been picked up by the ONR team.
* Reached a decision point on the development of the SURF project, a high-speed payout, expendable underwater fiber-optic cable suspended beneath the surface that can be deployed from a ship and used for high speed transport of data over tens or hundreds of miles. The decision was made to suspend funding on the project pending the resolution of the "connector" issue.
* Completed initial development of the Ocean Augmented Reality project, a next generation "heads-up" display using commercial off-the-shelf technology. The initial tests showed great potential for use in maintenance applications - future work in FY 2015 and possibly 2016 will explore more uses both ashore and afloat.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2140 / *CNO Rapid Innovation Cell (CRIC)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Continued development of the Hyper Agile Model Driven Development (HAMMD) project, a way to more rapidly/cheaply develop software solutions. The USAF was originally providing a significant amount of funding but it was lost during USAF budget drills. The result was a suspension of work pending the availability of additional funding from another source.<br>* Continued development of the Battle School project (kick-started in late FY 2013 with internally re-prioritized NWDC funding), a simulation driven tactical crowd-sourced wargame with potential uses in training and education environments. Initial response was good, resulting in some modifications that will continue into FY 2015.<br>* Began development of the B++ project and transitioned it to NAVCYBERCOM (classified). The initial demonstration of the project was successful and generated the CNO's comment that "if the CRIC produces nothing more than B++ it has been a success." Some residual follow-up work to complete the CRIC portion of the project remains to be done with FY 2015 CRIC funding.<br>* Began development of the Silent Nemo project, a small, autonomous, biomimetic UUV with potential for use in ISR missions. Development will continue with some FY 2015 funding with the potential of some carry-over into FY 2016.<br>* Began initial planning of the Waste to Watts project, a solid state anerobic digester to convert waste to energy and help reduce energy requirements. The prototype is being installed at the U.S. Naval Academy. | | | | | |
| ***FY 2015 Plans:***<br>During FY 2014 and FY 2015 the CNO's Rapid Innovation Cell (CRIC) was funded under Project 2356 - for FY 2016 and beyond Project 2140 has been created for CRIC funding. For traceability purposes this data appears under both projects.<br>* Continue work on Silent Nemo, a small, autonomous, biomimetic UUV with a multitude of possible ISR related issues.<br>* Continue to work on Waste to Watts, a solid state anerobic digester to convert waste to energy. The prototype is being installed and tested at the U.S. Naval Academy and is turning the waste products from the galley into electricity returned to the USNA power grid. If successful there are applications for this product at numerous shore installations around the world.<br>* Continue advanced development of the Ocean Augmented Reality project, a next generation "heads-up" displays using commercial off-the-shelf technology. Work in FY 2015 will focus on the development of additional "apps" in response to various fleet identified uses.<br>* Continue development of the Hyper Agile Model Driven Development project, a way to more rapidly/cheaply develop specialized software applications (dependent on available funding). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2140 / *CNO Rapid Innovation Cell (CRIC)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Continue advanced development of the Battle School project, a simulation driven tactical crowd-sourced wargame.<br>* Begin work on the Acoustic Jammer project, an idea to use off-the-shelf technology to overload adversary sonar systems (may be delayed until FY 2016 start due to separation from the Navy of the project lead and delay with identifying a replacement).<br>* Begin work on the Littoral Operations Center project, an idea to combine existing off-the-systems to create small operations centers suitable for use on small platforms and ashore.<br>* Begin work on the Statistically driven Maintenance Analysis and Reporting Technology (SMART) model which uses existing data to better predict maintenance needs. It builds on existing work done within the F/A-18 maintenance community.<br>* Begin work on the Cosmo Gator project, an alternative navigation capability when GPS is not available (may be delayed until FY 2016 start due to rotation of the project lead to a deployed sea tour and delay with identifying a replacement). | | | | | |
| ***FY 2016 Base Plans:***<br>* Complete any residual or follow-on work on Waste to Watts, a solid state anerobic digester to convert waste to energy. The prototype is being installed and tested at the U.S. Naval Academy and is turning the waste products from the galley into electricity returned to the USNA power grid. If successful there are applications for this product at numerous shore installations around the world.<br>* Complete any residual or follow-on work on the Silent Nemo project, a small, autonomous, biomimetic UUV with a multitude of possible ISR related issues.<br>* Begin (or continue if started in FY 2015) work on the Acoustic Jammer project, an idea to use off-the-shelf technology to overload adversary sonar systems.<br>* Continue work on the Littoral Operations Center project, an idea to combine existing off-the-shelf systems to create small operations centers suitable for use on small platforms and ashore.<br>* Continue work on the Statistically driven Maintenance Analysis and Reporting Technology (SMART) model which uses existing data to better predict maintenance needs. It builds on existing work done within the F/A-18 maintenance community.<br>* Begin (or continue if started in FY 2015) work on the Cosmo Gator project, an alternative navigation capability when GPS is not available.<br>* Begin development of up to four new CRIC projects to be selected from the 3rd generation of inputs (will be approved by the CNO during Q4 FY 2015 for FY 2016 new starts). | | | | | |
| ***FY 2016 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2140 / *CNO Rapid Innovation Cell (CRIC)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | - | - | 4.335 | - | 4.335 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

This funding is used to develop technology-related projects to the prototype stage for Fleet evaluation and feedback, or to develop disruptive ideas to the point of evaluation (generally wargaming) in an operational environment.

**E. Performance Metrics**

- Harvest innovative ideas or technologies with potential to significantly increase warfighting capabilities.
- Develop selected ideas or technologies to the prototype or test-ready phase.
- Provide Fleet feedback on selected ideas or technologies.
- Transition those selected technologies to program offices or other organizations for continued development.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2140 / *CNO Rapid Innovation Cell (CRIC)* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Test and Evaluation | C/CPFF | DTIC : Ft Belvoir VA | 0.000 | - | | - | | 1.715 | Oct 2015 | - | | 1.715 | Continuing | Continuing | Continuing |
| System Test and Evaluation | C/FFP | NAVSEA : Washington DC | 0.000 | - | | - | | 0.750 | Oct 2015 | - | | 0.750 | - | 0.750 | - |
| System Test and Evaluation | C/CPFF | NUWC : Newport RI | 0.000 | - | | - | | 0.500 | Oct 2015 | - | | 0.500 | - | 0.500 | - |
| System Test and Evaluation | C/CPFF | NAVSUP : Mechanicsburg PA | 0.000 | - | | - | | 0.750 | Oct 2015 | - | | 0.750 | - | 0.750 | - |
| | | **Subtotal** | 0.000 | - | | - | | 3.715 | | - | | 3.715 | - | - | - |

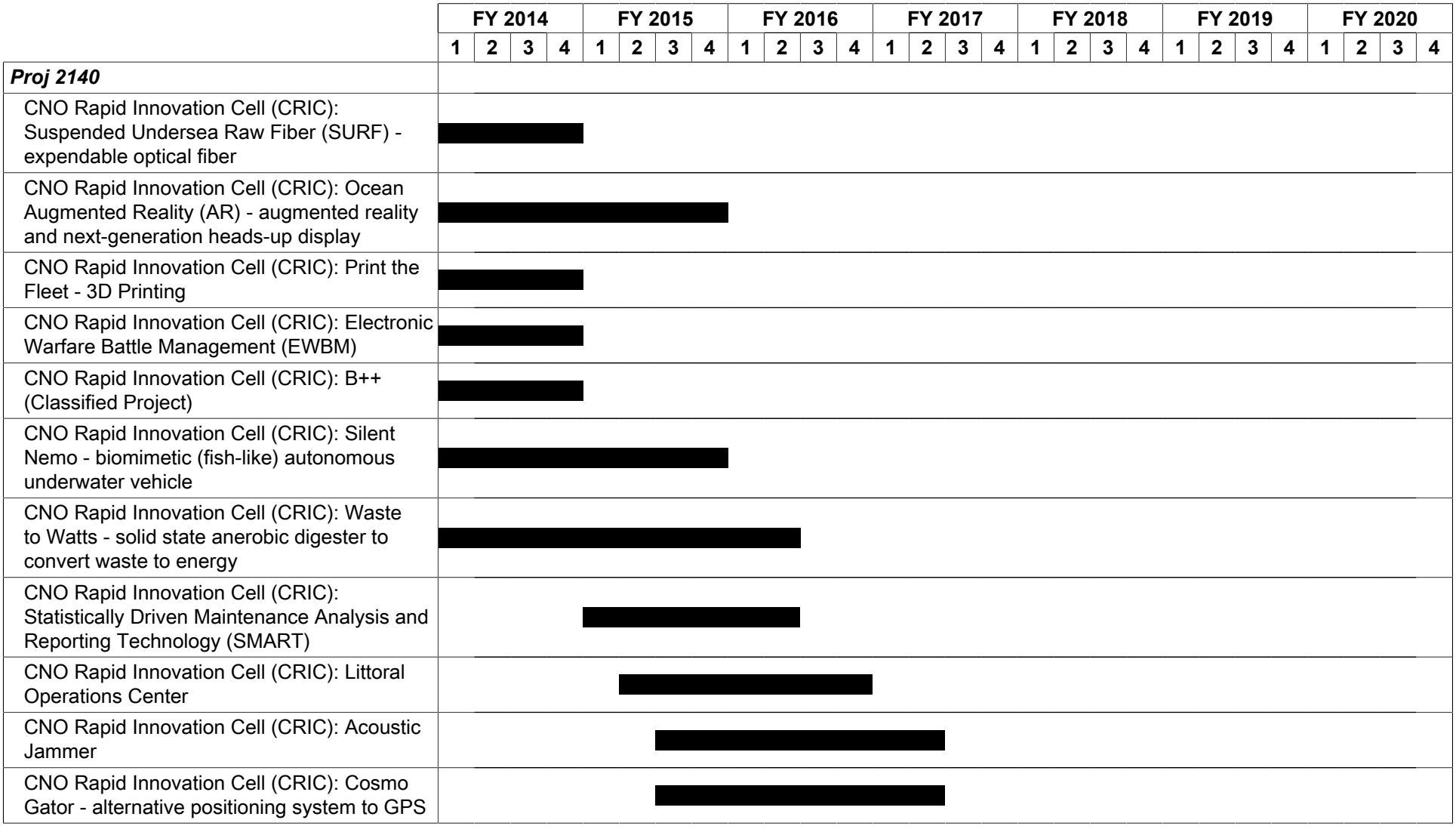
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management | C/CPFF | DTIC : FT Belvoir VA | 0.000 | - | | - | | 0.620 | Oct 2015 | - | | 0.620 | - | 0.620 | - |
| | | **Subtotal** | 0.000 | - | | - | | 0.620 | | - | | 0.620 | - | 0.620 | - |

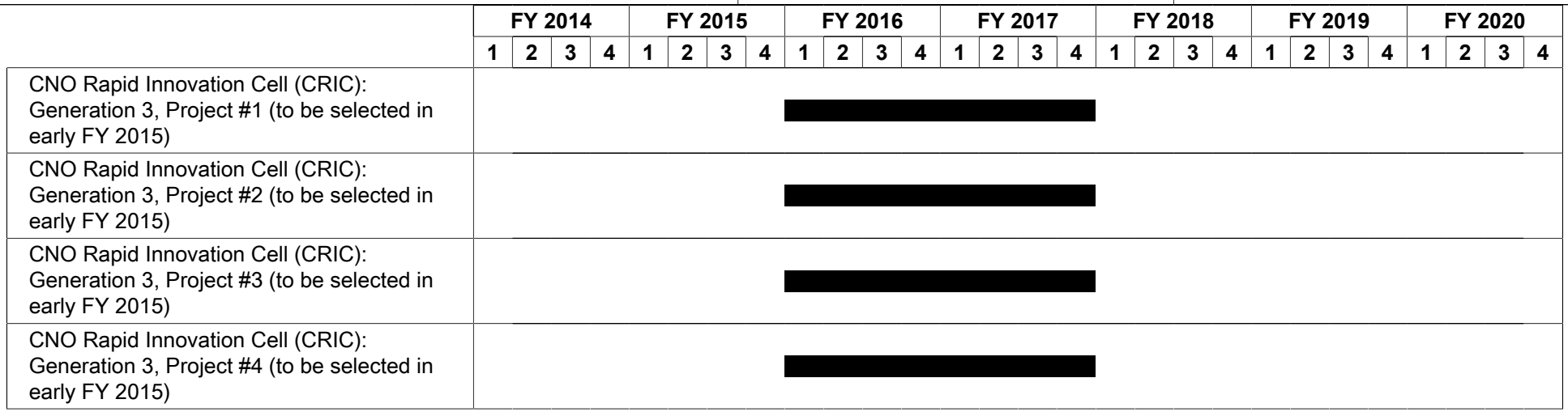
| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | - | | - | | 4.335 | | - | | 4.335 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2140 / *CNO Rapid Innovation Cell (CRIC)* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2140 / *CNO Rapid Innovation Cell (CRIC)* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2140 / *CNO Rapid Innovation Cell (CRIC)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2140*** | | | | |
| CNO Rapid Innovation Cell (CRIC): Suspended Undersea Raw Fiber (SURF) - expendable optical fiber | 1 | 2014 | 4 | 2014 |
| CNO Rapid Innovation Cell (CRIC): Ocean Augmented Reality (AR) - augmented reality and next-generation heads-up display | 1 | 2014 | 4 | 2015 |
| CNO Rapid Innovation Cell (CRIC): Print the Fleet - 3D Printing | 1 | 2014 | 4 | 2014 |
| CNO Rapid Innovation Cell (CRIC): Electronic Warfare Battle Management (EWBM) | 1 | 2014 | 4 | 2014 |
| CNO Rapid Innovation Cell (CRIC): B++ (Classified Project) | 1 | 2014 | 4 | 2014 |
| CNO Rapid Innovation Cell (CRIC): Silent Nemo - biomimetic (fish-like) autonomous underwater vehicle | 1 | 2014 | 4 | 2015 |
| CNO Rapid Innovation Cell (CRIC): Waste to Watts - solid state anerobic digester to convert waste to energy | 1 | 2014 | 2 | 2016 |
| CNO Rapid Innovation Cell (CRIC): Statistically Driven Maintenance Analysis and Reporting Technology (SMART) | 1 | 2015 | 2 | 2016 |
| CNO Rapid Innovation Cell (CRIC): Littoral Operations Center | 2 | 2015 | 4 | 2016 |
| CNO Rapid Innovation Cell (CRIC): Acoustic Jammer | 3 | 2015 | 2 | 2017 |
| CNO Rapid Innovation Cell (CRIC): Cosmo Gator - alternative positioning system to GPS | 3 | 2015 | 2 | 2017 |
| CNO Rapid Innovation Cell (CRIC): Generation 3, Project #1 (to be selected in early FY 2015) | 1 | 2016 | 4 | 2017 |
| CNO Rapid Innovation Cell (CRIC): Generation 3, Project #2 (to be selected in early FY 2015) | 1 | 2016 | 4 | 2017 |
| CNO Rapid Innovation Cell (CRIC): Generation 3, Project #3 (to be selected in early FY 2015) | 1 | 2016 | 4 | 2017 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2140 / *CNO Rapid Innovation Cell (CRIC)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| CNO Rapid Innovation Cell (CRIC): Generation 3, Project #4 (to be selected in early FY 2015) | 1 | 2016 | 4 | 2017 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>2144 / *Space & Elec Warfare Engineering* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2144: *Space & Elec Warfare Engineering* | 180.418 | 7.943 | 7.508 | 7.341 | - | 7.341 | 8.942 | 8.954 | 7.972 | 8.135 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

As of FY 2014, the Coalition Warrior Interoperability Demonstration (CWID) effort is referred to as Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX).

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

OPNAVINST 3050.25 outlines the policy to use Warfighting Capability, Capacity, and Wholeness assessments to support the Navy's Planning Programming Budgeting and Execution (PPBE) process. Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) integrated architectures serve as key components in assessing capability and capacity gaps, enabling analysis of individual platforms and System of Systems (SoS) capabilities in order to achieve the desired warfighting effect.

Office of the Secretary of Defense (OSD) has defined several key programs, initiatives and policies that drive Navy requirements prioritization and impact Navy programs of record. Major such efforts include Joint Information Environment (JIE), Intelligence Community Information Technology Environment (IC ITE), and the Department of Defense (DoD) Risk Management Framework (RMF). Space and Naval Warfare Systems Command (SPAWAR) responsibilities for Information Technology (IT) Technical Authority (TA), Information Assurance (IA) TA, and the Information Dominance Enterprise Architecture (IDEA) will guide Navy's alignment with and implementation of these key, external requirements.

Additionally, Office of the Chief of Naval Operations (OPNAV) N2/N6 Information Dominance (ID) objectives for Assured Command and Control (C2), Battlespace Awareness, and Integrated Fires capabilities require significant changes and improvements to the Navy's approach for managing its information infrastructure, content, and effects. Potential adversaries will exploit perceived U.S. space and cyberspace vulnerabilities which could impact United States information-handling capabilities and wartime readiness. To realize the ID vision, SPAWAR as the Navy's ID Systems Command, will need to support and enforce implementation of IT and IA TA architectures, specifications, standards and profiles to ensure Navy cyber capabilities are a warfighting asset, not a liability.

The Space and Electronic Warfare provides three main functions:
1) Perform SoS and platform technical evaluations to establish the alignment with the OPNAV N2/N6 ID vision for the Navy and identify performance and operational risks associated with the integration of multiple systems to provide a robust, mission based capability; 2) Develop C4ISR/IT/ID integrated architecture products; and 3) Support development of and compliance with C4ISR/IT/ID systems engineering processes and standards. The integrated architecture products are used to support the Navy's budget process by providing a current baseline and a target end state to inform decision-making and prioritization for how the acquisition system will deliver new capabilities to the war fighter. The systems engineering processes and standards provide the construct for Assured C2, Battlespace Awareness and Integrated Fires interoperability requirements analyses to identify capability shortfalls/gaps and to compare/test alternatives in a joint end-to end environment while identifying associated

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

Navy-wide C4ISR/IT/ID implications. Processes include developing and applying criteria for use in Systems Engineering Technical Reviews (SETRs) and Gate Reviews, and providing technical inputs and assessments to governance bodies. This includes Human Systems Integration (HSI) to provide a mission-centered orientation to ensure effective operational employment of fielded capability. As joint concepts and OSD efforts/programs are defined and matured, the Navy's Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) integrated architectures are refined in-turn, and the supporting C4ISR systems engineering processes and standards work to engineer and enact C4ISR implementations Navy-wide across all C4ISR mission areas.

Products provided:
1) C4ISR, Information Technology (IT), Information Assurance (IA) and Information Dominance (ID) integrated architectures to reflect current, as-programmed and future, target states
-Fit for Purpose/Department of Defense Architecture Framework (DoDAF) compliant architecture views
-Systems Command (SYSCOM) Technical Authority (TA) specifications, standards and profiles
-Common processes and tools
2) Supporting C4ISR/IT/ID systems engineering processes
- Technical standards, architectures, design guidance tools, and policies support to SYSCOMs developing IT systems and connecting to the Navy Enterprise Network afloat, ashore & aloft
-Technical analysis to Command 10th Fleet (C10F) and Office of the Chief of Naval Operations (OPNAV) utilizing an IA Risk Management Framework (RMF)
-Documentation of IT interfaces to Navy Networks
-Certifications of systems and applications connected to the Navy Enterprise Network
-Distributed Command and Control (C2) Interoperability Requirement Analysis - Gaps Analysis, Overlap Analysis, System Priority Lists, C4ISR Metrics and Models, Analysis of Alternatives, Requirements Database, Assessment Repository, Resource Implications Studies, Baseline Performance Models, Mission Task Analysis, Human Systems Integration (HSI) assessments
-End-to-End Systems Engineering and Integrated Design - Operational feasibility studies, technical feasibility studies, technical roadmap engineering validations, architectures and assessment traceability matrices
-Joint and Coalition interoperability trials - Joint end-to-end prototyping trials; joint/coalition interoperability demonstrations; interoperability assessments and metrics; and interoperability studies via the Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) formerly Coalition Warrior Interoperability Demonstration (CWID). United States Navy (USN) provides funding to the general CWID operating budget and participates by operating a USN demonstration site
-Technical analyses for Navy cloud computing options, including cloud deployment models (utility/data), mission context, warfighting and cost implications and possible implementation options for ashore and afloat capabilities
-Integration and Interoperability (I&I) - Support Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN(RDA)) and OPNAV I&I initiatives to ensure integration and interoperability across Assured C2, Battlespace Awareness and Integrated Fires to deliver ID to Navy warfighters. Conduct analyses and engineering activities that provide an operational, mission-driven context to the assessment of capability gaps and interoperability seams between Navy System of Systems (SoS) capabilities that better enable acquisition programs to deliver fully integrated and interoperable warfighting capabilities. Provide I&I support in Systems Engineering Technical Reviews (SETRs) and provide recommendations for updates to acquisition policies and guidance
-Information Technology Procurement Request (ITPR) - Review of Navy ITPRs for developing systems to ensure adherence to Navy IT Standards
3) Compliance and alignment reports with Navy Enterprise Architecture/Data Strategy and ASN(RDA) system engineering policies generated during SETRs

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** C4ISR Systems Engineering | 3.206 | 3.050 | 2.646 | - | 2.646 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Continued Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) and Information Dominance (ID) Transformation/Strategic Planning within Navy/Joint/Department of Defense (DoD) Framework: Assessed existing and emerging capabilities; developed and evaluated Navy-wide policies, plans, requirements, and compliance; developed integration and investment strategies; and accelerated innovation, testing, assessment and fielding of material and non-material solutions for enhanced operational capability, joint/allied/coalition interoperability and application/enforcement of enterprise requirements/ architectures/standards toward greater Net-Centric Operations/Warfare and ID capability.<br>-Continued to establish, develop, and validate interoperability requirements: Continued to perform Systems Engineering Technical Reviews (SETRs) utilizing validated assessment tools, system engineering methodologies and SETR checklists tracing system design to standards and requirements (e.g., Information Assurance (IA), data strategy, architecture, modeling, Open Architecture, Configuration Management (CM), Service Oriented Architecture (SOA) development, Anti-tamper, etc.) ensuring interoperability compliance to statutory and regulatory directives and guidance.<br>-Continued to ensure continuous improvement of SETR Checklists by incorporating the latest policy, guidance, standards, and specifications.<br>-Continued to perform System of Systems (SoS) and platform technical evaluations to integrate the alignment with the N2/N6 ID vision and identify performance and operational risks associated with the integration of multiple systems to provide a robust, mission based capability.<br>-Continued to conduct document reviews (of Acquisition Strategies, Systems Engineering Plans, Information Support Plans, Information Assurance (IA) Strategies, Initial Capabilities Documents, Capabilities Development Documents, Capabilities Production Documents, Enterprise Architectures, etc.) for Office of the Chief of Naval Operations (CNO), Assistant Secretary of the Navy for Research, Development and Acquisition (ASN(RDA)), and the Program Executive Offices (PEOs), and other services to ensure sound systems engineering analysis and design principles have been applied to system planning requirements, design, testing, and supportability.<br>-Continued to perform engineering evaluation and provide buy/no-buy decisions for proposed Deviations from Specification for afloat platforms to determine performance and operational impacts of the proposed changes and their effects on the platform's mission. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Continued to provide engineering evaluation and validation of Business Information Technology (IT) applications and IT infrastructure in order to combine, consolidate, and eliminate unnecessary or underutilized business systems for the Naval Enterprise.<br>-Continued to provide engineering evaluation and validation of programs and ensure adherence to technical standards in the following technical domains-communications, networks, Information Storage and Retrieval/ Information Surveillance Reconnaissance/Information Operations, afloat platforms (both large and small decks), submarines, shore and Maintenance Operations Center capability, command and control, and space systems.<br>-Continued to conduct Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Certifications through design and testing analysis ensuring C4ISR delivery to the platform (shore, surface ship, submarine) is validated to meet the operational need and is interoperable with platform, force level, joint/allied/coalition forces.<br>-Provided technical support to the Department of the Navy Chief Information Office (DoN CIO) assessment of compliance with Department of Navy Enterprise Architecture (DoN EA) as part of Title 40/Clinger-Cohen Act confirmation process. | | | | | |
| ***FY 2015 Plans:***<br>-Continue C4ISR and Information Dominance (ID) Transformation/Strategic Planning within Navy/Joint/ Department of Defense (DoD) Framework: Assess existing and emerging capabilities; develop and evaluate Navy-wide policies, plans, requirements, and compliance; develop integration and investment strategies; and accelerate innovation, testing, assessment and fielding of material and non-material solutions for enhanced operational capability, joint/allied/coalition interoperability and application/enforcement of enterprise requirements/architectures/standards toward greater Net-Centric Operations/Warfare and ID capability.<br>-Continue to establish, develop, and validate interoperability requirements: Continue to perform Systems Engineering Technical Reviews (SETRs) utilizing validated assessment tools, system engineering methodologies and SETR checklists tracing system design to standards and requirements (e.g., Information Assurance (IA), data strategy, architecture, modeling, Open Architecture, Configuration Management (CM), Service Oriented Architecture (SOA) development, Anti-tamper, etc.) ensuring interoperability compliance to statutory and regulatory directives and guidance.<br>-Continue to ensure continuous improvement of SETR Checklists by incorporating the latest policy, guidance, standards, and specifications.<br>-Continue to perform System of Systems (SoS) and platform technical evaluations to integrate the alignment with the N2/N6 ID vision and identify performance, interoperability, and operational risks associated with the integration of multiple systems to provide a robust, mission based capability. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Continue to conduct document reviews (of Acquisition Strategies, Systems Engineering Plans, Information Support Plans, IA Strategies, Initial Capabilities Documents, Capabilities Development Documents, Capabilities Production Documents, Enterprise Architectures, etc.) for Office of the Chief of Naval Operations (CNO), Assistant Secretary of the Navy for Research, Development and Acquisition (ASN(RDA)), and the Program Executive Offices (PEOs), and other services to ensure sound systems engineering analysis and design principles have been applied to system planning requirements, design, testing, and supportability.<br>-Continue to perform engineering evaluation and provide buy/no-buy decisions for proposed Deviations from Specification for afloat platforms to determine performance and operational impacts of the proposed changes and their effects on the platform's mission.<br>-Continue to provide engineering evaluation and validation of Business Information Technology (IT) applications and IT infrastructure in order to combine, consolidate, and eliminate unnecessary or underutilized business systems for the Naval Enterprise.<br>-Continue to provide engineering evaluation and validation of programs and ensure adherence to technical standards in the following technical domains-communications, networks, Information Storage and Retrieval/ Information Surveillance Reconnaissance/Information Operations, afloat platforms (both large and small decks), submarines, shore and Maintenance Operations Center capability, command and control, and space systems.<br>-Continue to conduct Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Certifications through design and testing analysis ensuring C4ISR delivery to the platform (shore, surface ship, submarine) is validated to meet the operational need and is interoperable with platform, force level, joint/allied/coalition forces.<br>-Continue to provide technical support to the Department of the Navy Chief Information Office (DoN CIO) assessment of compliance with Department of Navy Enterprise Architecture (DoN EA) as part of Title 40/Clinger-Cohen Act confirmation process. | | | | | |
| ***FY 2016 Base Plans:***<br>-Continue C4ISR and Information Dominance (ID) Transformation/Strategic Planning within Navy/Joint/ Department of Defense (DoD) Framework: Assess existing and emerging capabilities; develop and evaluate Navy-wide policies, plans, requirements, and compliance; develop integration and investment strategies; and accelerate innovation, testing, assessment and fielding of materiel and non-materiel solutions for enhanced operational capability, joint/allied/coalition interoperability and application/enforcement of enterprise requirements/architectures/standards toward greater Net-Centric Operations/Warfare and ID capability.<br>-Continue to establish, develop, and validate interoperability requirements: Continue to perform Systems Engineering Technical Reviews (SETRs) on Acquisition Category (ACAT) I,II, and III programs utilizing validated | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| assessment tools, system engineering methodologies and SETR checklists tracing system design to standards and requirements (e.g., Information Assurance (IA), data strategy, architecture, modeling, Open Architecture, Configuration Management (CM), Service Oriented Architecture (SOA) development, Anti-tamper, etc.) ensuring interoperability compliance to statutory and regulatory directives and guidance.<br>-Ensure continuous improvement on SETR Checklists for Acquisition Category (ACAT) I,II, and III programs by incorporating the latest policy, guidance, standards, and specifications, including specific criteria for effective implementation of and compliance with Information Technology (IT) and Information Assurance (IA) Technical Authority (TA) architectures, specifications, standards and profiles.<br>-Continue to perform System of Systems (SoS) and platform technical evaluations to assess alignment with Office of the Chief of Naval Operations (OPNAV) N2/N6 Information Dominance (ID) vision, and identify technical performance, interoperability, and operational risks associated with the integration of capabilities across multiple systems to provide a robust, mission-based capability.<br>-Continue to conduct document reviews (of Acquisition Strategies, Systems Engineering Plans, Information Support Plans, IA Strategies, Initial Capabilities Documents, Capabilities Development Documents, Capabilities Production Documents, Enterprise Architectures, etc.) for Office of the Chief of Naval Operations (CNO), Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN(RDA)), Program Executive Offices (PEOs), and other Services to ensure the application of sound systems engineering analysis and design principles to system planning requirements, design, testing, and supportability.<br>-Continue to perform engineering evaluations for afloat platforms to determine performance and operational impacts of proposed deviations from specification and provide buy/no-buy recommendations.<br>-Continue to conduct engineering evaluations and validation of Business IT applications and IT infrastructure in order to combine, consolidate, and eliminate unnecessary or underutilized business systems for the Naval Enterprise Network.<br>-Continue to provide engineering evaluations and validation of programs and ensure adherence to technical standards in the following technical domains: communications, networks, Information Storage and Retrieval/ Information Surveillance Reconnaissance/Information Operations, afloat platforms (both large and small decks), submarines, shore and Maintenance Operations Center capability, command and control, and space systems.<br>-Continue to conduct Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Certifications through design and testing analysis ensuring C4ISR delivery to the platform (shore, surface ship, submarine) is validated to meet the operational need and is interoperable with platform, force level, joint/allied/coalition forces. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Continue to provide technical support to the Department of the Navy Chief Information Office (DoN CIO) assessment of compliance with Department of Navy Enterprise Architecture (DoN EA) as part of Title 40/Clinger-Cohen Act certification process.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) (Formerly known as CWID) | 0.971 | 0.878 | 0.837 | - | 0.837 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Developed coalition and interagency interoperability and information sharing through coalition engagement, technology, demonstrations, and assessments leading to improvements of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems within the Navy and in conjunction with Joint Services and Coalition efforts.<br>-Leveraged Coalition Interoperability and Assurance Validate (CIAV) Future Mission Network (FMN) efforts in order to develop operationally relevant experiments focused on Navy mission enhancement in a Coalition environment.<br>-Developed experiments integrated with North Atlantic Treaty Organization (NATO) and Troop Contributing Nation (TCN) partners in conjunction with the Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) infrastructure (formerly Coalition Warrior Interoperability Demonstration (CWID)).<br>-Enhanced integration and engagement with Pacific Rim Coalition partners by leveraging existing experimentation and exercise venues in order to develop operationally relevant experiments focused on enhancing Navy missions.<br>-Demonstrated cutting-edge technologies and transition them to the end-user, including Coalition Partners, and the Joint Services.<br>-Continued to provide interoperability between existing and cutting-edge C4ISR systems. Integrated directly with Navy Program Managers (i.e. Program Executive Office Command, Control, Communications, Computers, Intelligence (PEO C4I) and the combatant commanders at the Technical Director, Acquisition Program Manager, and Science Advisor levels.)<br>-Validated technology selection, experimental objective design, and execution to influence and direct design efforts and to satisfy warfighter capability gaps in a Coalition setting. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Continued to develop operationally relevant classified laboratory environments for Joint/Coalition war fighter technology experiments. Year-round connectivity will be continued with end-users in order to provide a distributed Coalition experimentation environment focused enhancement of Navy missions. | | | | | |
| ***FY 2015 Plans:***<br>-Develop interoperability and information sharing through coalition engagement, technology, demonstrations, and assessments leading to improvements of C4ISR systems within the Navy and in conjunction with Joint Services and Coalition efforts.<br>-Leverage CIAV Mission Partner Environment (MPE) efforts in order to develop operationally relevant experiments and assessments focused on Navy mission enhancement in a Coalition environment.<br>-Continue development of a Navy experimentation environment that can be leveraged to provide Navy focused Assurance and Validation support to the CIAV community.<br>-Develop experiments integrated with NATO and TCN partners in conjunction with CWIX infrastructure.<br>-Enhance integration and engagement with Pacific Rim (PACOM AO) Coalition partners by leveraging existing experimentation and exercise venues (such as Rim of the Pacific (RIMPAC), Cooperation Afloat Readiness and Training (CARAT), Foal Eagle, and Cobra Gold) in order to develop operationally relevant experiments focused on enhancing Navy missions.<br>-Demonstrate and evaluate cutting-edge technologies and transition them to the end-user, including Coalition Partners, and the Joint Services.<br>-Continue to provide interoperability between existing and cutting-edge Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems. Integrate directly with Navy Acquisition Programs (i.e. Program Executive Office Command, Control, Communications, Computers, Intelligence (PEO C4I) and the Component/ Combatant Commanders at the Technical Director and Science Advisor levels).<br>-Validate technology selection, experimental objective design, and execution to influence and direct design efforts and to satisfy warfighter capability gaps in a Coalition setting.<br>-Continue to develop operationally relevant classified laboratory environments for Joint/Coalition war fighter technology experiments. Year-round connectivity will be continued with end-users in order to provide a distributed Coalition experimentation environment focused enhancement of Navy missions. | | | | | |
| ***FY 2016 Base Plans:***<br>-Develop interoperability and information sharing through coalition engagement, technology, demonstrations, and assessments leading to improvements of C4ISR systems within the Navy and in conjunction with Joint Services and Coalition efforts. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Further enhance integration and engagement with Pacific Rim (PACOM AO) Coalition partners as well as Coalition partners in the Southern Command Area of Operation (SOUTHCOM AO) by fostering a connected, distributed experimentation environment suitable for expanded experimentation in those areas.<br>-Seek enhanced interoperability with North Atlantic Treaty Organization (NATO) Coalition partners through the Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) infrastructure.<br>-Utilize existing events such as Coalition Interoperability Assurance and Validation (CIAV) and CWIX to expose interoperability issues between US and Coalition Partner systems and report issues and possible workarounds to relevant entities.<br>-Leverage CIAV infrastructure to enhance US maritime interoperability within the Joint Information Environment (JIE) Mission Partner Environment (MPE).<br>-Coordinate experimentation with applicable acquisition and operational entities (i.e. PEO C4I, Component/ Combatant Commanders at the Technical Director and Science Advisor levels) in order to assess interoperability between existing and cutting-edge C4ISR systems.<br>-Continue development of suitable environments for Joint/Coalition war fighter technology experiments. Periodic connectivity will be continued with end-users in order to provide a distributed Coalition experimentation environment focused enhancement of Navy missions.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Systems Engineering and Integration Revitalization | 1.046 | 0.995 | 0.862 | - | 0.862 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Developed Integration and Interoperability (I&I) Systems Engineering Technical Reviews (SETR) checklist in support of Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN(RDA)).<br>-Conducted I&I SETR events to validate and refine I&I checklist items.<br>-Reviewed all Navy Information Technology Procurement Requests (ITPR) for developing systems to ensure adherence to Navy Information Technology (IT) standards and capture and report metric information to support moving to bulk IT procurement to take advantage of economies of scale across the Department of the Navy (DoN).<br>***FY 2015 Plans:***<br>-Continue to refine the I&I SETR checklist in support of ASN(RDA).<br>-Continue to conduct I&I SETR events to validate and refine I&I checklist items. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Continue to review all Navy ITPR for developing systems to ensure adherence to Navy IT standards and capture and report metric information to support moving to bulk IT procurement to take advantage of economies of scale across the DoN.<br>-Provide Command, Control, Communications, Computers, Intelligence (C4I) and Information Assurance (IA) Certifications (Naval Warfare Systems Certification (NWSCP)) and Department of Defense Information Assurance Certification and Accreditation Process (DIACAP)).<br>***FY 2016 Base Plans:***<br>-Continue to develop and refine the I&I Integrated Capability Framework's (ICF) Mission Technical Baselines aligned to Required Operational Capability (ROC)/Platform Operational Environment (POE) mission areas to capture and decompose operational requirements and define System of System (SoS) interoperability requirements. Use these SoS baselines to develop Integrated Capability Technical Baselines to support analysis of capability gaps and engineering trades to inform investment decisions.<br>-Continue to evolve Assured Command and Control (C2), Battlespace Awareness and Integrated Fires Integrated Capability Technical Baselines to ensure Information Dominance (ID) capabilities align to mission-specific kill chains to reduce interoperability seams across the supporting SoS.<br>-Establish robust, foundational mission engineering tools (e.g., executable architecture models) to support Integration and Interoperability (I&I) technical performance gap analysis and trade recommendations.<br>-Review impact on Acquisition Category (ACAT) I,II, and III programs of I&I Systems Engineering Technical Reviews (SETR) checklist items on SETR outcomes and acquisition system improvements to deliver fully integrated and interoperable warfighting capability.<br>-Provide Command, Control, Communications, Computers, Intelligence (C4I) and Information Assurance Certifications (Naval Warfare Systems Certification (NWSCP) and Department of Defense Risk Management Framework (RMF)).<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Systems Engineering Standards and Processes | 2.720 | 2.585 | 2.996 | - | 2.996 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Continued to develop processes to integrate System of System (SoS) engineering technical assessments to identify cross system dependencies. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Continued to incorporate lessons learned from prior year system engineering efforts to ensure multi-systems processes were intuitive and met the mission of the Navy.<br>-Developed Joint cloud-enabled, secure domain environment using virtual desktop technology that allow secure and cost effective operations at the point of need, creating improved efficiencies, enhanced cyber operations and improved capabilities across a range of military operations.<br>-Developed Utility Cloud, Storage Cloud and planned and executed risk reduction for UNCLASSIFIED/SECRET/ TOPSECRET/Sensitive Compartmented Information (SCI) Data Cloud providing secure access to other users.<br>-Developed mission effectiveness of a data centric architecture.<br>-Developed secure thin client (enterprise applications) device capability integration with the current Navy enterprise.<br>-Developed the future Navy cloud architecture to inform Navy acquisition programs on cloud technologies.<br>-Developed Continental United States (CONUS)/Outside Continental United States (OCONUS) cloud-based capabilities. | | | | | |
| ***FY 2015 Plans:***<br>-Continue to develop/refine processes to integrate SoS engineering technical assessments to identify cross system dependencies and potential interoperability and integration issues.<br>-Continue to incorporate lessons learned from prior year system engineering efforts to ensure multi-systems processes are intuitive and meet the mission of the Navy.<br>-Continue efforts to develop Joint cloud-enabled, secure domain environment using virtual desktop technology that allow secure and cost effective operations at the point of need, creating improved efficiencies, enhanced cyber operations and improved capabilities across a range of military operations.<br>-Develop Information Technology (IT) and Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) requirements and interface specifications and standards.<br>-Develop Information Assurance (IA) requirements and interface specifications and standards.<br>-Develop/refine processes for IT and C4ISR Technical Authority (TA) implementation.<br>-Develop/refine processes for IA TA implementation.<br>-Establish an online repository of System of System (SoS) IT and IA Engineering Policies, Requirements, Standards, and Best Practices to facilitate consistent SoS Engineering across all Navy activities.<br>-Update the future Navy cloud architecture to inform Navy acquisition programs on cloud technologies. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Reduce cyber variance through the standardization of afloat, ashore and aloft infrastructure. Continue IT and IA TA efforts to define, place under configuration control, and manage physical and logical interface requirements and IA controls for systems that connect to the Navy Enterprise Network.<br>-Sustain actions to develop platform as-programmed and target architectures to support continued progress toward reducing the number of unique interfaces and variance across platform configurations.<br>-Continue to develop and promulgate specifications, standards and profiles under IT TA.<br>-Develop and promulgate cybersecurity standards under IA TA to ensure consistent implementation of IA controls across Navy systems.<br>-Develop Navy Cybersecurity Situational Awareness (NCSA) requirements and interface specifications and standards to reduce variance across the Navy cyber environment and enable integration and interoperation across multiple tools and technologies.<br>-Ensure compliance with NCSA requirements and standards across Navy networks and systems, to include C4ISR systems as well as tactical control systems such as combat, Hull Mechanical & Electrical (HM&E), and navigation systems.<br>-Perform risk assessments to improve NCSA decision-making regarding the protection, detection, and response to cyber events on Navy networks and systems.<br>-Develop and maintain enterprise-level cybersecurity target architectures to support Navy transition to a holistic cybersecurity strategy that enables implementation of a common, layered, Defense-in-Depth approach that improves the Navy's cyber security posture. Develop and support implementation of the Defense-in-Depth Functional Implementation Architecture (DFIA) to define IA boundaries, IA and logical attributes, controlling parameters, and inheritable security controls.<br>-Support Navy's continued implementation of Department of Defense (DoD) Risk Management Framework (RMF), to include development and maintenance of guidance for Navy RMF implementation, including Continuous Monitoring and Risk Scoring (CMRS). Carry out activities as Navy's Security Controls Assessor (SCA).<br>-Carry forward efforts to modify existing processes on Acquisition Category (ACAT) I,II, and III programs (e.g., Systems Engineering Technical Reviews (SETR), Gate Reviews, etc.) to ensure compliance with Information Technology (IT) and Information Assurance (IA) Technical Authority (TA) specifications, standards and profiles early in the acquisition lifecycle. Mature IT and IA Configuration Management and Waiver processes to ensure implementation and compliance determinations are based on enterprise-level risk management assessments.<br>-Maintain the Information Dominance Enterprise Architecture (IDEA) to serve as the Navy Enterprise Network target end state that supports alignment with the Joint Information Environment (JIE), Intelligence Community Information Technology Environment (IC ITE), and enables integration of Navy Tactical Cloud capabilities. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Establish the IDEA-Repository (IDEA-R) to serve as the authoritative source of IT and IA TA architectures, specifications, standards and profiles. Sustain efforts to include Integration and Interoperability (I&I) outputs (e.g., Mission Technical Baselines, Integrated Capability Technical Baselines) and vignette descriptions within the IDEA-R to support mission-/capability-driven and System of Systems assessments that support Program Objective Memorandum (POM) inputs and ensure IDEA-related products support objectives for Assured Command & Control, Battlespace Awareness and Integrated Fires.<br>-Use IDEA to update the future Navy cloud architecture to inform Navy acquisition program investments on cloud technologies.<br>-Certify applications and systems connected to the Naval Enterprise Network for compliance to IT/IA standards and best practices and assure cyber resilience.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.943 | 7.508 | 7.341 | - | 7.341 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Space and Electronic Warfare (SEW) Engineering is a non-acquisition program that develops, tests, implements technical authority, and validates naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR); provides integrated architecture products and supports C4ISR systems engineering processes and standards. Activities include acquiring intellectual capital in emerging technical areas through contracts providing technical engineering expertise and surge capacity for emerging tasks.

**E. Performance Metrics**

The Space and Electronic Warfare (SEW) engineering program will employ rigorous and consistent system engineering practices in an evolving value model to support development and deployment of shipboard, undersea, and land based capabilities based on mission and performance requirements, integrated enterprise architectures, model-validated solutions, and sustainment and supportability needs for the Command and Control, Intelligence, Networks, Communications, Space, and Business Information Technology domains.

Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) Performance Metrics: Three key metrics: (1) Interoperability and compliance with Naval, joint, coalition and other non-governmental organization architectures, systems and equipment; (2) Compliance with Defense Information

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

Services Agency (DISA), National Security Agency (NSA), and other joint and coalition information assurance and security standards; and (3) war fighter utility assessment across the joint and coalition spectrum. Specific metrics validate performance of individual technologies participating in Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>2144 / *Space & Elec Warfare Engineering* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | Various | Various : Various | 4.554 | - | | - | | - | | - | | - | - | 4.554 | - |
| SEW/C4I Technology Integration | Various | Various : Various | 12.985 | - | | - | | - | | - | | - | - | 12.985 | - |
| MDA Prototype SE Support | Various | Various : Various | 17.376 | - | | - | | - | | - | | - | - | 17.376 | - |
| Systems Engineering & Integration Revitalization | Various | Various : Various | 2.174 | - | | - | | - | | - | | - | - | 2.174 | - |
| Systems Engineering & Integration Revitalization | C/CPFF | ComGlobal : San Diego, CA | 0.565 | - | | - | | - | | - | | - | - | 0.565 | - |
| Systems Engineering & Integration Revitalization | C/CPFF | AUSGAR : San Diego, CA | 0.496 | 0.470 | Mar 2014 | 0.448 | Mar 2015 | 0.317 | Mar 2016 | - | | 0.317 | Continuing | Continuing | Continuing |
| Systems Engineering & Integration Revitalization | C/CPFF | METRON : Reston, VA | 0.316 | - | | - | | - | | - | | - | - | 0.316 | - |
| Systems Engineering & Integration Revitalization | C/CPFF | SAIC : McLean, VA | 0.316 | - | | - | | - | | - | | - | - | 0.316 | - |
| Systems Engineering & Integration Revitalization | WR | SSC LANT : Charleston, NC | 0.479 | 0.158 | Feb 2014 | 0.149 | Feb 2015 | 0.149 | Feb 2016 | - | | 0.149 | Continuing | Continuing | Continuing |
| Systems Engineering & Integration Revitalization | WR | SSC PAC : San Diego, CA | 1.226 | 0.418 | Feb 2014 | 0.398 | Feb 2015 | 0.396 | Feb 2016 | - | | 0.396 | Continuing | Continuing | Continuing |
| Systems Engineering Standards & Processes | Various | Various : Various | 5.588 | - | | - | | - | | - | | - | - | 5.588 | - |
| Systems Engineering Standards & Processes | C/CPFF | ComGlobal : San Diego, CA | 1.454 | - | | - | | - | | - | | - | - | 1.454 | - |
| Systems Engineering Standards & Processes | C/CPFF | AUSGAR : San Diego, CA | 1.264 | 1.224 | Mar 2014 | 1.164 | Mar 2015 | 0.817 | Mar 2016 | - | | 0.817 | Continuing | Continuing | Continuing |
| Systems Engineering Standards & Processes | C/CPFF | METRON : Reston, VA | 0.813 | - | | - | | - | | - | | - | - | 0.813 | - |
| Systems Engineering Standards & Processes | C/CPFF | SAIC : McLean, VA | 0.812 | - | | - | | - | | - | | - | - | 0.812 | - |
| Systems Engineering Standards & Processes | WR | SSC LANT : Charleston, NC | 1.236 | 0.408 | Feb 2014 | 0.388 | Feb 2015 | 0.379 | Feb 2016 | - | | 0.379 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>2144 / *Space & Elec Warfare Engineering* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering Standards & Processes | WR | SSC PAC : San Diego, CA | 3.210 | 1.088 | Feb 2014 | 1.034 | Feb 2015 | 1.020 | Feb 2016 | - | | 1.020 | Continuing | Continuing | Continuing |
| Systems Engineering Standards & Processes | C/CPFF | BAH : McLean, VA | 0.000 | - | | - | | 0.780 | Dec 2015 | - | | 0.780 | Continuing | Continuing | Continuing |
| Systems A&E and Validation | Various | Various : Various | 13.188 | - | | - | | - | | - | | - | - | 13.188 | - |
| Distributed C2 Interoperability Requirement analysis | Various | Various : Various | 16.583 | - | | - | | - | | - | | - | - | 16.583 | - |
| C4ISR Architecture and Standards | Various | Various : Various | 14.268 | - | | - | | - | | - | | - | - | 14.268 | - |
| End-to-End System Engineering and Integrated Design | Various | Various : Various | 10.994 | - | | - | | - | | - | | - | - | 10.994 | - |
| Info. Repository/Naval Architecture | Various | Various : Various | 4.000 | - | | - | | - | | - | | - | - | 4.000 | - |
| C4ISR Systems Engineering | Various | Various : Various | 5.157 | - | | - | | - | | - | | - | - | 5.157 | - |
| C4ISR Systems Engineering | WR | NSWC Dahlgren : Dahlgren, MD | 0.590 | 0.289 | Feb 2014 | - | | - | | - | | - | - | 0.879 | - |
| C4ISR Systems Engineering | MIPR | DISA : Pensacola, FL | 0.169 | 0.097 | Feb 2014 | - | | - | | - | | - | - | 0.266 | - |
| C4ISR Systems Engineering | C/CPFF | ComGlobal : San Diego, CA | 5.746 | 1.890 | Oct 2013 | - | | - | | - | | - | - | 7.636 | - |
| C4ISR Systems Engineering | C/CPFF | AUSGAR : San Diego, CA | 0.000 | - | | 1.800 | Mar 2015 | 1.401 | Mar 2016 | - | | 1.401 | Continuing | Continuing | Continuing |
| C4ISR Systems Engineering | WR | SSC LANT : Charleston, NC | 0.440 | - | | - | | - | | - | | - | - | 0.440 | - |
| C4ISR Systems Engineering | WR | SSC PAC : San Diego, CA | 3.025 | 0.930 | Feb 2014 | 0.885 | Feb 2015 | 0.882 | Feb 2016 | - | | 0.882 | Continuing | Continuing | Continuing |
| C4ISR Systems Engineering | C/CPFF | SAIC : McLean, VA | 0.000 | - | | 0.364 | Jan 2015 | 0.363 | Jan 2016 | - | | 0.363 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>2144 / *Space & Elec Warfare Engineering* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C4ISR Systems Engineering | WR | NAVAIR : Patuxent River, MD | 0.088 | - | | - | | - | | - | | - | - | 0.088 | - |
| C4ISR Systems Engineering | MIPR | CECOM : Fort Monmouth, NJ | 0.264 | - | | - | | - | | - | | - | - | 0.264 | - |
| C4ISR Systems Engineering | MIPR | AF : Hill AFB, UT | 0.220 | - | | - | | - | | - | | - | - | 0.220 | - |
| | | **Subtotal** | 129.596 | 6.972 | | 6.630 | | 6.504 | | - | | 6.504 | - | - | - |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEW Eng/CWIX | Various | Various : Various | 30.171 | - | | - | | - | | - | | - | - | 30.171 | - |
| SEW Eng/CWIX | MIPR | Defense Information Systems Agency : Arlington, VA | 0.234 | 0.109 | Apr 2014 | 0.098 | Apr 2015 | 0.093 | Apr 2016 | - | | 0.093 | Continuing | Continuing | Continuing |
| SEW Eng/CWIX | WR | Joint Interoperability Test Command : Fort Huachuca, AZ | 1.846 | 0.358 | Mar 2014 | - | | - | | - | | - | - | 2.204 | - |
| SEW Eng/CWIX | WR | SSC Pacific : San Diego, CA | 2.190 | 0.504 | Dec 2013 | 0.490 | Dec 2014 | 0.467 | Dec 2015 | - | | 0.467 | Continuing | Continuing | Continuing |
| SEW Eng/CWIX | MIPR | US Northern Command : Peterson AFB, CO | 0.332 | - | | - | | - | | - | | - | - | 0.332 | - |
| SEW Eng/JRAE | Various | Various : Various | 15.978 | - | | - | | - | | - | | - | - | 15.978 | - |
| SEW Eng/CWIX | C/CPFF | SAIC : McLean, VA | 0.000 | - | | 0.190 | Jan 2015 | 0.182 | Jan 2016 | - | | 0.182 | Continuing | Continuing | Continuing |
| SEW Eng/CWIX | C/CPFF | AUSGAR : San Diego, CA | 0.000 | - | | 0.100 | Mar 2015 | 0.095 | Mar 2016 | - | | 0.095 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 50.751 | 0.971 | | 0.878 | | 0.837 | | - | | 0.837 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACQ Workforce Fund | Various | Various : Various | 0.071 | - | | - | | - | | - | | - | - | 0.071 | - |
| | | **Subtotal** | 0.071 | - | | - | | - | | - | | - | - | 0.071 | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 180.418 | 7.943 | | 7.508 | | 7.341 | | - | | 7.341 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

| | FY 2014 | | | | FY 2015 | | | | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 2144*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Coalition Warrior Interoperability Demonstration/Coalition Warrior Interoperability Experiment (CWID/CWIX): Schedule as directed by the Joint Management Office (JMO) during execution year. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2144 / *Space & Elec Warfare Engineering* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2144*** | | | | |
| Coalition Warrior Interoperability Demonstration/Coalition Warrior Interoperability Experiment (CWID/CWIX): Schedule as directed by the Joint Management Office (JMO) during execution year. | 1 | 2014 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>2356 / *Maritime Concept Generation & Development* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2356: *Maritime Concept Generation & Development* | 4.191 | 9.789 | 5.346 | 8.390 | - | 8.390 | 8.668 | 8.829 | 9.012 | 9.200 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

In FY 2014 and FY 2015 the Maritime Concept Generation and Development project also included funding for the CNO's Rapid Innovation Cell (CRIC). Beginning in FY 2016 funding for the CNO's Rapid Innovation Cell (CRIC) is in Project 2140.

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

In "A Cooperative Strategy for 21st Century Seapower" then CNO, ADM Gary Roughead, reiterated the importance of fleet experimentation "Specific initiatives in support of this strategy must be vetted and tested over time through experimentation, wargaming, and continued operational experience..."

The "Naval Operations Concept of 2010 (NOC 10)" included direct references to experimentation: "The ideas in NOC 10 will be refined over time through wargaming, experimentation, operational analysis and practical experience - ultimately resulting in changes to the way naval forces are employed."

In a June 2013 Proceedings article entitled "A New Naval Era", the current CNO and the Commandant of the Marine Corps discussed the importance of a Navy-Marine Corps team dedicated to redefining the contours of tomorrow's naval force today through innovation and experimentation.

The Maritime Concept Generation and Concept Development project funds four main efforts:
(1) Experimentation in support of the Concept Generation/Concept Development (CG/CD) program. The priorities for the CG/CD program are to explore near/far-term technological and non-technological solutions to war fighting gaps across all naval warfare areas. The associated experimentation efforts include planning, systems engineering and integration, modeling and simulation support, event execution, data collection, analysis, and assessment for a wide-range of experiment venues, such as workshops, seminars, war games, limited objective experiments, limited technical experiments, and live force events.
(2) Provides planning, execution and analysis support to the Fleet Experimentation (FLEX) program, a joint U.S. Fleet Forces/Pacific Fleet effort managed by NWDC, and the only program. NWDC provides planning, systems engineering and integration, execution, data collection, and analysis support for FLEX events to address identified warfighting gaps prioritized in the CUSFF/CPF Commander's Guidance for Fleet Experimentation. The FLEX program and efforts of the FLEX team support the "last tactical mile" of many other Navy Science and Technology (S&T) programs by supporting those programs when the technology is mature enough and requires evaluation on or by a "fleet asset" - ships, airplanes, submarines, sailors. Reductions in FLEX program support cause many other innovative/S&T programs to also suffer the consequences through the loss of the expertise resident in the FLEX program/team.
(3) Provides Modeling and Simulation (M&S) support to FLEX and NWDC experimentation efforts. Where practical M&S is used to stimulate decision making during wargaming and experimentation vice the more expensive and difficult use of live forces.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

(4) Provides for the Navy's Tactical Development and Evaluation (TAC D&E) program, managed by NWDC. This program, focused on providing near-term solutions to address specific fleet-identified tactical issues. Proposed projects are submitted by fleet units, prioritized against Commander's Guidance issued by Commander US Fleet Forces and Commander Pacific Fleet, and then funded to the extent of the available funding.

Products produced include:
- Concepts signed by the CNO that influence future funding and technological development
- White papers (think pieces) intended to generate further discussion within Navy leadership
- Experimentation final reports (including analysis and recommendations)
- FLEX event Analysis Reports
- FLEX event DOTMLPF change recommendations
- New/revised doctrinal and Tactics/Techniques/Procedures publications
- Tactical Memorandum (TACMEMOs)(draft doctrine)
- Concepts of Operation (CONOPS)
- Tactical Decision Aids (TACAIDS)

Specific products are listed in the Accomplishments/Plans section of this exhibit.

Tis project shows an increase from FY 2015 to FY 2016 even though the CRIC is funded from its own project in FY 2016. The FY 2015 funding, however, did not adequately cover the CRIC projects approved for execution by the CNO (approximately $3M shortfall) nor did it adequately cover experimentation support costs (reduction of contractor support resulted in down-scoping of some experimentation efforts). The lack of adequate FY 2015 funding has put NWDC in a position where FY 2016 funding will be required during October 2015 to avoid a work stoppage.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Maritime Concept Generation and Development | 9.789 | 5.346 | 8.390 | - | 8.390 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** In FY 2014 and FY 2015 this project funded:<br>- portions of the CNO's Concept Generation/Concept Development program.<br>- NWDC management, planning and execution support to the Fleet Experimentation (FLEX) program.<br>- Modeling and Simulation support to the FLEX program.<br>- CNO's Rapid Innovation Cell (CRIC).<br>- Navy's Tactical Development and Evaluation (TAC D&E) program.<br><br>In FY 2016 funding for the CNO's Rapid Innovation Cell (CRIC) moves to a new project, 2140. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***FY 2014 Accomplishments:***<br>Concept Generation/Concept Development<br>* Completed the Undersea Domain Operating Concept, an idea of how to maintain and maximize our advantages in the undersea environment, which was signed by the CNO along with a POA&M assigning actions to appropriate stakeholders. One of those actions included developing an Undersea Domain Operating Concept experimentation campaign to assist in turning the conceptual ideas into reality.<br>* Completed development of the Information Dominance Enabling Concept: Assured C2 (IDEC) which was signed by the CNO in Dec 2014. This concept focused on how we prevail in an A2/AD environment.<br>* Completed the Counter-Intelligence, Surveillance, Reconnaissance (C-ISR) concept which is awaiting VCNO endorsement. This concept is focused on creating a temporary window of access in a robust A2/AD environment.<br>* Completed work on the Joint Concept for Rapid Aggregation (JCRA), a Joint Staff concept that will improve speed of response to global crises given the future operating environment. The draft is currently being reviewed by the Service N3/5s.<br>* Started development of the Agile Forward Presence concept which is focused on a different way of deploying forces and providing presence. The first draft is being circulated to numerous stakeholders for feedback.<br>* Started development of the Distributed Naval Air Operations concept which is focused on a way of spreading air strike capabilities across multiple platforms. The first draft is being circulated to numerous stakeholders for feedback.<br>* Completed a White Paper for a prospective concept on Operational Logistics (OPLOG). The concept will focus on ways to mitigate challenges to sustainment in the future operating environment. This White Paper is at CUSFF//CPF for approval.<br>* Completed a White Paper for a prospective concept on Electro-Magnetic Maneuver Warfare (EMW). The concept will focus on methods to enable friendly forces to maneuver within a contested electromagnetic environment. this White Paper is at CUSFF/CPF for approval.<br>* Began work on an update to the 2006 Operating Concept for the Rail Gun. NWDC is managing the project with NAVSEA 405 as the customer. First draft is due in Mar 2015.<br>* Worked with the Combined Joint Operations from the Sea Center for Excellence (CJOS COE), a NATO command, on the Allied Maritime ISR concept to improve allied interoperability with ISR capabilities. Allied Command for Transformation (ACT) has placed this concept on hold. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| NWDC provides design, planning, systems engineering and integration, modeling and simulation support, event execution, data collection, analysis, and assessment support for a wide-range of Fleet Experimentation (FLEX) program experiment venues, such as workshops, seminars, war games, limited objective experiments, limited technical experiments, and live force events. Following is information on some of the FLEX events supported in FY 2014:<br>* Completed the Fleet Battle Experiment 13 (FBX 13) as part of the FLEX 2013 Execution Plan. The execution event, done in conjunction with a fleet training/certification event was delayed to Nov 2013 due to ship scheduling issues. FBX 13, the culminating event of a three year Counter-Intelligence, Surveillance and Reconnaissance (C-ISR) campaign evaluated the tactical use and integration of several classified technologies in an operational environment. As a result of FBX 13 four new tactical publications have been produced.<br>* The Naval Integrated Fire Control - Counter Air (NIFC-CA) is a complex system of systems capability being deployed on Carrier Strike Groups beginning in 2016. A multi-year campaign plan was developed to aid in the integration,tactics development, and employment of this complex system. The FY-14 portion of the multi-year plan included all of the planning and preliminary events leading up to Wargame #2 that was held in Dec 2014. Those preliminary events included a series of six workshops that developed/examined NIFC-CA tactics and system capabilities/limitations. The Assessment Report (due in Jan 2015) will inform updates to the NIFC-CA CONOPS, other air warfare related doctrinal publications, and fleet training programs and exercises.<br>* The Laser Weapon System (LAWS) Experimentation Campaign is a multi-year effort that began in 2012 with BLACK DART 2012 with the first successful engagement of an unmanned aerial vehicle with a laser weapon system from a US warship (USA DEWEY, DDG 105). As a result of this experiment the CNO directed the installation and deployment of a laser prototype on USS PONCE (AFSB-1) in FY 2014. An operational demonstration of that system against operationally representative targets in a realistic environment was accomplished in Nov 2014. That effort, part of the FLEX 2014 plan, is producing a Final Report (including analysis and recommendations) as well as a Solid State Laser Tactical Memorandum (TACMEMO), draft tactics for the safe and effective utilization of this new system.<br>* The Aegis Ashore Wargame, conducted as part of the FLEX 2014 Execution Plan, was an examination by Navy stakeholders of the operational, training, and logistics requirements to effectively sustain and operate the Aegis Ashore system as a critical part of the European Phased Adaptive Approach - the President's plan to provide Ballistic Missile Defense of Europe. This effort produced a QuickLook Report, Final Experiment Report, and an Analysis Report - all of which identified "wholeness" gaps (operational, employment, training, logistics and sustainment) as well as an evaluation of the adequacy of the Aegis Ashore Platform Wholeness CONOPS.<br>* The JHSV Campaign Plan was conducted in two parts - SPEARHEAD's (JHSV-1) maiden deployment to COMSIXTHFLT and operations in the COMFOURTHFLT area. The purpose of the campaign, which will | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| continue into FY-15, is to examine other missions for which the JHSV is suitable with little to no modification to the existing sea frame. The C6F efforts looked at the use of the JHSV in Theater Security Cooperation, Maritime Command and Control, and Afloat Forward Staging Base missions; while the primary focus of the C4F efforts looked at its use in Counter-Illicit Trafficking operations. A follow-on JHSV/MLP wargame examined interoperability issues associated with the MLP and the JHSV, LMSR, LCS, and other ship-to-shore connectors. The major products of the FY-14 efforts include a Final Experiment Report which will inform key OPNAV investment decisions; and revisions to the JHSV Platform Wholeness CONOPS, JHSV Warfighting CONOPS and AFP Fleet CONOPS.<br>* Executed the Obscurants Campaign, a three phased experiment focused on assessing the potential of Naval Obscurants to reduce the vulnerability of U.S. platforms to detection and targeting, and identifying the potential detrimental effects on own-ship systems including radar, communications, machinery and human health. A great deal of existing data from previous Army and Navy obscurants efforts was utilized in building the campaign plan. The plan consisted of a Modeling & Simulation event (Phase I), a shore based event (Phase II), and an at-sea event in the COMSEVENTHFLT (C7F) area. Phases I and II provided risk-mitigation, increased the knowledge base, and aided in the design and planning for Phase III. Products included a Final Experiment Report and a draft Obscurants Employment Manual.<br>* Executed Trident Warrior (TW) 14 in conjunction with RIMPAC, a large multi-national exercise. Trident Warrior is an annual at-sea warfighting event that in 2014 evaluated the potential military utility of 37 new and emerging capabilities (including eight initiatives sponsored by the AUSCANNZUKUS experimentation alliance) and involved 7 USN ships, 3 allied ships, and 11 US and allied shore installations. Integrating this experiment into RIMPAC 14 leveraged planned steaming days, flight hours, and the operational environment to conduct a cost-effective large-scale at-sea experimentation event. The three specific functions of TW were to: (1) identify and capture innovative solutions that addressed prioritized fleet warfighting gaps; (2) refine systems interfaces and interoperability using fleet operator input in an operational environment; and (3) develop and deliver documents that inform operations and key investment decisions. In addition to the Final Experiment Report (which will include DOTMLPF recommendations), products include changes to seven existing tactical publications, inputs to four tactical publications currently in draft, and the input to five original tactical publications. Of interest, one of the key initiatives evaluated was the CNO Speed to Fleet Transportable EW Module (TEWM) with the immediate benefit being the accelerated deployment of that system on ships deployed to the C6F area.<br>* Continued work on the multi-year Fast Attack Craft/Fast Inshore Attack Craft (FAC/FIAC) campaign plan by identifying and testing near-term (within 12 months) capability improvements to the fleet. The Final Experiment Report will provide recommended changes to current FAC/FIAC doctrine as well as DOTMLPF recommendations to inform acquisition decisions. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Executed Undersea Warfare Employment of Emerging Technologies (USWEET) 14, an experiment focused on evaluating emerging technologies with the potential to close anti-submarine and mine warfare capability gaps. The focus of USWEET 14 was on shallow water surveillance and several systems were examined. The Experiment Final Report includes DOTMLPF recommendations that will inform acquisition investment decisions.<br>* Executed experimentation phase of Valiant Shield 2014 (VS14), a bi-annual exercise focused on at-sea training in the Pacific area of operations. The VS14 experimentation phase included 21 experiments and demonstrations examined C-ISR tactics, joint interoperability of selected forces, theater-wide strategic communications, ASW in a multi-threat environment, electronic attack, and distributed basing. In addition to the VS14 Final Experiment Report (DOTMLPF recommendations), the Unmanned Aircraft Systems Third Party Targeting TACMEMO and the Employment of surface Warfare Tactical Tomahawk TACBUL (Tactical Bulletin) were validated.<br>* Executed the Joint Standoff Weapon - C (JSOW-C) employment Limited Objective Experiment (LOE). The focus was to evaluate live JSOW-C employment tactics using a simulated artillery bunker as a target. The result were two updates to the TOPGUN manual - one describing JSOW-C employment in a complex tactical environment and the other describing JSOW-C employment in an Electronic Attack environment.<br>* Executed the F-35B and LHA/D Integration Wargame, the focus of which was to inform development of a Fleet Warfighting CONOPS on F-35B employment as part of a large Naval Force beyond the traditional ACE-MEU/ ARG configuration. This event brought together a large number of subject matter experts to evaluate three different F-35B/MV-22 embarkation options in a variety of different scenarios postulated in the HQMC LHA/D and F-35B Integration White Paper and determine the advantages/disadvantages of each. In addition to the Final Experiment Report which included the findings and recommendations, this effort informed the development of a F-35B and LHA/D Fleet Warfighting CONOPS, and recommended changes to the Amphibious Assault Ship and F-35B Aircraft Integration Platform Wholeness CONOPS.<br><br>Preliminary planning work was started on the following events in the FLEX Execution Plan for 2015:<br>* Continued work on the Trident Warrior experimentation campaign with advance planning for Trident Warrior 15, to be done in conjunction with C7F.<br>* Continued planning for the FY15 events in the NIFC-CA Experimentation Campaign.<br>* Started advance planning for the FY15 Rail Gun Wargame.<br>* Started advance planning for the FY15 Counter FAC/FIAC At-Sea Experiment.<br>* Started advance planning for the Netted Sensors At-Sea Experiment.<br>* Continued planning for the COMFOURTHFLT JHSV At-Sea Experiment that was postponed from FY-14 to FY-15 due to equipment casualties. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Started advance planning for the 5 Eyes UUV Operations Wargames.<br>* Started advance planning for the LPD-17 Wargame.<br>* Started advance planning for the Alternative Platforms with Payloads Wargame.<br><br>During FY 2014 and FY 2015 the CNO's Rapid Innovation Cell (CRIC) was funded under Project 2356 - for FY 2016 and beyond Project 2140 has been created for CRIC funding. For traceability purposes this data appears under both projects.<br>FY 2014 CRIC accomplishments included:<br>* Completed the Additive Manufacturing (3D Printing) project started in FY 2013 and transitioned it to OPNAV N4. This project placed a 3D printer at Dam Neck and another on board a forward deployed amphibious ship where data was gathered on the various ways sailors were able to use it to make themselves more productive and their jobs easier. 3D printing has the potential to dramatically alter afloat maintenance and logistics by providing the ability to fabricate some types of spare parts on board vice waiting weeks for them to be shipped from a warehouse.<br>* Completed the Electronic Warfare Battle Management (EWBM) project that was kick-started in FY 2013 with a small amount of internally re-prioritized NWDC funding. This project attempted to integrate meteorological data into an EW battlefield visualization system being developed by ONR. It showed promise but more work is required beyond the capability of the CRIC, and the project has been picked up by the ONR team.<br>* Reached a decision point on the development of the SURF project, a high-speed payout, expendable underwater fiber-optic cable suspended beneath the surface that can be deployed from a ship and used for high speed transport of data over tens or hundreds of miles. The decision was made to suspend funding on the project pending the resolution of the "connector" issue.<br>* Completed initial development of the Ocean Augmented Reality project, a next generation "heads-up" display using commercial off-the-shelf technology. The initial tests showed great potential for use in maintenance applications - future work in FY 2015 and possibly 2016 will explore more uses both ashore and afloat.<br>* Continued development of the Hyper Agile Model Driven Development (HAMMD) project, a way to more rapidly/cheaply develop software solutions. The USAF was originally providing a significant amount of funding but it was lost during USAF budget drills. The result was a suspension of work pending the availability of additional funding from another source.<br>* Continued development of the Battle School project (kick-started in late FY 2013 with internally re-prioritized NWDC funding), a simulation driven tactical crowd-sourced wargame with potential uses in training and education environments. Initial response was good, resulting in some modifications that will continue into FY 2015. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Began development of the B++ project and transitioned it to NAVCYBERCOM (classified). The initial demonstration of the project was successful and generated the CNO's comment that "if the CRIC produces nothing more than B++ it has been a success." Some residual follow-up work to complete the CRIC portion of the project remains to be done with FY 2015 CRIC funding.<br>* Began development of the Silent Nemo project, a small, autonomous, biomimetic UUV with potential for use in ISR missions. Development will continue with some FY 2015 funding with the possibility of some spill-over into FY 2016.<br>* Began initial planning of the Waste to Watts project, a solid state anerobic digester to convert waste to energy and help reduce energy requirements. The prototype is being installed at the U.S. Naval Academy. | | | | | |
| ***FY 2015 Plans:***<br>Continue all FY 2014 Concept Generation/Concept Development efforts that were not completed in FY14 and begin development of new concepts resulting from the idea harvesting/Four Star approval of previous years.<br>* Continue development of the Agile Forward Presence concept which is focused on a different way of deploying forces and providing presence. Produce an updated draft based on stakeholder feedback.<br>* Continue development of the Distributed Naval Air Operations concept which is focused on a way of spreading air strike capabilities across multiple platforms. Produce an updated draft based on stakeholder feedback.<br>* After White Paper approval by CUSFF/CPF, begin development of an Operational Logistics (OPLOG) concept focused on ways to mitigate challenges to sustainment in the future operating environment.<br>* After White Paper approval by CUSFF/CPF, begin development of an Electro-Magnetic Maneuver Warfare (EMW) concept focused on methods to enable friendly forces to maneuver within a contested electromagnetic environment.<br>* Continue work on an update to the 2006 Operating Concept for the Rail Gun. NWDC is managing the project with NAVSEA 405 as the customer. First draft is due in Mar 2015.<br>* Continue to work with the Combined Joint Operations from the Sea Center for Excellence (CJOS COE), a NATO command, on the Allied Maritime ISR concept to improve allied interoperability with ISR capabilities.<br>* Complete development of a White Paper on a Navy Concept for Sea Denial Operations and forward to CUSFF/CPF for approval. After White Paper approval begin development of the concept.<br>* Complete development of a White Paper on a Cross Domain Operations concept and forward to CUSFF/CPF for approval. After White Paper approval begin development of the concept.<br>* Provide the completed White Paper on Sowing Chaos/Harvesting Advantages to stakeholders for feedback prior to CUSFF/CPF approval. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Begin development of a White Paper on a Navy Capstone Concept for Operations for possible CUSFF/CPF approval.<br><br>Complete remaining events from the FY 2014 FLEX Execution Plan, continue work on the multi-year campaign plans, and execute the FY 2015 FLEX Execution Plan:<br>* Complete Bold Alligator 14 (Oct-Nov 14), an event focused on Navy-Marine Corps integration and Command and Control, and provide Final Report containing DOTMLPF recommendations to Navy and Marine Corps stakeholders.<br>* Complete any hold-over tasking originating from the Dec 2014 NIFC-CA wargame.<br>* Continue to work on items from the Undersea Domain Operating Concept experimentation campaign which is focused on ways to maintain and maximize our advantages in the undersea environment.<br>* Continue to work on items from the Naval Integrated Fire Control - Counter Air (NIFC-CA) experimentation campaign which is focused on the integration of advanced air defense capabilities.<br>* Continue to work on items from the Counter-Intelligence, Surveillance, Reconnaissance (C-ISR) experimentation campaign which is focused on tactics and technologies to counter the adversary's ISR systems.<br>* Continue to work on items from the Command and Control in a Denied/Degraded Environment (C2D2E) experimentation campaign which is focused on tactics to ensure connectivity when communication systems are attacked.<br>* Continue planning and execution of Trident Warrior 15, an annual event that looks at the integration and use of emerging technologies. TW15 will be executed in the C7F area and will focus on the needs of the forward deployed forces.<br>* Plan and execute the Alternate Platforms with Payloads Wargame focused on how USNS platforms can be used for selected missions generally accomplished with gray-hull platforms. Products will inform future investment decisions and CONOPS for the use of these USNS platforms.<br>* Continue the planning and execute the JHSV LOE 2 in the C4F area, an event that was postponed from FY-14 to FY-15 due to equipment casualties. The FY-15 efforts will look at the capability of the JHSV to support several Adaptive Force Packages, specifically Mine Warfare, Counter-Trafficking Afloat Forward Staging Base, and organic Unmanned Aerial Systems support. The products of this event will inform investment decisions and CONOPS for the use of these Adaptive Force Packages and the JHSV.<br>* Plan and execute the Netted Sensors At-Sea Experiment, an event that will look at eight different initiatives that will fuze data from multiple sensors into a single picture, greatly improving situational awareness. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Plan and execute the Electromagnetic Maneuver Warfare (EMW) experimentation initiatives scheduled for several different events during FY-15 including two different wargames and an at-sea event. This will be the first year of an extended multi-year EMW experimentation looking at ways to increase our ability to utilize the electromagnetic spectrum while limited our adversaries' ability to do the same. The products of the FY-15 events will inform future investment decisions as well as provide updates to six different tactics and doctrinal publications.<br>* Plan and execute the Counter FAC/FIAC At-Sea element of the 2015 FLEX Execution Plan. This FY-15 event will focus on the use of small armed UAVs against hostile boats, and will inform investment decisions and updated tactics.<br>* Plan and execute the 5 Eyes Unmanned Undersea Vehicles (UUV) Operations Wargame. This will be a two phased wargame focused on the employment of integrated UUVs operating in a coalition environment. The product of this experiment will be a 5 Eyes releasable Tactical Memorandum (TACMEMO).<br>* Plan and execute the LPD-17 Wargame, an event that will focus on the feasibility of using the LPD-17 class to perform additional missions as a Regional/Sector Air Defense Coordinator, and as an alternate Command and Control platform. The results of this wargame will inform changes to various LPD-17 documents including the Class Tactical Manual and the LPD-17 manning plan.<br>* Complete the planning and execute the Rail Gun Wargame, the purpose of which is to inform the update of the Rail Gun Operating Concept.<br><br>During FY 2014 and FY 2015 the CNO's Rapid Innovation Cell (CRIC) was funded under Project 2356 - for FY 2016 and beyond Project 2140 has been created for CRIC funding. For traceability purposes this data appears under both projects.<br>* Continue work on Silent Nemo, a small, autonomous, biomimetic UUV with a multitude of possible ISR related issues.<br>* Continue to work on Waste to Watts, a solid state anerobic digester to convert waste to energy. The prototype is being installed and tested at the U.S. Naval Academy and is turning the waste products from the galley into electricity returned to the USNA power grid. If successful there are applications for this product at numerous shore installations around the world.<br>* Continue advanced development of the Ocean Augmented Reality project, a next generation "heads-up" displays using commercial off-the-shelf technology. Work in FY 2015 will focus on the development of additional "apps" in response to various fleet identified uses. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| * Continue development of the Hyper Agile Model Driven Development project, a way to more rapidly/cheaply develop specialized software applications (dependent on available funding).<br>* Continue advanced development of the Battle School project, a simulation driven tactical crowd-sourced wargame.<br>* Begin work on the Acoustic Jammer project, an idea to use off-the-shelf technology to overload adversary sonar systems (may be delayed until FY 2016 start due to separation from the Navy of the project lead and delay in identifying a replacement).<br>* Begin work on the Littoral Operations Center project, an idea to combine existing off-the-systems to create small operations centers suitable for use on small platforms and ashore.<br>* Begin work on the Statistically driven Maintenance Analysis and Reporting Technology (SMART) model which uses existing data to better predict maintenance needs. It builds on existing work done within the F/A-18 maintenance community.<br>* Begin work on the Cosmo Gator project, an alternative navigation capability when GPS is not available (may be delayed until FY 2016 start due to rotation of the project lead to a deployed sea tour and delay in identifying a replacement). | | | | | |
| ***FY 2016 Base Plans:***<br>Continue CG/CD development efforts that carry-over from FY 2014 and FY 2015.<br>* Begin development of new concepts resulting from the idea harvesting/Four Star approval from previous years.<br><br>The Fleet Experimentation (FLEX) FY 2016 Execution Plan is based on two sets of inputs. The first is the FY 2016 events from the multi-year campaign plans developed to address major capability gaps. The second is based on recently identified fleet capability gaps that can be addressed within a single event. The experimentation for those recently identified capability gaps is proposed during the FY 2016 Execution Plan Development Conference scheduled for 1-2 Apr 2015. At that conference numbered fleets, warfare centers, Navy labs and other stakeholders present their plans and needs for FY 2016. Those needs are then prioritized based on the Commander USFF/Commander Pacific Fleet guidance message, combined with the FY 2016 events from the multi-year campaign plans, and developed into a proposed execution plan that will be refined during Q3 FY 2015 and approved by the two Fleet Commanders in early Q4 FY 2015. At that point the available FY 2016 funding is applied to the execution plan to form a FY 2016 spend plan and advance planning begins on the FY 2016 experimentation events. Following that we should have a much firmer picture of the actual events, contract costs, etc. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Execute FY 2016 events of the following Experimentation campaigns:<br>* Undersea Domain Operating Concept (UDOC) experimentation campaign (experimentation on ways to maintain and maximize our advantages in the undersea environment).<br>* Naval Integrated Fire Control - Counter Air (NIFC-CA) experimentation campaign (integration of advanced air defense capabilities).<br>* Counter-Intelligence, Surveillance, Reconnaissance (C-ISR) experimentation campaign (tactics and technologies to counter the adversary's ISR systems).<br>* Command and Control in a Denied/Degraded Environment (C2D2E) experimentation campaign (tactics when communication systems are attacked).<br>* Trident Warrior experimentation campaign with the planning and execution of Trident Warrior 16 (use of the new/improved N2/N6 related technologies and tactics selected for examination in FY 2016). Trident Warrior 16 will be conducted in conjunction with RIMPAC 2016, a multi-national Pacific area training exercise.<br>* F-35/LHD Integration experimentation campaign.<br>* Multi-mission strike group operations in a complex electromagnetic spectrum environment (how to best maximize use and minimize mutual interference).<br><br>Complete execution of the following FY 2015 experiments that carry over into FY 2016:<br>* Joint Assured Access (integration of joint capabilities to assure access when needed).<br>* Unmanned Systems Utilization (integrate and maximize existing and developing unmanned systems).<br>* Introduction of Adaptive Force Packages for LCS, JHSV and Mobile Landing Platforms (MLP)<br>* Introduction of DDG-1000 (integration of new platform).<br>* Electromagnetic Maneuver Warfare (maximize our advantage in the electromagnetic environment).<br><br>Begin development of experimentation campaigns as laid out in the CUSFF/CPF "Commander's Guidance for Fleet Experimentation" for FY 2016 and FY 2017 which will be released in Q2 2015.<br><br>There has been no funding available for Tactical Development and Evaluation (TAC D&E) projects since FY 2012 which has resulted in a backlog of proposed projects with tactical utility. Some of have incorporated into existing or planned experimentation events when practical but most have been deferred. The TAC D&E program, a CNO directed NWDC responsibility with no dedicated funding line, provides a way for the fleet to identify potential solutions to narrowly defined tactical issues, generally in the form of a Tactical Memorandum (TACMEMO). Based on current projected FY 2016 funding NWDC expects to dedicate $2-3M across multiple projects drawn from the backlog and new proposals. Since the purpose of the program is to respond to today's | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| fleet issues, the projects to be funded will be determined in early Q3 2015. Among those that will be considered are:<br>* Tactical usage of small Unmanned Aerial Vehicles (UAVs) from small platforms such as patrol craft (PCs) and riverine boats.<br>* Tactical usage of small UAVs from Military Sealift Command platforms being used in non-traditional missions.<br>* Tactical usage of small, armed UAVs in a SOF support role.<br>* Tactical usage of small, armed UAVs in a counter FAC/FIAC role.<br>* Tactical usage of small UAVs in a communications relay role.<br>* Tactical usage of small Unmanned Surface Vessels (USVs) in a counter FAC/FIAC role.<br>* Revised drop points for light-weight torpedoes against new adversary undersea platforms.<br>* Tactical usage of non-traditional weapons against bottomed submarines.<br>* Tactical usage of non-traditional weapons against shallow-water mines.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 9.789 | 5.346 | 8.390 | - | 8.390 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

This funding is generally used to buy people to generate/develop/validate concepts, or to build and analyze the results of experiments focused on improved processes and tactics/techniques/procedures to mitigate identified war fighting gaps. The majority of this funding buys a core group of contractors who provide experiment design, execution and analysis support while the remainder is used to buy specific skill sets that are not part of the core group, and also cover some of the engineering and integration costs associated with certain experiments.

**E. Performance Metrics**

Maritime Concept Generation and Development/Related Experimentation:
- Refine concepts and identify key performance levels necessary for implementation.
- Demonstrate feasibility and discriminate among competing concepts and implementation alternatives.
- Understand potential military effectiveness and risk.
- Evaluate how much of the new capability and attendant force structure is needed.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

- Learn how to operate the new force and combine it with the legacy force.
- Develop recommended Doctrine, Organization, Training, Materiel, Leadership, and Personnel (DOTMLP) changes.
- Develop fleet war fighting requirements for submission to the OPNAV Navy Capabilities Development Process (NCDP) to inform Navy acquisition decisions.
- Integrate emergent concepts and technologies, leading to rapid introduction of needed war fighting capabilities in the fleet.
- Rapidly mature concepts, technologies, and doctrine.
- Focus on near, mid and long term war fighting challenges to realize increased war fighting effectiveness.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Test and Evaluation | C/CPFF | Defense Technical Information Center : Ft Belvoir VA | 3.000 | 4.000 | Oct 2013 | 2.000 | Feb 2015 | 2.400 | Nov 2015 | - | | 2.400 | Continuing | Continuing | Continuing |
| System Test and Evaluation | Various | SPAWARSYSCEN Atlantic : San Diego CA | 0.250 | 1.600 | Jan 2014 | 0.562 | Jan 2015 | - | | - | | - | Continuing | Continuing | Continuing |
| System Test and Evaluation | Various | ONR : Washington DC | 0.200 | 0.920 | Mar 2014 | 0.250 | Mar 2015 | 0.990 | Dec 2015 | - | | 0.990 | Continuing | Continuing | Continuing |
| System Test and Evaluation | Various | NAVSEA : Washington DC | 0.000 | 0.800 | Feb 2014 | 0.534 | Jan 2015 | 0.500 | Dec 2015 | - | | 0.500 | - | 1.834 | - |
| System Test and Evaluation | C/CPFF | NAVSUP : Norfolk VA | 0.000 | 0.500 | May 2014 | 1.500 | May 2015 | 4.000 | Dec 2015 | - | | 4.000 | - | 6.000 | - |
| System Test and Evaluation | WR | Naval Underwater Warfare Center : Newport RI | 0.000 | 0.500 | Jan 2014 | - | | - | | - | | - | - | 0.500 | - |
| | | **Subtotal** | 3.450 | 8.320 | | 4.846 | | 7.890 | | - | | 7.890 | - | - | - |

**Remarks**

The vast majority of the contract costs are for people, primarily on two large Multi-Award contracts, one through DTIC (Defense Services MAC) and one through NAVSUP (Joint Staff J-7 MAC). Task orders on the DS MAC contract provide the majority of the Modeling & Simulation support for experimentation and some of the experiment planner support. Task orders on the JS J-7 MAC provide the majority of the experiment design, planner, and execution support provided by NWDC to the Fleet Experimentation program. With the planned availability of $2-3M FY-16 funding for the Navy's Tactical Development and Evaluation (TAC D&E) program after three years of zero funding, it is anticipated that the TAC D&E projects selected for FY-16 funding will be executed under JS J-7 MAC task orders, thus explaining the dramatic increase. The remaining money is spread across several smaller contracts through NAVSEA, SPAWAR and ONR for CRIC projects and technical support for experimentation and modeling & simulation efforts. The fluctuation from year to year is the result of the expiration of existing contracts and the award from other contracting offices, and the movement of government support between various organizations based on the need of a specific experiment or project.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management | C/FFP | Navy Warfare Development | 0.741 | 1.469 | Oct 2013 | 0.500 | Feb 2015 | 0.500 | Feb 2016 | - | | 0.500 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Command : Norfolk VA | | | | | | | | | | | | | |
| | | **Subtotal** | 0.741 | 1.469 | | 0.500 | | 0.500 | | - | | 0.500 | - | - | - |

**Remarks**

The majority of management costs is in CIVPERS salaries and not reflected in this exhibit. The difference between FY 2014 and FY 2015 was a re-alignment of responsibilities.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 4.191 | 9.789 | | 5.346 | | 8.390 | | - | | 8.390 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| | FY 2007 | | | | FY 2008 | | | | FY 2009 | | | | FY 2010 | | | | FY 2011 | | | | FY 2012 | | | | FY 2013 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 2356*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime Concept Generation and Development Efforts: Undersea Domain Operating Concept development efforts | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime Concept Generation and Development Efforts: Agile Forward Presence Concept | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime Concept Generation and Development Efforts: Distributed Naval Air Operations Concept | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime Concept Generation and Development Efforts: Information Dominance Enabling Concept: Assured C2 Concept | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime Concept Generation and Development Efforts: Counter-Intelligence, Surveillance, Reconnaissance (C-ISR) Concept | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime Concept Generation and Development Efforts: Operational Logistics White Paper | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime Concept Generation and Development Efforts: Rail Gun Operating Concept Update | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime Concept Generation and Development Efforts: Electro-Magnetic Maneuver Warfare White Paper | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Aegis Ashore Wargame | | | | | | | | | | | | | | | | | | | | | | | | | [redacted] | | | |
| Experimentation Efforts: JHSV LOE 1 (C6F) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

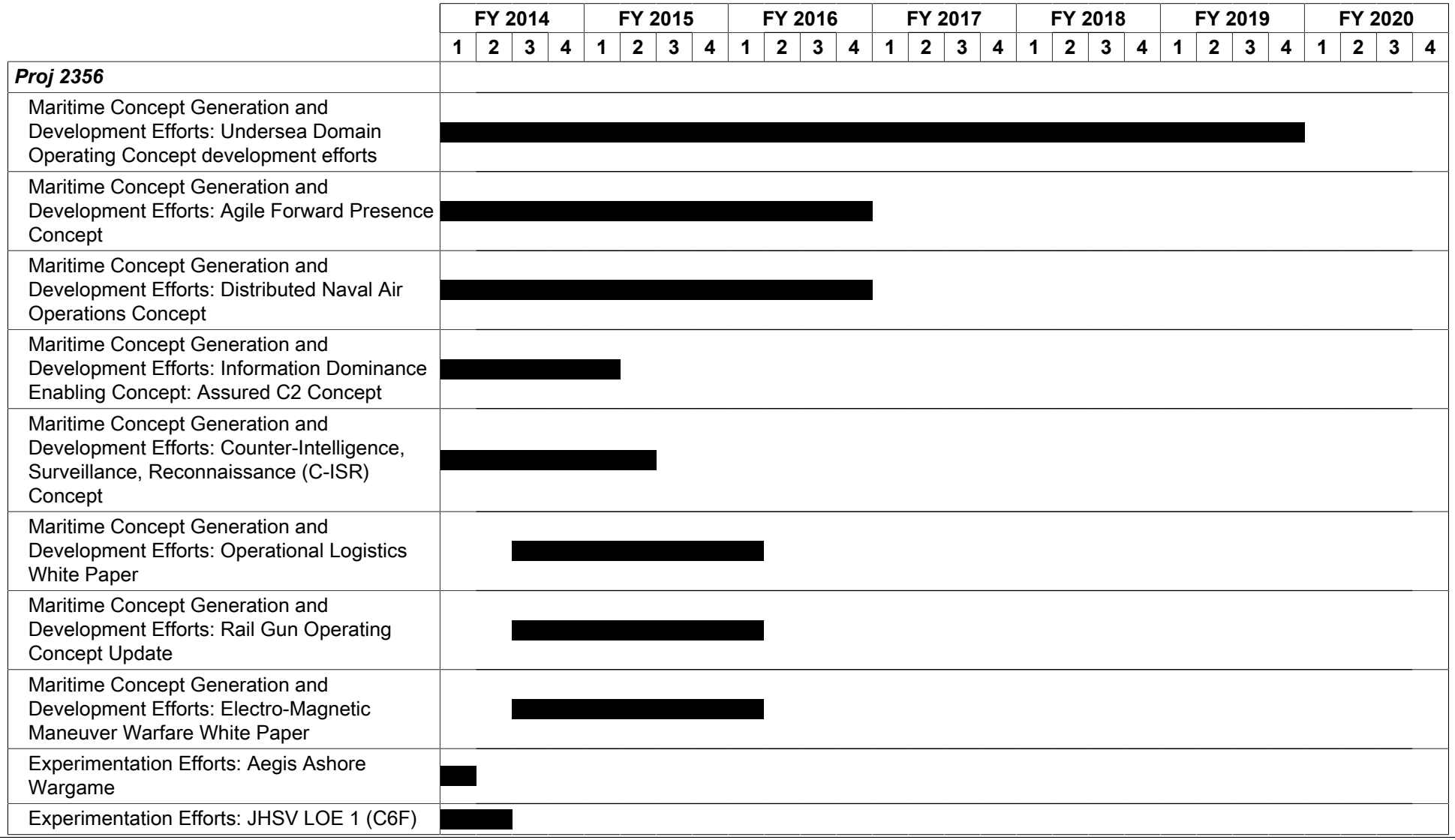
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| | FY 2007 | | | | FY 2008 | | | | FY 2009 | | | | FY 2010 | | | | FY 2011 | | | | FY 2012 | | | | FY 2013 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 |
| Experimentation Efforts: JHSV LOE 2 (C4F) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Trident Warrior 14 (RIMPAC) | | | | | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ |
| Experimentation Efforts: Valiant Shield 14 | | | | | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ |
| Experimentation Efforts: Counter-Intelligence,Surveillance, Reconnaissance (C-ISR) Experimentation Campaign | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Command and Control in a Denied, Degraded Environment (C2D2E)Experimentation Campaign | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Naval Integrated Fires - Counter Air (NIFC-CA) Experimentation Campaign | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Laser Weapon System | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Trident Warrior Experimentation Campaign | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Obscurants Campaign | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Netted Sensors At-Sea Experiment | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Joint Standoff Weapon - C (JSOW-C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Undersea Warfare Employment of Emerging Technologies (USWEET) 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: F-35/LHD Integration Wargame | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

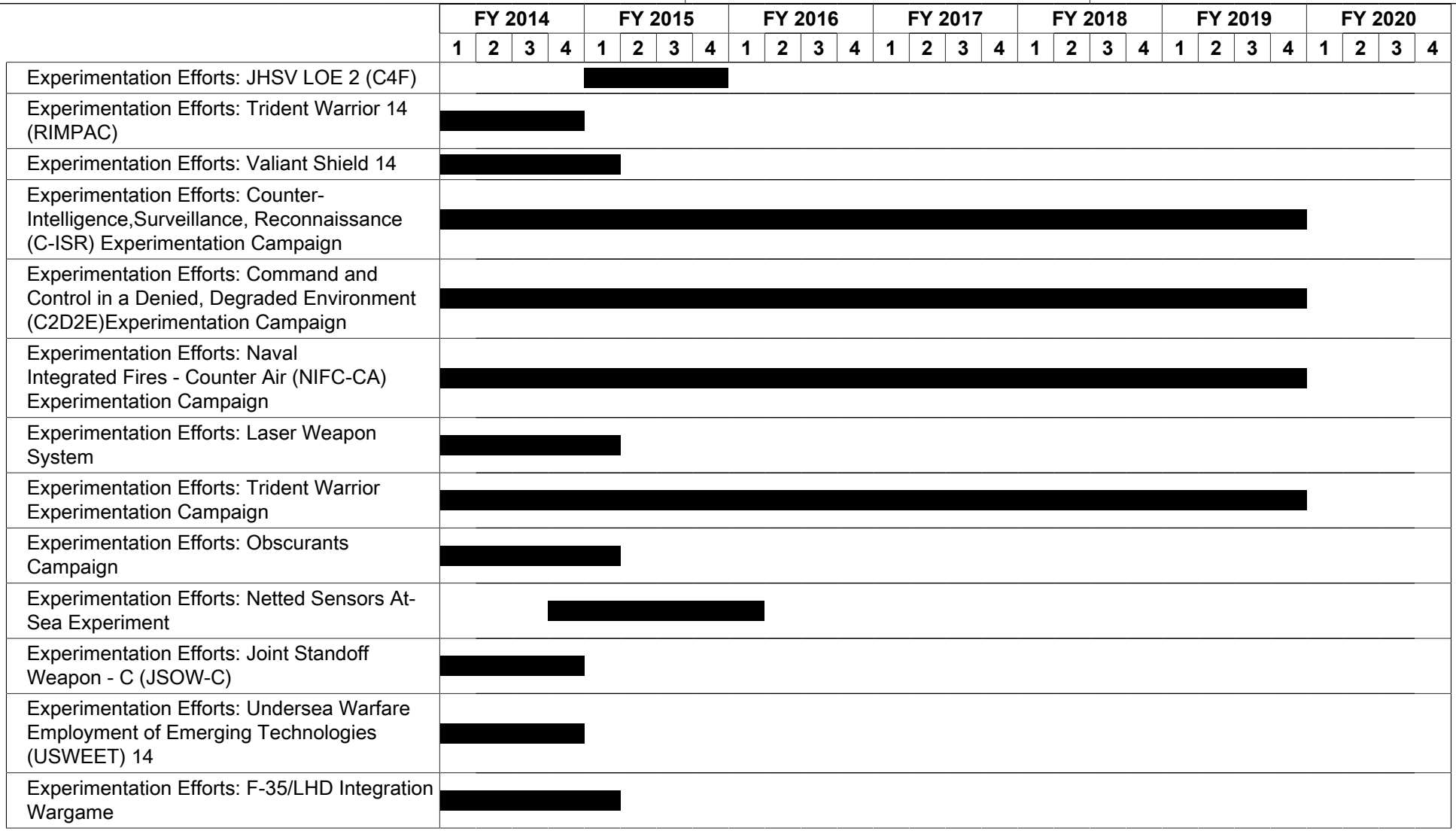
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| | FY 2007 | | | | FY 2008 | | | | FY 2009 | | | | FY 2010 | | | | FY 2011 | | | | FY 2012 | | | | FY 2013 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 |
| Experimentation Efforts: 5 Eyes UUV Operations Wargame | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Rail Gun Wargame | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: LPD-17 Wargame | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Alternative Platforms with Payloads Wargame | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Electromagnetic Maneuver Warfare Experimentation Campaign | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Counter FAC/FIAC At-Sea Experiment | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimentation Efforts: Trident Warrior 15 (w/C7F) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tactical Development and Evaluation (TAC D&E) Projects: TAC D&E 2016-01 (to be selected in mid FY 2015) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tactical Development and Evaluation (TAC D&E) Projects: TAC D&E 2016-02 (to be selected in mid FY 2015) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tactical Development and Evaluation (TAC D&E) Projects: TAC D&E 2016-03 (to be selected in mid FY 1015) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tactical Development and Evaluation (TAC D&E) Projects: TAC D&E 2016-04 (to be selected in mid FY 2015) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

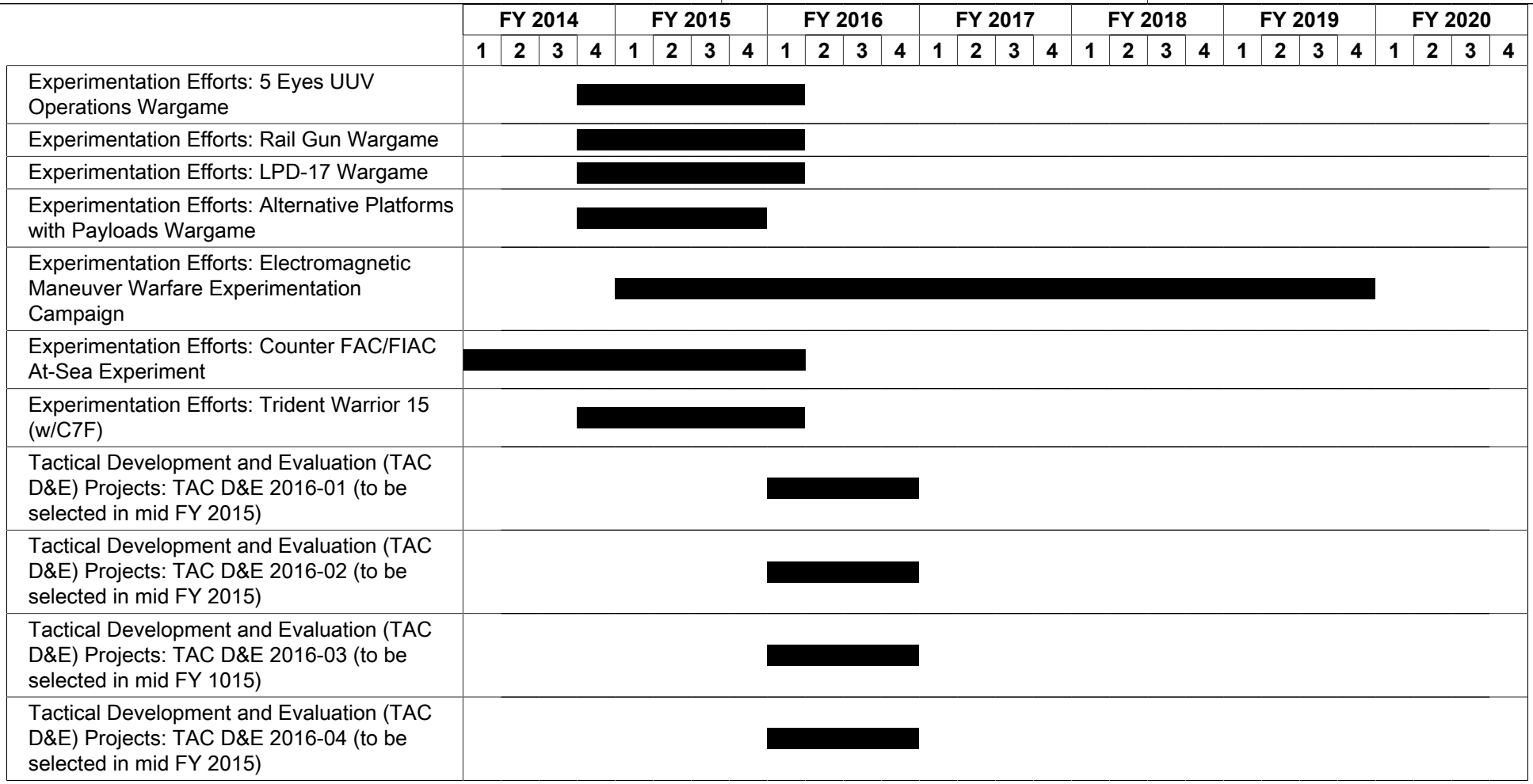
| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2356*** | | | | |
| Maritime Concept Generation and Development Efforts: Undersea Domain Operating Concept development efforts | 1 | 2014 | 4 | 2019 |
| Maritime Concept Generation and Development Efforts: Agile Forward Presence Concept | 1 | 2014 | 4 | 2016 |
| Maritime Concept Generation and Development Efforts: Distributed Naval Air Operations Concept | 1 | 2014 | 4 | 2016 |
| Maritime Concept Generation and Development Efforts: Information Dominance Enabling Concept: Assured C2 Concept | 1 | 2014 | 1 | 2015 |
| Maritime Concept Generation and Development Efforts: Counter-Intelligence, Surveillance, Reconnaissance (C-ISR) Concept | 1 | 2014 | 2 | 2015 |
| Maritime Concept Generation and Development Efforts: Operational Logistics White Paper | 3 | 2014 | 1 | 2016 |
| Maritime Concept Generation and Development Efforts: Rail Gun Operating Concept Update | 3 | 2014 | 1 | 2016 |
| Maritime Concept Generation and Development Efforts: Electro-Magnetic Maneuver Warfare White Paper | 3 | 2014 | 1 | 2016 |
| Experimentation Efforts: Aegis Ashore Wargame | 4 | 2012 | 1 | 2014 |
| Experimentation Efforts: JHSV LOE 1 (C6F) | 1 | 2014 | 2 | 2014 |
| Experimentation Efforts: JHSV LOE 2 (C4F) | 1 | 2015 | 4 | 2015 |
| Experimentation Efforts: Trident Warrior 14 (RIMPAC) | 4 | 2012 | 4 | 2014 |
| Experimentation Efforts: Valiant Shield 14 | 4 | 2012 | 1 | 2015 |
| Experimentation Efforts: Counter-Intelligence,Surveillance, Reconnaissance (C-ISR) Experimentation Campaign | 1 | 2014 | 4 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Experimentation Efforts: Command and Control in a Denied, Degraded Environment (C2D2E)Experimentation Campaign | 1 | 2014 | 4 | 2019 |
| Experimentation Efforts: Naval Integrated Fires - Counter Air (NIFC-CA) Experimentation Campaign | 1 | 2014 | 4 | 2019 |
| Experimentation Efforts: Laser Weapon System | 1 | 2014 | 1 | 2015 |
| Experimentation Efforts: Trident Warrior Experimentation Campaign | 1 | 2014 | 4 | 2019 |
| Experimentation Efforts: Obscurants Campaign | 1 | 2014 | 1 | 2015 |
| Experimentation Efforts: Netted Sensors At-Sea Experiment | 4 | 2014 | 1 | 2016 |
| Experimentation Efforts: Joint Standoff Weapon - C (JSOW-C) | 1 | 2014 | 4 | 2014 |
| Experimentation Efforts: Undersea Warfare Employment of Emerging Technologies (USWEET) 14 | 1 | 2014 | 4 | 2014 |
| Experimentation Efforts: F-35/LHD Integration Wargame | 1 | 2014 | 1 | 2015 |
| Experimentation Efforts: 5 Eyes UUV Operations Wargame | 4 | 2014 | 1 | 2016 |
| Experimentation Efforts: Rail Gun Wargame | 4 | 2014 | 1 | 2016 |
| Experimentation Efforts: LPD-17 Wargame | 4 | 2014 | 1 | 2016 |
| Experimentation Efforts: Alternative Platforms with Payloads Wargame | 4 | 2014 | 4 | 2015 |
| Experimentation Efforts: Electromagnetic Maneuver Warfare Experimentation Campaign | 1 | 2015 | 4 | 2019 |
| Experimentation Efforts: Counter FAC/FIAC At-Sea Experiment | 1 | 2014 | 1 | 2016 |
| Experimentation Efforts: Trident Warrior 15 (w/C7F) | 4 | 2014 | 1 | 2016 |
| Tactical Development and Evaluation (TAC D&E) Projects: TAC D&E 2016-01 (to be selected in mid FY 2015) | 1 | 2016 | 4 | 2016 |
| Tactical Development and Evaluation (TAC D&E) Projects: TAC D&E 2016-02 (to be selected in mid FY 2015) | 1 | 2016 | 4 | 2016 |
| Tactical Development and Evaluation (TAC D&E) Projects: TAC D&E 2016-03 (to be selected in mid FY 1015) | 1 | 2016 | 4 | 2016 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>2356 / *Maritime Concept Generation & Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Tactical Development and Evaluation (TAC D&E) Projects: TAC D&E 2016-04 (to be selected in mid FY 2015) | 1 | 2016 | 4 | 2016 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>3319 / *Fleet Experimentation* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3319: *Fleet Experimentation* | 33.939 | 11.876 | 5.158 | 8.864 | - | 8.864 | 11.410 | 11.659 | 11.308 | 11.544 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Fleet Experimentation (FLEX) program (formerly Sea Trial) develops new or improved warfighter capabilities through the experimentation of high payoff initiatives, technologies and concepts, Fleet Concepts of Operations (CONOPS), doctrine, and new tactics, techniques and procedures (TTP). The objective of the CUSFF/CPF directed FLEX program is to produce recommended changes in doctrine, organization, training, materiel, leadership development, personnel, facilities, and policy (DOTMLPF-P) actions, with an emphasis on non-materiel solutions. Implementation is aimed at delivering potential solutions in support of Operations Plans (OPLANS). FLEX is dedicated to providing solutions to near term (within the Fiscal Year Defense Plan) prioritized warfighting gaps as defined by the Commander, U.S. Fleet Forces (CUSFF)/Commander, Pacific Fleet (CPF) FLEX annual guidance.

FLEX exists today because CNOs (past and present) believe experimentation is vital to continuously improving naval warfighting capabilities. The FLEX program considers those warfighting gaps identified in: Integrated Prioritized Capability Lists (IPCL) generated by Warfighting Development Centers (WDC) through the warfare improvement program; the USFF/CPF Integrated Priorities Letter (IPL) delivered annually to the CNO; USFF/CPF Commanders' FLEX Guidance; and Navy and Joint Urgent Operational Needs Statements (UONS and JUONS). Of critical importance to understand is the fact that the FLEX program and associated efforts of the FLEX team support the "last tactical mile" of Navy and science and technology (S&T) programs. This "last tactical mile" support is delivered through "at sea" or "salt-water" testing and experimentation at a time when the technology is mature enough and requires evaluation on or by a fleet asset - ships, airplanes, submarines, networks, and/or sailors. In accordance with the joint CUSFF and CPF FLEX instruction, the FLEX program is the only authorized conduit to conduct experimentation using operational fleet assets.

FLEX runs the gamut from multi-year campaigns (experimentation of complex DOTMLPF capability), wargames (seminar and systems, workshops, limited objective/ technical experiments and advanced war fighting experiments. The campaigns involve all facets of experimentation including design, planning, systems engineering and integration, execution, data collection, analysis, assessment, and the delivery of tangible products for the fleet. While Navy-centric, FLEX efforts include joint and coalition partners when appropriate.

Experimentation is vital to the Navy's future. It helps inform acquisition decisions and the development of emerging tactics, and it provides unique training opportunities for today's warfare commander, air, surface, subsurface and information dominance assets.

Further reducing or diminishing support of the FLEX program will cause innovative and S&T programs to suffer consequences through the loss of expertise resident in the FLEX program and team. FLEX faces additional challenges as efforts are becoming increasingly more complex and are being conducted at higher classification levels. These challenges prevent CUSFF/CPF from publicizing successes via mainstream channels thereby giving an incomplete impression of FLEX program contributions to the USFF/CPF organize, train, equip and capability requirements mission.

We had to reduce the planned funding for several contracts in FY15 due to the reduction of the FY15 budget from $6.9M to $5.1M. In addition, planned new contracts/ solicitations for FY15 had to be put on hold or cancelled due to the budget cuts.

The contract cost increase for FY16 is based on an assumption that FLEX will receive $8.8M, and can initiate new contract solicitations to replace expiring contracts, and replace contracts using First In First Out accounting system.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

FY16 has only 10 planned experiments because of the varying degrees of complexity for several of the planned events, specifically the EMW campaign. Highly complex threat and introduction of capability take years to experiment with in order to deliver TTP/TACMEMOs/Doctrine/Material capability for the Fleet to train to and use.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Fleet Experimentation | 11.876 | 5.158 | 8.864 | - | 8.864 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** - FLEX is a USFF/CPF collaborative effort to address fleet prioritized capability gaps, led by USFF N8/N9, supported by Navy Warfare Development Command (NWDC), and coordinated with Naval Component Commands (NCC)/Numbered Fleets, Type Commanders (TYCOM), Systems Commands (SYSCOM), OPNAV, Services, Coalition, and Science & Technology (S&T) community. The Fleet Experimentation program objective is to produce recommended changes in doctrine, organization, training, materiel, leadership development, personnel, facilities, and policy (DOTMLPF-P) actions, with an emphasis on non-materiel solutions. Deliverables are focused on operational and tactical warfighting capability in the near term (within the Fiscal Year Defense Plan), and prioritized by the Commander, U.S. Fleet Forces (USFF)/Commander, Pacific Fleet (CPF) Fleet Experimentation annual guidance. NWDC plans and executes USFF/CPF approved multi-year Fleet experimentation campaigns and final reports. USFF/CPF staff manage the follow-on DOTMLPF-P actions with OPNAV, SYSCOMs, TYCOMs and Warfighter Development Command (WDC) staffs to establish or enhance warfighting capability in Integrated Air and Missile Defense (IAMD), Amphibious Warfare (AMW), Surface Warfare (SUW), Strike Warfare (STW), Anti-Submarine Warfare(ASW),Expeditionary Warfare (EXW), Information Dominance (ID), Mine Warfare (MIW) and Anti-Terrorism/Force Protection (AT/FP).

- Operational venue to experiment, demonstrate, assess warfighting CONOPS development, doctrine/training development, techniques and procedures (TTPs), and technologies
- Multi-year experiment campaigns focused on warfighting capability per CPF/CUSFFC guidance to evaluate and transition to DOTMLPF-Policy change recommendations:
- The intent of FLEX is to rapidly deploy/transition
- New tactics, TTPs, and training
- Emerging technologies
- Fleet Concepts of Operations (CONOPS)
- Innovative concepts and applications of existing systems
- Trident Warrior is the component of FLEX that specifically targets C4I systems

***FY 2014 Accomplishments:***

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - In FY14, NWDC, through the FLEX program, executed over 20 significant experiment events encompassing 103 individual experiment initiatives. Those events ranged from single initiative experiments, such as the live-fire evaluation of JSOW-C employment against a hardened target, to TRIDENT WARRIOR 2014, a large-scale at-sea experiment involving 37 Coalition initiatives conducted in conjunction with exercise RIMPAC 2014, to the NFIC-CA multi-year campaign to incrementally enhance the Fleet's Integrated Air and Missile Defense capability.<br><br>- Every FLEX initiative is evaluated and selected for execution during a FLEX event based on several metrics. The two primary metrics are (1) whether or not the initiative can potentially provide a solution or make a significant contribution to resolving an identified warfighting capability gap, and (2) whether the initiative can be implemented or have an impact in the near term (next 1-3 years).<br>- Of the more than 20 campaigns completed in FY14, the following 12 campaigns are described in detail to demonstrate specific campaign focus, function, deliverables, and accomplishments.<br><br>- Campaign: Naval Integrated Fire Control - Counter Air (NIFC-CA)<br><br>- Focus: NIFC-CA is a complex system- of-systems capability representing a significant investment by the Navy. FLEX program/team efforts in 2013 and 2014 support CUSFF's direction to conduct a phased, campaign-style approach to capabilities integration and implementation to improve understanding of NIFC-CA Increment I capability and its employment by Carrier Strike Groups (CSGs) in the 2016 time frame. Planned and executed throughout multiple events (workshops, systems and seminar wargames) the FY-14 work to develop appropriate TTP/SOP/CONOPS culminated in a fully-informed environment in a December CY 2014 Wargame 2 event. Wargame 2 consisted of the main Modeling and Simulation (M&S)-stimulated operator-in-the-loop (OITL) event, and supporting pre-wargame workshops and Limited Objective Events (LOE) - EMW/Counter-ISR/T, Combat ID (CID), Blue Force Laydown/Stationing, Tactics, Techniques and Procedures (TTP), and Commander's Conference for Command and Control (C2)/Composite Warfare Commander (CWC)/Rules of Engagement (ROE). NIFC-CA Wargame 2 support was provided in the following areas:<br>- 3.1 Wargame Planning and Design<br>- 3.2 Wargame Execution<br>- 3.3 Wargame Data Collection and Analysis<br>- 3.4 Wargame Reporting Outcome and Results<br><br>- Functions: Support USFFC in planning, designing, executing, data collection and analysis, and reporting on Wargame 2 results as part of the NIFC-CA Wargame campaign plan. The intent was to ensure all wargame | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| initiatives were provided end-to-end consistent methodologies resulting in an independent, objective verification of results. Decision-makers are assured results are reliable and unbiased.<br><br>- Deliverables: Data Collection and Analysis Plan (DCAP) for the NIFC-CA Wargame, EMW/C-ISR/T, CID, Blue Force Laydown/Stationing, TTP, and Compiled Assessment Report<br><br>- Accomplishments: Preparations for the wargame included support to six major workshops that developed/ examined draft NIFC-CA tactics, techniques, and procedures (TTP) and system capabilities and limitations. The results/deliverables of this wargame informs the NIFC-CA Fleet Warfighting CONOPS and other air warfare related NWPs and NTTPs - and will inform changes to fleet training programs from the classroom to CSG-level COMPTUEXs and JTFEXs. The result is a more capable integrated air and missile defense CSG.<br><br>- Campaign: Laser Weapon System (LaWS)<br><br>- Focus: In August 2012, during BLACK DART 2012 (a FY12 FLEX event), the Navy Air and Missile Defense Command, with support from NWDC, led the execution of a fleet experiment which resulted in the first successful engagement of an unmanned aerial vehicle - with a laser weapon system - from U.S. Navy Destroyer USS DEWEY (DDG 105). As a result, CNO directed installation and deployment of a high-energy solid-state laser prototype on USS PONCE [AFSB(I)]. The system is projected to operate for approximately one year starting late-FY14 with a two-fold purpose:<br>- Fill an immediate capability gap associated with platform and theater<br>- Provide an opportunity to answer questions to support formal development and operational fielding of high energy laser weapons<br><br>- Functions:<br>- Conduct an operational demonstration in support of Solid State Laser Quick Reaction Capability (SSL-QRC) deployment onboard USS PONCE.<br>- Successfully demonstrate SSL operations against operationally representative targets in a realistic environment.<br>- Inform development of SSL TACMEMO in support of SSL continued operations onboard USS PONCE.<br>- Inform development of high-energy laser for system-of-record deployment on surface combatants. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Deliverables: Solid State Laser TACMEMO that provides crucial guidance for the crew of PONCE (and future platforms) to safely and effectively employ this new weapon system, the Analysis Report, and LaWS Final Report.<br><br>- Accomplishments: Without the FLEX program, LaWS, the Navy's most revolutionary weapon of the 21st century, would not have been employed on a surface combatant nor would it be installed and in use today on USS PONCE.<br>- First "shoot down" of representative UAV in an operational environment<br>- First destruction of ordnance in an operational environment<br>- Effective interface between CIWS and LaWS<br>- LaWs embarked and engaged air targets:<br>- Destroyed all three threat representative UAVs<br>- Demonstrated High Energy Laze (HEL) reversible jamming of an Intelligence Surveillance and Reconnaissance (ISR) sensor on a UAV<br>- Conducted scoring runs with HEL radiation on a UAV airborne target<br><br>- Campaign: Aegis Ashore<br><br>- Focus: The Navy's first Aegis ashore site is scheduled to meet full operational capability in FY 2015. The establishment and follow-on operation of Aegis Ashore presents unique challenges to include:<br>for the entirety of Aegis Ashore.<br>- The Aegis ashore CONEMP and MER institutes two commanding officers.<br>- Navy BMD Enterprise is the forum for coordination but not execution.<br>- No single Navy representative can independently assure performance of the Combat System without support functions outside their authority.<br><br>- In light of these challenges, CNO designated USFFC Executive Agent for European Phased Adaptive Approach (EPAA) phase II, responsible for Aegis Ashore wholeness. To support this effort, USFFC directed a Wargame be conducted involving cognizant navy stakeholders to validate operational, training, and logistics planning in order to ensure the achievement of initial operational capability with proper mission wholeness.<br><br>- Functions: Wargame Objectives: | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Identify gaps in procedures, resources, manpower, and interoperability of civilian, contractor, and military personnel base-wide at varying readiness states.<br>- Identify gaps in training and qualification for AAMDS and AAMDF personnel.<br>- Identify gaps in the logistical support, functional roles, responsibilities, and processes.<br><br>- Deliverables:<br>- Quicklook and final report documented risks, gaps, and mitigation options for the forward basing, sustainment, and operational employment of Aegis Ashore.<br>- Wargame Analysis Report identifying wholeness gaps in order to influence contract and budgetary requirements including:<br>- A list of identified operational, employment, training, logistics, and sustainment challenges, and gaps and seams for Aegis Ashore.<br>- A list of actionable stakeholder items, based on findings, that will lead to revising CONOPS and governing documents.<br>- Recommended revisions to the following: host nation agreements, host tenant agreements, emergency action plan, Force Protection plan, development of other security procedures, development of damage control and other emergency procedures, logistics concept of operations, training plan for facility personnel, maintenance procedure development, and medical concept of operations.<br><br>- Accomplishments: In addition to producing the quicklook report, final experiment report, and analysis report, the effort evaluated the adequacy of the Aegis Ashore Platform Wholeness Fleet Concept of Operations (CONOPS). Installation of the first Aegis Ashore system in Romania in 2015 represents phase 2 of the U.S's EPAA designed to provide ballistic missile defense to portions of the European continent. The FLEX program provided direct support to a key national strategic imperative.<br><br>- Campaign: Joint High Speed Vehicle (JHSV)<br><br>- Focus: Conducted at the direction of CUSFF and in direct support of the OPNAV-led LCS/JHSV Council, the 2014 JHSV campaign evaluated new missions capable of being supported by the JHSV, with an initial focus on mission options involving little or no modification to the existing sea frame. Completed in two phases during USNS SPEARHEAD's (JHSV-1) maiden deployment to COMSIXTHFLT (C6F) and COMFOURTHFLT (C4F) AORs from Jan-Oct 2014, the effort explored the effectiveness of using various Adaptive Force Packages (AFPs) to expand JHSV platform employment options. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Functions: Tasks:<br>- Aerostar was tasked by NWDC/C4F to provide a turnkey Persistent Surveillance Solution (PSS) on JHSV SPEARHEAD. The PSS solution consisted of a Tethered Aerostat System and an EO/IR Sensor and Radar System.<br><br>- Installation, integration, and initial operational readiness review on the SPEARHEAD<br>- Provided labor, travel and Per Diem for all Aerostar support staff<br>- TIF-25K Aerostat, SSRS-F50 Radar and General Dynamics V9 Camera or equivalent EO/IR Sensor and required support equipment<br>- Provided shipping for product to CONUS departure point<br>- Provided Helium for initial fill of aerostat<br>- Provided sensor feeds to the SPEARHEAD network<br>- Month-to-month operations on the SPEARHEAD<br>- Provided (1) Flight Director, (2) Operators and (1) Radar specialist for oversight of daily operations, supplemented with the ship's crew for sensor operation, recoveries and deployments<br>- Provided Helium for required top-offs<br>- Deflation and pack-out of the PSS System when operations concluded<br>- Personnel return travel and Per Diem<br><br>- Deliverables:<br>- Successful inflation and integration on the SPEARHEAD<br>- Radar and EO/IR imagery successfully transmitted to JIATF-S and/or SOUTHCOM during underway operations<br>- In addition to a final experiment report, the products of this effort include revisions to the JHSV Platform Wholeness, JHSV Warfighting, and AFP Fleet CONOPS.<br>- More importantly, the results will informs key investment decisions being made by OPNAV regarding the employment of adaptable sensor, communication, and support payloads to enable JHSV to conduct a range of missions beyond those it was originally built to perform.<br><br>- Accomplishments: Through a series of LOEs spanning the full deployment, this effort assessed the ability of the JHSV platform to support multiple missions such as Maritime C2, Theater Security Cooperation, Counter Illicit Trafficking, Afloat Forward Staging Base, etc. A follow-on JHSV/MLP wargame examined interoperability issues | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| associated with MLP and JHSV, Large Medium Speed Roll-On/Roll-Off (LMSR), Littoral Combat Ship (LCS), and other ship-to-shore connectors.<br><br>- Campaign: Fast Attack Craft/Fast Incoming Attack Craft (FAC FIAC)<br><br>- Focus:<br>- Evaluate surface and air weapon effectiveness against FAC/FIAC-representative targets.<br>- Evaluate the effectiveness of non-lethal technology to disable small boat engines<br>- Evaluate the effectiveness of employing an armed Switchblade UAS against FAC/FIAC target<br><br>- Functions:<br>- FLEX resources were used to manage and coordinate Navy stakeholder's efforts in this mission area in order to identify warfighting capability solutions, validate results, and deliver results to the Fleet over the next 12 months.<br><br>- Deliverables:<br>- Integrated, validated DOTMLPF-P solution set - Near Term Focus<br>- New/revised TTPs<br>- Training & Readiness input<br><br>- Accomplishments: In addition to a final experiment report, this effort provided DOTMLPF-P recommendations to inform acquisition investment decisions and also provided recommended revisions to current counter FAC/ FIAC doctrine.<br><br>- Campaign: Undersea Warfare Employment of Emerging Technologies (USWEET)<br><br>- Focus: USWEET investigated emerging technologies having potential to close warfighting gaps identified in the anti-submarine warfare (ASW) and mine warfare (MIW) IPCLs. Planned and executed by C3F, NMAWC, STDG, and NWDC, the event was conducted on the Southern California Operating Area (SCORE) Range, Mine Training Areas, and other SOCAL areas to meet technology objectives.<br><br>- Functions: | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Building on lessons learned from USWEET '13, for each exercise a small array (2-3) of small form-factor, low power, passive sensors mounted to surface buoys were employed in shallow and deep water marine environments to detect contacts of interest and output an assessment of the size, speed, and bearing of the detected contact.<br>- FLEX supported core services funding for Shallow Water Surveillance System (SWSS) experimentation to include SWSS test planning, testing specific hardware fixtures, personnel travel, support watch standers, diver services, crane services, small craft transportation and support for testing, data collection, and post experiment data analysis leading to delivery of performance analysis.<br>- During USWEET 14 SSC PAC tested SWSS components in a production representative/form factor node enclosure with the acoustic array to ascertain end-to-end autonomous processing in a production ready integration of hardware and software.<br><br>- Deliverables:<br>- A report of SWSS experimental observed results and detailed analysis of performance capabilities within 120 days following completion of the event.<br>- Planning meeting minutes and an updated action item register - within one week following all planning meetings.<br>- Operation order and data collection and analysis plan 45 days prior to event start.<br>- After action overview summary within 10 working days following receipt of all data.<br>- Flag level briefings within 90 days of the event<br>- A final report informing acquisition investment decisions within 6 months following completion of the event.<br><br>- Accomplishments: Autonomous deployment, detection, and reporting of an undersea contact. Evaluated several emerging technologies showing potential to close warfighting gaps identified in the ASW and MIW IPCLs.<br><br>- Campaign: Valiant Shield<br><br>- Focus: Valiant Shield 2014 (VS14) is a bi-annual exercise focusing on at-sea training and experimentation for critical maritime initiatives.<br>- VS14 is directed by U.S. Pacific Command (PACOM), and NWDC is responsible for experiment design, data collection, and analysis for initiatives participating in this at-sea experimentation event. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Participants include Space and Naval Warfare Systems Command (SPAWAR), ships and aircraft from the Navy and Air Force, program executive offices (PEO), coalition and allied partners, and multiple Navy commands.<br>- Strict experimental design and controlled data collection efforts, including both quantitative and qualitative metrics, make VS14 a robust venue for the evaluation of technologies in an operational setting. The complexity of this experiment requires a skilled, highly experienced staff for planning, experiment design, data analysis, and reporting. Pacific Science & Engineering Group (PSE), having resident experience in the past 11 Trident Warrior experiments and in VS13, is considered uniquely and distinctly qualified to perform these tasks.<br><br>- Functions: PSE provided human-system integration (HSI) analytical, experimental, and human factors engineering services to support NWDC during experimental design, execution, analysis, and reporting of VS14. PSE completed the following tasks in support of VS14:<br>- Developed Experimental Design and Test Plan<br>- Advised Focus Area Leads and other subject matter experts (SME) on matters related to qualitative data collection.<br>- Reviewed Experiment Plans contained in the FLEX Information Management System (FIMS) database and input plans for qualitative components.<br>- Execution and Data Collection.<br>- Developed items for data collection instruments to measure attributes of interest to answer VS14 critical questions.<br>- Developed data collection instruments (surveys, observation logs, and interviews).<br>- Provided data collection instruments in on-line, paper and pencil, and other formats as required.<br>- Assisted in the development of Data Collector training and materials.<br>- Analyzed Results and Outcomes.<br>- Collaborated with active duty and Naval Reserve personnel and NWDC staff to ensure all data was accounted for.<br>- Analyzed data and developed data summaries by attributes. Entered summary results into the appropriate results databases.<br>- Reporting Findings - Represented assigned data types at assessment workshops and assisted with formulation of answers to critical questions.<br><br>- Deliverables:<br>- Data collection instruments | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Data summaries at critical questions level in a form suitable for input into FIMS database<br><br>- Accomplishments:<br>- VS14 included 21 experiments and demonstrations, with 19 successfully completed, 1 partially accomplished, and 1 not executed with the following objectives completed:<br>- Improve tactical readiness of selected forward deployed forces while mitigating exposure of tactics, techniques and procedures (TTPs) to adversary collection efforts.<br>- Improve and advance joint interoperability of selected theater forces<br>- Support and assess USPACOM theater-wide strategic communication<br>- Assess Anti-Submarine Warfare in a multi-threat environment.<br>- Assess distributed basing (Expeditionary Airfield Operations) to include ashore logistics and sustainment operations.<br>- Validation of Unmanned Aircraft Systems (UAS) third party targeting TACMEMO completed.<br>- Validation of Employment of Surface Warfare (SUW) Tactical Tomahawk TACBUL completed.<br>- Additionally, sufficient data was collected to be analyzed over the coming months to determine the effects of electronic attacks.<br><br>- Campaign: Naval Obscurants<br><br>- Focus: Conduct a three-phased naval obscurants experiment.<br>- Phase I, a modeling and simulation (M&S) event, was paramount to the safe completion of the phase III at-sea experiment. Serving as risk mitigation for Phase III, Phase I answered critical questions for shaping the experiment design and removed challenges for completing the Naval obscurants campaign in the C7F AOR.<br>- The M&S and the Phase II shore-based events provided risk mitigation, fostered experiment design, and increased the knowledge base. Additionally, M&S and shore-based phases benefitted NWDC and the Navy beyond the Naval obscurants campaign by providing a capability that will be useful for training, and developing larger form tactics, techniques, and procedures.<br><br>- Functions: Assessed the potential of Naval Obscurants to reduce the vulnerability of U.S. platforms to detection and explored the potential detrimental effects on own-ship systems including radar, communications, human health, and machinery.<br>- Study relied heavily upon existing information, including Naval Obscurant test data, ship system radio frequency (RF) performance information, published health studies, and other literature (open and classified). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Deliverables:<br>- Draft USV/Obscurants Concept of Employment<br>- Final Experiment Report<br>- Phase 1 (M&S validation event)<br>- Phase 2 (Shore based effects testing)<br>- Phase 3 (At-sea ASBM experiment)<br>- In addition to a final experiment report, this effort provided a draft obscurants employment document.<br><br>- Accomplishments:<br>- Established studies on:<br>- Effectiveness against threat<br>- Effect on Own Radar Performance<br>- Effect on Own Communications Performance<br>- Effect on Own Countermeasures Performance<br>- Effect on Own Crew Health<br>- Effect on Own Machinery<br>- Informed USFF/CPF endorsement of Speed to Fleet program<br><br>- Campaign: CSG 360 (CDRs Intent)<br><br>- Focus:The Commanders Intent Wargame was based on the SG-360 Wargame format, a two-sided, open ended, real world, tabletop wargame designed to provide a learning opportunity to Carrier Strike Group and Expeditionary Strike Group staffs to invigorate tactical planning and thought versus an agile, thinking opposition force.<br>- Provided learning opportunities to CSG staffs meant to "invigorate their tactical DNA" playing against an agile, thinking OPFOR.<br>- The critical skills required to gain and hold the advantage at sea against a robust, high-technology foe must be developed, practiced, and honed in order to maintain "sufficient maritime superiority".<br><br>- Functions: Responsibilities and tasks included working with USFF N7 to develop goals and objectives, and scenario and MSEL's, and to execute the Commanders Intent Wargame. NWDC served as the lead Action | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Officer for the Commander's Intent Wargame and worked under the supervision of the Strike Group 360 Game director. NWDC tasks included:<br>- Define Commander's Intent Wargame format<br>- DevelopCommander's Intent Wargame Scenario<br>- Plan and executeCommander's Intent Wargame<br><br>- Deliverables:<br>- Execute Commander's Intent Wargame<br>- Over multiple games, provide data for analysis to determine if certain tactics, techniques, procedures, technology or the combinations thereof result in a better likelihood of establishing "sufficient maritime superiority"<br><br>- Accomplishments: Data collected over several games will be analyzed to evaluate effectiveness of existing tactics, techniques, and procedures (TTP).<br><br>- Campaign: Joint Standoff Weapon-C (JSOW-C) Employment LOE<br><br>- Focus: Using two AGM-154C JSOWs with live warheads, telemetry, and flight terminations systems, evaluate live JSOW-C employment TTPs versus using a simulated artillery bunker recessed into a mountain with an opposing slope.<br>- Functions: Conducted two instrumented JSOW-C releases on the China Lake range in an EA environment. Objectives were:<br>- Assess JSOW-C survivability in an EA environment.<br>- Assess JSOW-C guidance performance in an EA environment.<br>- Assess JSOW-C mission planning support.<br>- Assess supporting systems for JSOW-C BDA<br><br>- Deliverables:<br>- JSOW-C mission planning standard operating procedure (SOP) was developed and evaluated - and an evaluation was made of the P-3C LSRS's ability to conduct battle damage assessment.<br>- Recommendations to pursue BDA capability, if the results are favorable, 30 days after test.<br>- Validated procedures for producing imagery templates from Distributed Common Ground System - Navy (DCGS-N). Expect 60 days after test. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Draft an update to the TOPGUN manual describing JSOW-C employment in a complex tactical environment with specific support capabilities, including tactical considerations (subject to restriction SEPCOR) 180 days after test.<br>- Draft an update to the TOPGUN manual describing employment procedures in an EA environment. Associated recommendations posted on NSAWC website within 6 months of test; requires completion of TOPGUN standardization board process.<br><br>- Accomplishments:<br>- Shortened kill chain with greater targeting confidence.<br>- Greater weapon-target pairing flexibility for Offensive ASuW.<br>- Allows E-2D automatic PGM update of target location (Non-contracted precision cue).<br>- Allows E-2D control of JSOW for attack.<br>- Frees F/A-18 for post-weapons launch re-tasking.<br>- Additionally, three key points to note regarding the effort:<br>- Prior to this event, there had been only one JSOW-C release since it reached IOC in 2004.<br>- The event was primarily planned and executed by the instructors stationed at NSAWC.<br>- Total cost for the event was $75K - all of which went to pay for the services of the China Lake range - all other services were provided by various organizations (PMA-201, VX-9, VP-40, etc.) at no cost to the FLEX program.<br><br>- Campaign: RIMPAC (Trident Warrior)<br><br>- Focus: TW is an annual experimentation event alternating yearly between east and west coast AORs. TW14 was co-led by C3F and CNWDC as part of the Fleet Experimentation (FLEX) program. This advanced at-sea warfighting experiment evaluated the potential military utility of 37 new and emerging capabilities involving 7 USN ships, 3 allied ships, and 11 shore locations.<br>- TW14 was held in conjunction with RIMPAC 14 and leveraged planned steaming days to conduct at-sea experimentation.<br>- TW14 encompassed all U.S. Navy experimentation during RIMPAC and consolidated efforts as a cost effective means to experiment with multiple initiatives in an operational environment.<br>- TW14 was fully integrated into RIMPAC, further expanding the exercise's training environment.<br><br>- Functions:<br>- Identified and captured innovative solutions addressing prioritized fleet warfighting gaps. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Refined systems interfaces and interoperability using fleet operator input in an operational environment.<br>- Developed and delivered products (doctrine, TTP, and Final Reports with findings and recommendations informing key acquisition investment decisions).<br><br>- Deliverables:<br>- Final experiment report<br>- Assessment report for Fleet stakeholders containing DOTMLPF recommendations<br>- Analysis feedback for initiative sponsors<br>- Doctrine deliverables<br>- In addition to a final experiment report, expected TW14 products include:<br>- Change recommendations to 7 existing doctrine publications<br>- Recommended input into 4 publications currently being drafted<br>- Development of 5 original publications.<br><br>- Accomplishments:<br>- Key initiatives evaluated included the CNO Speed to Fleet's Transportable EW Module (TEWM) project, ONR's EW Battle Management project, and 8 initiatives sponsored by the AUSCANNZUKUS experimentation alliance.<br>- FLEX leveraged RIMPAC, the world's largest international maritime exercise, to provide a unique training opportunity that strengthens international maritime partnerships, enhances interoperability, and improves readiness of participating forces for a wide range of potential operations.<br>- RIMPAC demonstrates the value of maritime forces, improves international naval cooperation, and provides a unique training opportunity.<br><br>- Campaign: F-35B and LHA/D Integration Wargame<br><br>- Focus: Inform development of Fleet Warfighting CONOPS on F-35B employment as part of a large Naval Force beyond traditional ACE - MEU/ARG configuration.<br>- Examined expeditionary operations employing an F-35B-equipped Expeditionary Strike Group (ESG) across aircraft embarkation option two (16 F-35B and 6-8 MV-22) and option three (20 F-35B), to include the use of expeditionary basing ashore.<br>- Identified how proposed F-35B force mixes aboard LHA/D and contributes to the capability of a larger amphibious force or other Naval Task Force (NTF). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Identified DOTMLPF-P gaps and unique mission requirements associated with proposed F-35B force aboard LHA/D assigned to a larger amphibious force or other NTF.<br>- Examined feasibility and overall supportability of concepts described in the HQMC CD&I LHA/D and F-35B Integration White Paper.<br><br>- Functions: Provided stakeholders with:<br>- Refined descriptions of integrated capabilities and employment options for inclusion in Fleet Warfighting CONOPS<br>- Unique mission requirements and operational considerations required to achieve capabilities described in Fleet Warfighting CONOPS.<br>- Other relevant information discovered through the course of the wargame (e.g. Platform Wholeness information)<br><br>- Deliverables:<br>- Provided F-35B and LHD/A Integration War Game Final Experiment Report including results, findings, and recommendations for initiative sponsors and the Navy and Marine Corps communities at large.<br>- In addition to a final experiment report, this effort informed development of an F-35B and LHA/D Warfighting Fleet CONOPS and made recommendations regarding changes to the Amphibious Assault Ship and F-35B Aircraft Integration Platform Wholeness CONOPS.<br><br>- Accomplishments: The wargame generated more than 1200 observations collected via a number of different methodologies. These observations will be combined with other information gleaned from document review, site visits, and planning conferences to generate CONOPS-relevant information in support of game objectives. | | | | | |
| ***FY 2015 Plans:***<br>Execute experimentation as laid out in the FLEX Execution Plan for 2015 including:<br><br>1. Campaign Naval Integrated Fire Control-Counter Air (NIFC-CA) Wargame 2<br>Focus<br>Executed NIFC-CA Wargame 2 in Dec 2014.<br>Navy leadership requires awareness and understanding of the NIFC-CA capability in order to protect its "game changing" capabilities and key programs. A comprehensive methodology is required to synchronize delivery of all NIFC-CA doctrine, organization, training, materiel, leadership, personnel, facilities, and policy (DOTMLPF- | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| P) actions, and Navy leadership requires insight into challenges and limitations associated with NIFC-CA in operational scenarios.<br>Throughout FY15, conduct a series of events including modeling and simulation (M&S) development leading up to NIFC-CA system wargame 3 planned for Dec 2016. Examine how NIFC-CA increment 1 capabilities, circa 2017, contribute to air warfare in an operationally representative environment.<br>Objectives<br>- Inform decisions on<br>- Concepts of Operation (CONOPS), tactics, techniques, and procedures (TTP), and Operational Task (OPTASK) modifications<br>- Training requirements and future experimentation<br>- NIFC-CA pillar program investments<br>- Investigate<br>- C2 flow/decision making<br>- Battlespace management and deconfliction in a joint engagement zone (JEZ)<br>- Combat ID (CID) with National Technical Means (NTM) and 5th-4th Generation<br>- Operations in an electronic attack (EA) environment<br>- Counter-intelligence, surveillance, reconnaissance (C-ISR)/counter-targeting (CTTG) impact on red force response (post-wargame)<br>Functions<br>USFFC proposes continued Fleet - OPNAV NIFC-CA partnership.<br>Support a United States Fleet Forces Command (USFFC)-led multi-year NIFC-CA campaign plan to explore NIFC-CA capabilities, C2 decision-making, training, CONOPS, and TTP.<br>Inform development/refinement of NIFC-CA Fleet CONOPS, Integrated Air and Missile Defense (IAMD) TTPs, and OPTASKs.<br>Inform the Fleet training continuum from schoolhouse to Fleet Synthetic Training (FST) to Composite Training Unit Exercise (COMPTUEX).<br>Costing Data<br>- NIFC-CA workshops, fleet participant travel, and Senior Leadership Seminar ($0.7M)<br>- Workshop CID, TTP, Air Defense Commander (ADC)/Composite Warfare Commander (CWC)/Rules of Engagement (ROE), CTTG/Electromagnetic Warfare (EMW), SLS<br>- Wargame execution IT weeks, TTP execution check, and final execution weeks<br>- Wargame data analysis support<br>- Core wargame cost using wargame 1 as baseline (BL) ($2.5M) | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Increased to three BL-9<br>- Modeling and simulation, technical support, and venue<br>- F-22/F-15 Integration ($0.2M)<br>- Manned F-22s and constructive F-15s<br>- Leverages combination of NTM, Info Gateway for 5th-4th Gen FTRs/L16<br>- Blue EA (EA-18G) ($0.25M)<br>- Explicit effect modeling of jammers<br>- Improves capability to support Growler employment/contribution to integrated fire control (IFC)<br>- Dynamic Red Team ($0.2M)<br>- Manned threat fighters, enemy Operator in the Loop (OITL) reaction to Blue actions<br>Participants<br>- Subject Matter Experts (SMEs) from fleet, training, doctrine, acquisition, and test communities<br>- Future generations of NIFC-CA stakeholders<br><br>Deliverables<br>- Wargame Glideslope<br>- Preliminary workshops (CID, Blue Force Laydown, TTP Development, Air Defense Syndicate)<br>- Wargame planning, scenario and Data Collection and Analysis Plan (DCAP) development, IT testing and M&S engineering<br>- Dry runs/TTP week/wargame execution<br>- Post-wargame workshop (C-ISR/T)<br>- Wargame 2<br>- Counter ISR/C-Targeting<br>- Understand how EMW and C-ISR/T techniques can be applied to achieve desired results to counter Red's ability to target Blue's location, and/or disrupt Red's ability to conduct coordinated attacks (ex. simultaneous Time on Target (TOT), threat axes, etc.) based on results of AC-14C.<br>- NIFC-CA wargame 2 Senior Leader Seminar (SLS)<br><br>Accomplishments<br>- Evaluate potential kill chains for desirability, relevancy<br>- Create ideal and realistic wargame 2 mission plan<br><br>2. Campaign Alternative Platforms with Payloads Seminar (APPS) Wargame | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Focus<br>Combatant Commander (CCDR) steady-state requirements are straining naval Cruiser-Destroyer (CRUDES) and Amphibious capacities to source and sustain Phase 0/1 missions. This USFFC N85 led FY14/15 Fleet Experimentation (FLEX) effort will identify mission payloads with enablers to allow designated USNS vessels to support selected Navy Component Command (NCC) steady state missions.<br>Functions<br>The experiment was comprised of two events - a workshop in September 2014 and a tabletop in November 2014. This study's objectives included<br>1. Define NCC identified mission set<br>2. Define platform baseline<br>3. Identify required payloads to support mission sets<br>4. Identify disparity between platform's baseline and mission payload<br>5. Identify enablers to integrate platform and mission payload<br>The results of this study will be used to inform the USFF/CPF 2017 POM input to OPNAV.<br>Key Participants<br>- HQMC DC CD&I SID<br>- OPNAV (N2/6, N3/5, N95, N8/N81M, N42, 931)<br>- BUMED CD&I,<br>- NCCs<br>- SURFLANT<br>- NECC (N5, N3, N43)<br>- NEMSCOM<br>- USFF Fleet Surgeon<br>- MARFORCOM<br>- Fleet CYBERCOM<br>- PACFLT (N3/5, N4, N7)<br>- USCG<br>- NWDC<br>- MSC (N02M, PM4A1, PM5, PM3, PM4A2, N4, Counsel)<br>- NAVAIR IWC<br>- NAVSEA<br>- PEO SHIPS<br>- NAVELSG | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Deliverables<br>Quicklook and final experiment report with findings and mission payloads with enabler recommendations<br>- Define NCC selected missions and associated mission tasks<br>- Define platform baseline<br>- Identify required payloads to support mission sets<br>- Identify disparities between platform's baseline and mission payloads<br>- Identify enablers required to integrate platform and mission payloads<br>Accomplishments<br>- Reviewed task<br>- Developed draft problem and response statements<br>- Identified key participants<br>- Refined the deliverable list<br>- Established follow-on action items<br><br>3. Campaign EMW Experiment Campaign<br>Focus The EMW experiment campaign represents a series of coordinated 2015 events designed to explore innovative TTP and/or technologies to "operationalize" EMW across the Fleet.<br>Functions<br>- A seminar wargame in Q4 FY15 to examine EMW functionality at the Operational Level of War (OLW)<br>- Several at-sea experiments to examine EMW-related initiatives<br>Deliverables<br>- Training<br>- Develop coherent EMW education/training requirements for individuals<br>- Develop clearly defined Maritime Operations Center (MOC)/Carrier Strike Group (CSG)/Amphibious Readiness Group (ARG)/unit EMW Fleet Readiness Training Plan (FRTP) training/certification requirements across all warfare areas<br>- Develop EM Operating Force (OPFOR) capability to challenge/train in contested EM environment<br>- Experimentation and Doctrine/TTP Development<br>- EMW-related functions aligned to Warfare Commander that is properly manned, trained, and qualified<br>- Develop EMW Navy Mission Essential Task Lists (NMETL)<br>- EMW-related experiments prioritized in FLEX program<br>- Communications<br>- Aligned EMW message across Fleet and in public forums including Congress | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Regular drumbeat to maintain internal EMW awareness<br>- Develop standard EMW priorities to align internal USN audiences at all levels<br>- Future Capabilities<br>- Develop and resource EMW Workforce Man, Train, and Equip (MT&E)<br>- Implement governance to integrate efforts of multiple resource sponsors and Systems Commands (SYSCOMs) similar to NIFC-CA<br>- Develop and resource EMW Integrated Capability Packages to support Fleet EMW operations<br>Accomplishments<br>- Evaluated Threat Assessment trends (Intelligence Preparation of the Operational Environment (IPOE) provided by Office of Naval Intelligence (ONI))<br>- Collected inputs from Type Commanders (TYCOMS), numbered Fleets, Stakeholders<br>- Analyzed current capabilities<br>- Understand and group by EMW facets<br>- Compare capabilities to threats to identify gaps<br>- Extracted key takeaways<br><br>4. Campaign Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS) 5 Eyes Unmanned Undersea Vehicle (UUV) Operations<br>Focus<br>Execute a seminar wargame followed by a system wargame to develop common tactics and procedures for employment of integrated UUVs operating in a 5 Eyes environment.<br>Currently each member of the 5 Eyes community is developing, in isolation, TTPs for UUV operations which limits information exchange regarding use of similar UUV systems.<br>Develop a 5 Eyes releasable TACMEMO addressing UUV operations in a shared battle space.<br>Functions<br>Develop common tactics and procedures for employment of integrated UUVs operating in a 5 eyes environment.<br>Participants<br>- NWDC<br>- STDG<br>- NECC<br>- Maritime Warfighting Center Forum<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - 5 Eyes releasable TACMEMO addressing UUV operations<br>Accomplishments<br>TBD<br><br>5. Campaign Counter Fast Attack Craft (FAC) & Fast Incoming Attack Craft (FIAC) Weapons Evaluation At-Sea Experiment<br>Focus<br>Conduct an at-sea experiment to evaluate the effectiveness of alternative munitions vs. representative FAC and/or FIAC targets - specifically<br>- Armed Switchblade Unmanned Air System (UAS)<br>- MK47 40mm grenade launcher<br>- US Army 20mm frangible Close-In Weapon System (CIWS) round<br>Functions<br>Manage and coordinate the efforts of Navy stakeholders in this mission area to identify warfighting capability solutions, validate results, and deliver to the fleet over the next 12 months.<br>Support continuing efforts to give the Fleet capable and cost-effective weapons to engage the FAC & FIAC threat<br>Stakeholders<br>- STDG<br>- NWDC<br>- CNSF<br>Deliverables<br>- Integrated, validated DOTMLPF-P solution set - near term focus<br>- Updated/new TTPs<br>- Training & readiness input<br>Accomplishments<br>TBD<br><br>6. Campaign Rail Gun Seminar Wargame<br>Focus<br>Conduct a seminar wargame to examine a revised Rail Gun Operating Concept.<br>Functions | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Evaluate new platforms and weapon systems prior to Fleet introduction. First at-sea Rail Gun demonstration planned for FY16 aboard Joint High Speed Vehicle (JHSV) platform.<br>Support NAVSEA Rail Gun program office request to update the current Rail Gun Operating Concept to encompass new missions and target sets envisioned for the rail gun and associated hyper-velocity projectile.<br><br>Participants<br>- NWDC<br>- NAVSEA<br>- USFF<br>- MSC<br>- ONR<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Revised Rail Gun Operating Concept<br>Accomplishments<br>- Operational Impact<br>- Wide Area Coverage<br>- Increased speed to target@ 100+ nautical miles (NM)<br>- Faster response to Call-for-Fire<br>- More Time-Critical-Strike missions<br>- Accelerates operational tempo<br>- Faster attrition of enemy personnel and equipment<br>- Operation timeline shifts left<br>- Saves Lives<br>- Faster attrition of enemy reduces threat<br>- Reduced friendly casualties<br>- No unexploded ordnance on battlefield<br>- Enhances Safety<br>- No risk of sympathetic detonation<br>- Simplified storage, transportation, and replenishment<br>- Reduces Logistics<br>- Reduced ammo and fuel usage by ground force<br>- Shifts logistics load to seabase | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Reduces Cost per Kill<br>- Lower Unit Cost<br>- Lower handling cost<br><br>7. Campaign Undersea Domain Operating Concept (UDOC) Experimentation Campaign<br>Focus<br>The FY15 UDOC experimentation campaign consists of several events/efforts supporting Commander, Submarine Force (COMSUBFOR) as they develop and implement a plan in support of the UDOC.<br>Functions<br>Conduct seminar workshops in Q1 & Q2 FY15 to explore how innovative technologies, such as those within the COMSUBFOR Undersea Rapid Capability Initiative (URCI), might be employed by the Fleet to<br>- Exploit use of the undersea<br>- Deny the adversary's use of the undersea<br>- Provide war-winning cross domain effects<br>Conduct an additional Theater Undersea Warfare (USW) C2 seminar workshop in Q3 FY15 to address questions/topics not previously considered to feed Theater Undersea Warfare (TUSW) C2 CONOPS development<br>Conduct a seminar workshop to develop Periscope Detection & Discrimination (PDD) TTP<br>Conduct an at-sea experiment event in Q4 FY15 to examine the employment of prototype technologies (including the COMSUBFOR URCI projects)<br>Stakeholders<br>- COMSUBFOR<br>- NWDC<br>- NMAWC<br>- STDG<br>- NUWC<br>- ONR<br>- NRL<br>- CNMOC<br>- OPNAV<br>- NAVSEA<br><br>Deliverables | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Periscope Detection & Discrimination (PDD) TTP<br>- Training and Readiness input<br>Accomplishments<br>TBD<br><br>8. Campaign LPD-17 Seminar Wargame<br>Focus<br>Conduct a seminar wargame to examine the feasibility of using the LPD-17 class to perform additional missions as a Regional/Sector Air Defense Coordinator and/or an alternate Command and Control platform.<br>Functions<br>During the KEARSARGE ARG/26 Marine Expeditionary Unit (MEU) Post Deployment Brief (PDB), CUSFFC directed the identification of potential employment areas that differ from traditional LPD employment.<br>Inform changes to LPD-17 Class Required Operational Capabilities (ROC)/Projected Operational Environment (POE), LPD-17 Class Tactical Manual, LPD-17 manning plan, and other related documents.<br>Participants<br>- NWDC<br>- ESG-2<br>- USFF<br>- CPF<br>- CNSL<br>- CNAL<br>- C4F<br>- C5F<br>- C6F<br><br>Deliverables<br>- Training and Readiness input<br>- Recommended changes to<br>- LPD-17 Class Required Operational Capabilities (ROC)/Projected Operational Environment (POE)<br>- LPD-17 Class Tactical Manual<br>- LPD-17 manning plan and other related documents.<br>Accomplishments | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| TBD<br><br>9. Campaign Netted Sensors At-Sea Experiment<br>Focus<br>Explore multiple initiatives focused on technologies and TTP that will improve Navy capability to passively find, fix, track, target, and ID surface and air contacts at extended ranges largely in support of long range Surface Warfare (SUW).<br>Functions<br>Supports efforts to shorten timelines to geo-locate short-duration emitters and enhance CID capability through networked sensors.<br>Stakeholders<br>- NWDC<br>- PMA 231<br>- PMA 265<br>- VX-23<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Training and Readiness input<br>Accomplishments<br>TBD<br><br>10. Campaign Trident Warrior 2015 At-Sea Experiment<br>Focus<br>Conduct a 5-phase at-sea experiment from March through July 2015 in C7F Area of Responsibility (AOR) to include participation in PACOM/PACFLT exercise TALISMAN SABRE 2015.<br>Evaluate multiple technologies and/or TTP initiatives to close warfighting gaps focused on C2 of EMW assets in a contested environment, assured communications (Pandarra Net), Air Sea Battle concepts, long range SUW, and C-ISR.<br>Functions<br>Support OPNAV, SPAWAR, program offices, ONR, NRL, and others in the spiral development of prototype capabilities - at sea and in the hands of warfighters.<br>Address warfighting gaps identified across multiple POM-16 Integrated Priority Capability Lists (IPCLs)<br>Support/leverage C7F experimentation (to include Pandarra and Silent Banshee series) | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Stakeholders<br>- C7F<br>- NWDC<br>- CPF<br>- OPNAV N2/N6E/F<br>- ONR<br>- NRL<br>- NCWDG<br>- SPAWAR<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Training and Readiness input<br>- Develop new/revise TTPs<br>- Spiral development of prototype capabilities<br>Accomplishments<br>TBD<br><br>11. Campaign C4F JHSV At-Sea Experiment<br>Focus<br>Conduct an at-sea experiment in the Jun-Aug 2015 timeframe during JHSV C4F Southern Partnership Station deployment.<br>Evaluate multiple technologies to enhance JHSV capability to serve as an Afloat Forward Staging Base (AFSB) and to improve JHSV surface surveillance capability - specifically<br>- A small-boat docking facility<br>- A parasail to host elevated sensors<br>- A telescoping mast to extend radar horizon<br>- Small Unmanned Air Systems (UAS) operations<br>- Temporary armory and holding cell facilities<br>Complete FY14 FLEX Mine Warfare-related at-sea experiment<br>Functions<br>Continue to evaluate the capability of the JHSV platform to perform missions for which it was not originally designed | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Evaluate the JHSV as a Counter-tracking AFSB and its ability to support Unmanned Mine Counter Measures (UMCM) operations<br>Inform changes to JHSV Fleet Warfighting CONOPS and inform acquisition investment decisions<br>Stakeholders<br>- C4F<br>- NWDC<br>- USFF<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Training and Readiness input<br>- Revised CONOPS/TTPs<br>Accomplishments<br>TBD | | | | | |
| ***FY 2016 Base Plans:***<br>1. Campaign Naval Integrated Fire Control-Counter Air (NIFC-CA) Wargame 2<br>Focus<br>Will executed NIFC-CA Wargame 3 in Dec 2015.<br>Navy leadership requires awareness and understanding of the NIFC-CA capability in order to protect its "game changing" capabilities and key programs. A comprehensive methodology is required to synchronize delivery of all NIFC-CA doctrine, organization, training, materiel, leadership, personnel, facilities, and policy (DOTMLPF-P) actions, and Navy leadership requires insight into challenges and limitations associated with NIFC-CA in operational scenarios.<br>Throughout FY15, conduct a series of events including modeling and simulation (M&S) development leading up to NIFC-CA system wargame 3 planned for Dec 2016. Examine how NIFC-CA increment 1 capabilities, circa 2017, contribute to air warfare in an operationally representative environment. There are repeats in the work as campaigns such as NIFC-CA are multi-year events based on additions of capability also known as increments. The highly complex threat and introduction of capability take years to experiment with in order to deliver TTP/ TACMEMOs/Doctrine/Material capability for the Fleet to train to and use.<br><br>While the number of campaigns may decrease, the complexity will increase. For instance, EMW is ramping up in complexity and scope as the operators get smarter on what they need to experiment on in order to deliver capability. Same can be said for NIFC-CA as the increment comes on line. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Objectives<br>- Inform decisions on<br>- Concepts of Operation (CONOPS), tactics, techniques, and procedures (TTP), and Operational Task (OPTASK) modifications<br>- Training requirements and future experimentation<br>- NIFC-CA pillar program investments<br>- Investigate<br>- C2 flow/decision making<br>- Battlespace management and deconfliction in a joint engagement zone (JEZ)<br>- Combat ID (CID) with National Technical Means (NTM) and 5th-4th Generation<br>- Operations in an electronic attack (EA) environment<br>- Counter-intelligence, surveillance, reconnaissance (C-ISR)/counter-targeting (CTTG) impact on red force response (post-wargame)<br>Functions<br>USFFC proposes continued Fleet - OPNAV NIFC-CA partnership.<br>Support a United States Fleet Forces Command (USFFC)-led multi-year NIFC-CA campaign plan to explore NIFC-CA capabilities, C2 decision-making, training, CONOPS, and TTP.<br>Inform development/refinement of NIFC-CA Fleet CONOPS, Integrated Air and Missile Defense (IAMD) TTPs, and OPTASKs.<br>Inform the Fleet training continuum from schoolhouse to Fleet Synthetic Training (FST) to Composite Training Unit Exercise (COMPTUEX).<br>Deliverables<br>- Wargame Glideslope<br>- Preliminary workshops (CID, Blue Force Laydown, TTP Development, Air Defense Syndicate)<br>- Wargame planning, scenario and Data Collection and Analysis Plan (DCAP) development, IT testing and M&S engineering<br>- Dry runs/TTP week/wargame execution<br>- Post-wargame workshop (C-ISR/T)<br>- Wargame 2<br>- Counter ISR/C-Targeting | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Understand how EMW and C-ISR/T techniques can be applied to achieve desired results to counter Red's ability to target Blue's location, and/or disrupt Red's ability to conduct coordinated attacks (ex. simultaneous Time on Target (TOT), threat axes, etc.) based on results of AC-14C.<br>- NIFC-CA wargame 2 Senior Leader Seminar (SLS)<br>Accomplishments<br>- Evaluate potential kill chains for desirability, relevancy<br>- Create ideal and realistic wargame 2 mission plan<br><br>2. Campaign Alternative Platforms with Payloads Seminar (APPS) Wargame<br>Focus<br>Combatant Commander (CCDR) steady-state requirements are straining naval Cruiser-Destroyer (CRUDES) and Amphibious capacities to source and sustain Phase 0/1 missions. This USFFC N85 led FY14/15 Fleet Experimentation (FLEX) effort will identify mission payloads with enablers to allow designated USNS vessels to support selected Navy Component Command (NCC) steady state missions.<br>Functions<br>The experiment was comprised of two events. This study's objectives included<br>1. Define NCC identified mission set<br>2. Define platform baseline<br>3. Identify required payloads to support mission sets<br>4. Identify disparity between platform's baseline and mission payload<br>5. Identify enablers to integrate platform and mission payload<br>The results of this study will be used to inform the USFF/CPF 2017 POM input to OPNAV.<br>Deliverables<br>Quicklook and final experiment report with findings and mission payloads with enabler recommendations<br>- Define NCC selected missions and associated mission tasks<br>- Define platform baseline<br>- Identify required payloads to support mission sets<br>- Identify disparities between platform's baseline and mission payloads<br>- Identify enablers required to integrate platform and mission payloads<br><br>3. Campaign EMW Experiment Campaign<br>Focus The EMW experiment campaign represents a series of coordinated 2015 events designed to explore innovative TTP and/or technologies to "operationalize" EMW across the Fleet. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Functions<br>- A seminar wargame in Q4 FY16 to examine EMW functionality at the Operational Level of War (OLW)<br>- Several at-sea experiments to examine EMW-related initiatives<br>Deliverables<br>- Training<br>- Develop coherent EMW education/training requirements for individuals<br>- Develop clearly defined Maritime Operations Center (MOC)/Carrier Strike Group (CSG)/Amphibious Readiness Group (ARG)/unit EMW Fleet Readiness Training Plan (FRTP) training/certification requirements across all warfare areas<br>- Develop EM Operating Force (OPFOR) capability to challenge/train in contested EM environment<br>- Experimentation and Doctrine/TTP Development<br>- EMW-related functions aligned to Warfare Commander that is properly manned, trained, and qualified<br>- Develop EMW Navy Mission Essential Task Lists (NMETL)<br>- EMW-related experiments prioritized in FLEX program<br>- Communications<br>- Aligned EMW message across Fleet and in public forums including Congress<br>- Regular drumbeat to maintain internal EMW awareness<br>- Develop standard EMW priorities to align internal USN audiences at all levels<br>- Future Capabilities<br>- Develop and resource EMW Workforce Man, Train, and Equip (MT&E)<br>- Implement governance to integrate efforts of multiple resource sponsors and Systems Commands (SYSCOMs) similar to NIFC-CA<br>- Develop and resource EMW Integrated Capability Packages to support Fleet EMW operations<br>Accomplishments<br>- Evaluated Threat Assessment trends (Intelligence Preparation of the Operational Environment (IPOE) provided by Office of Naval Intelligence (ONI))<br>- Collected inputs from Type Commanders (TYCOMS), numbered Fleets, Stakeholders<br>- Analyzed current capabilities<br>- Understand and group by EMW facets<br>- Compare capabilities to threats to identify gaps<br>- Extracted key takeaways<br>- | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| 4. Campaign Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS) 5 Eyes Unmanned Undersea Vehicle (UUV) Operations<br>Focus<br>Execute a seminar wargame followed by a system wargame to develop common tactics and procedures for employment of integrated UUVs operating in a 5 Eyes environment.<br>Currently each member of the 5 Eyes community is developing, in isolation, TTPs for UUV operations which limits information exchange regarding use of similar UUV systems.<br>Develop a 5 Eyes releasable TACMEMO addressing UUV operations in a shared battle space.<br>Functions<br>Develop common tactics and procedures for employment of integrated UUVs operating in a 5<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- 5 Eyes releasable TACMEMO addressing UUV operations<br><br>5. Campaign Counter Fast Attack Craft (FAC) & Fast Incoming Attack Craft (FIAC) Weapons Evaluation At-Sea Experiment<br>Focus<br>Conduct an at-sea experiment to evaluate the effectiveness of alternative munitions vs. representative FAC and/or FIAC targets - specifically<br>- Armed Switchblade Unmanned Air System (UAS)<br>- MK47 40mm grenade launcher<br>- US Army 20mm frangible Close-In Weapon System (CIWS) round<br>Functions<br>Manage and coordinate the efforts of Navy stakeholders in this mission area to identify warfighting capability solutions, validate results, and deliver to the fleet over the next 12 months.<br>Support continuing efforts to give the Fleet capable and cost-effective weapons to engage the FAC & FIAC threat<br>Deliverables<br>- Integrated, validated DOTMLPF-P solution set - near term focus<br>- Updated/new TTPs<br>- Training & readiness input<br><br>6. Campaign Rail Gun Seminar Wargame | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Focus<br>Conduct a seminar wargame to examine a revised Rail Gun Operating Concept.<br>Functions<br>Evaluate new platforms and weapon systems prior to Fleet introduction. First at-sea Rail Gun demonstration planned for FY16 aboard Joint High Speed Vehicle (JHSV) platform.<br>Support NAVSEA Rail Gun program office request to update the current Rail Gun Operating Concept to encompass new missions and target sets envisioned for the rail gun and associated hyper-velocity projectile.<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Revised Rail Gun Operating Concept<br>Accomplishments<br>- Operational Impact<br>- Wide Area Coverage<br>- Increased speed to target@ 100+ nautical miles (NM)<br>- Faster response to Call-for-Fire<br>- More Time-Critical-Strike missions<br>- Accelerates operational tempo<br>- Faster attrition of enemy personnel and equipment<br>- Operation timeline shifts left<br>- Saves Lives<br>- Faster attrition of enemy reduces threat<br>- Reduced friendly casualties<br>- No unexploded ordnance on battlefield<br>- Enhances Safety<br>- No risk of sympathetic detonation<br>- Simplified storage, transportation, and replenishment<br>- Reduces Logistics<br>- Reduced ammo and fuel usage by ground force<br>- Shifts logistics load to seabase<br>- Reduces Cost per Kill<br>- Lower Unit Cost<br>- Lower handling cost | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| 7. Campaign Undersea Domain Operating Concept (UDOC) Experimentation Campaign<br>Focus<br>The FY16 UDOC experimentation campaign consists of several events/efforts supporting Commander, Submarine Force (COMSUBFOR) as they develop and implement a plan in support of the UDOC.<br>Functions<br>Conduct seminar workshops in Q1 & Q2 FY16 to explore how innovative technologies, such as those within the COMSUBFOR Undersea Rapid Capability Initiative (URCI), might be employed by the Fleet to<br>- Exploit use of the undersea<br>- Deny the adversary's use of the undersea<br>- Provide war-winning cross domain effects<br>Conduct an additional Theater Undersea Warfare (USW) C2 seminar workshop in Q3 FY16 to address questions/topics not previously considered to feed Theater Undersea Warfare (TUSW) C2 CONOPS development<br>Conduct a seminar workshop to develop Periscope Detection & Discrimination (PDD) TTP<br>Conduct an at-sea experiment event in Q4 FY16 to examine the employment of prototype technologies (including the COMSUBFOR URCI projects)<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Periscope Detection & Discrimination (PDD) TTP<br>- Training and Readiness input<br>8. Campaign LPD-17 Seminar Wargame<br>Focus<br>Conduct a seminar wargame to examine the feasibility of using the LPD-17 class to perform additional missions as a Regional/Sector Air Defense Coordinator and/or an alternate Command and Control platform.<br>Functions<br>During the KEARSARGE ARG/26 Marine Expeditionary Unit (MEU) Post Deployment Brief (PDB), CUSFFC directed the identification of potential employment areas that differ from traditional LPD employment.<br>Inform changes to LPD-17 Class Required Operational Capabilities (ROC)/Projected Operational Environment (POE), LPD-17 Class Tactical Manual, LPD-17 manning plan, and other related documents.<br>Deliverables<br>- Training and Readiness input<br>- Recommended changes to<br>- LPD-17 Class Required Operational Capabilities (ROC)/Projected Operational Environment (POE) | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - LPD-17 Class Tactical Manual<br>- LPD-17 manning plan and other related documents.<br>9. Campaign Netted Sensors At-Sea Experiment<br>Focus<br>Explore multiple initiatives focused on technologies and TTP that will improve Navy capability to passively find, fix, track, target, and ID surface and air contacts at extended ranges largely in support of long range Surface Warfare (SUW).<br>Functions<br>Supports efforts to shorten timelines to geo-locate short-duration emitters and enhance CID capability through networked sensors.<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Training and Readiness input<br><br>10. Campaign Trident Warrior 2015 At-Sea Experiment<br>Focus<br>Conduct a 5-phase at-sea experiment from March through July 2015 in C7F Area of Responsibility (AOR) to include participation in PACOM/PACFLT exercise TALISMAN SABRE 2015.<br>Evaluate multiple technologies and/or TTP initiatives to close warfighting gaps focused on C2 of EMW assets in a contested environment, assured communications (Pandarra Net), Air Sea Battle concepts, long range SUW, and C-ISR.<br>Functions<br>Support OPNAV, SPAWAR, program offices, ONR, NRL, and others in the spiral development of prototype capabilities - at sea and in the hands of warfighters.<br>Address warfighting gaps identified across multiple POM-16 Integrated Priority Capability Lists (IPCLs)<br>Support/leverage C7F experimentation (to include Pandarra and Silent Banshee series)<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Training and Readiness input<br>- Develop new/revise TTPs<br>- Spiral development of prototype capabilities<br>Campaign C4F JHSV At-Sea Experiment<br>Focus | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Conduct an at-sea experiment in the Jun-Aug 2016 timeframe during JHSV C4F Southern Partnership Station deployment.<br>Evaluate multiple technologies to enhance JHSV capability to serve as an Afloat Forward Staging Base (AFSB) and to improve JHSV surface surveillance capability - specifically<br>- A small-boat docking facility<br>- A parasail to host elevated sensors<br>- A telescoping mast to extend radar horizon<br>- Small Unmanned Air Systems (UAS) operations<br>- Temporary armory and holding cell facilities<br>Complete FY15 FLEX Mine Warfare-related at-sea experiment<br>Functions<br>Continue to evaluate the capability of the JHSV platform to perform missions for which it was not originally designed<br>Evaluate the JHSV as a Counter-tracking AFSB and its ability to support Unmanned Mine Counter Measures (UMCM) operations<br>Inform changes to JHSV Fleet Warfighting CONOPS and inform acquisition investment decisions<br>Deliverables<br>- Quicklook and final experiment report with findings and DOTMLPF-P recommendations<br>- Training and Readiness input<br>- Revised CONOPS/TTPs<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 11.876 | 5.158 | 8.864 | - | 8.864 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

This funding is used for 20 to 30 significant experiment campaigns/events encompassing up to 103 individual experiment initiative annually. These campaigns/events focused on addressing fleet identified capability gaps. The majority of this funding is used to acquire intellectual capital in emerging technical areas through contracts

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

providing engineering expertise, experiment design, execution and analysis support, and also used to purchase some engineering and integration costs associated with certain experiments.

**E. Performance Metrics**

Fleet Experimentation:
- Refine concepts and identify key performance levels necessary for implementation.
- Demonstrate feasibility and discriminate among competing concepts and implementation alternatives.
- Understand potential military effectiveness and risk.
- Evaluate how much of the new capability and attendant force structure is needed.
- Learn how to operate the new force and combine it with the legacy force.
- Develop recommended Doctrine, Organization, Training, Materiel, Leadership, and Personnel (DOTMLP) changes.
- Develop fleet war fighting requirements for submission to the OPNAV Navy Capabilities Development Process (NCDP) to inform Navy acquisition decisions.
- Integrate emergent concepts and technologies, leading to rapid introduction of needed war fighting capabilities in the fleet.
- Rapidly mature concepts, technologies, and doctrine.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>3319 / *Fleet Experimentation* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Test and Evaluation | MIPR | Defense Technical Information Center : Ft Belvoir VA | 2.100 | 2.036 | Mar 2014 | 1.400 | Apr 2015 | 1.700 | Dec 2015 | - | | 1.700 | Continuing | Continuing | Continuing |
| Systems Test and Evaluation | C/FFP | NAVSEA : Washington DC | 2.714 | 0.800 | Oct 2013 | 0.300 | Mar 2015 | 0.400 | Mar 2016 | - | | 0.400 | Continuing | Continuing | Continuing |
| Systems Test and Evaluation | C/FFP | SPAWAR : San Diego CA | 3.334 | 1.657 | Aug 2014 | 0.700 | Jul 2015 | 1.600 | Mar 2016 | - | | 1.600 | Continuing | Continuing | Continuing |
| Systems Test and Evaluation | C/FFP | SPAWARSYSCEN Atlantic : Charleston SC | 2.723 | 0.600 | Feb 2014 | 0.200 | Mar 2015 | 0.200 | Mar 2016 | - | | 0.200 | Continuing | Continuing | Continuing |
| Systems Test and Evaluation | Various | SPAWARSYSCEN Pacific : San Diego CA | 2.583 | 0.394 | Oct 2013 | 0.200 | Mar 2015 | 0.400 | Mar 2016 | - | | 0.400 | Continuing | Continuing | Continuing |
| Systems Test and Evaluation | Various | Naval Undersea Warfare Center : Newport RI | 0.658 | 0.741 | Mar 2014 | 0.400 | Mar 2015 | 0.400 | Feb 2016 | - | | 0.400 | Continuing | Continuing | Continuing |
| Systems Test and Evaluation | Various | Naval Surface Warfare Center : CA, IN, MD, VA | 2.143 | 0.827 | Nov 2013 | 0.500 | Jul 2015 | 0.600 | Jul 2016 | - | | 0.600 | Continuing | Continuing | Continuing |
| Systems Test and Evaluation | C/FFP | Naval Postgraduate School : Monterey CA | 1.500 | 0.095 | Aug 2014 | - | | - | | - | | - | - | 1.595 | - |
| Systems Test and Evaluation | C/FFP | Navy Warfare Development Command : Norfolk VA | 0.713 | 0.500 | Oct 2013 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| Systems Test and Evaluation | C/FFP | Naval Research Laboratory : Washington DC | 0.100 | 0.150 | Jan 2014 | 0.200 | May 2015 | 0.500 | Jun 2016 | - | | 0.500 | Continuing | Continuing | Continuing |
| System Test and Evaluation | C/FFP | Naval Air Warfare Center : Point Mugu CA | 0.491 | 0.200 | Jan 2014 | 0.200 | Oct 2014 | 0.400 | Jun 2016 | - | | 0.400 | Continuing | Continuing | Continuing |
| Systems Test and Evaluation | C/FFP | Fleet Industrial Supply : Norfolk VA | 0.130 | 0.599 | Aug 2014 | 0.158 | Apr 2015 | 0.464 | Mar 2016 | - | | 0.464 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604707N / *SEW Architecture/Eng Support* | Project (Number/Name)<br>3319 / *Fleet Experimentation* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Test and Evaluation | C/FFP | Naval Air Warfare Center Aircraft Division : Patuxent River MD | 6.909 | 0.400 | Feb 2014 | 0.200 | Mar 2015 | 0.500 | Mar 2016 | - | | 0.500 | Continuing | Continuing | Continuing |
| System Test and Evaluation | MIPR | Air Force Research Lab : Wright Patterson AFB OH | 0.950 | 0.300 | Dec 2013 | 0.200 | Apr 2015 | 0.400 | Mar 2016 | - | | 0.400 | Continuing | Continuing | Continuing |
| System Test and Evaluation | C/FFP | Navy System Management Activity : Washington DC | 0.316 | 0.800 | Aug 2014 | 0.300 | Jun 2015 | 0.800 | Jun 2016 | - | | 0.800 | Continuing | Continuing | Continuing |
| System Test and Evaluation | C/FFP | Naval Surface Warfare Center : Corona CA | 0.246 | - | Feb 2014 | - | | - | | - | | - | Continuing | Continuing | Continuing |
| System Test and Evaluation | C/FFP | CECOM : Aberdeen Proving Grounds MD | 0.150 | - | | - | | - | | - | | - | - | 0.150 | - |
| System Test and Evaluation | C/FFP | DMEA : Sacramento CA | 0.400 | 0.135 | Dec 2013 | - | | - | | - | | - | - | 0.535 | - |
| System Test and Evaluation | Various | Naval Surface Warfare Command : Dahlgren VA | 0.000 | 0.201 | Dec 2013 | 0.200 | May 2015 | 0.200 | Jun 2016 | - | | 0.200 | Continuing | Continuing | Continuing |
| System Test and Evaluation | Various | APG-Army : Natick | 0.000 | 0.467 | Mar 2014 | - | | - | | - | | - | - | 0.467 | - |
| System Test and Evaluation | Various | Naval air Warfare Center : CA, NJ | 0.000 | 0.514 | Aug 2014 | - | | 0.300 | Aug 2016 | - | | 0.300 | - | 0.814 | - |
| System Test and Evaluation | Various | BTR per DCNO N2N6 : To Project 3311 | 0.000 | 0.460 | Oct 2014 | - | | - | | - | | - | - | 0.460 | - |
| | | **Subtotal** | 28.160 | 11.876 | | 5.158 | | 8.864 | | - | | 8.864 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

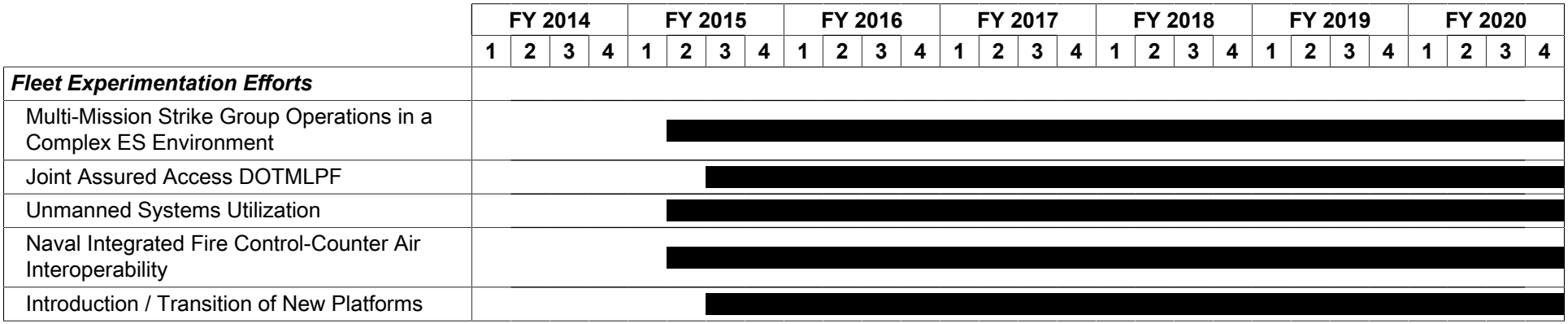
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management | C/FFP | SPAWAR : San Diego CA | 3.190 | - | | - | | - | | - | | - | - | 3.190 | - |
| Program Management | C/FFP | Naval Postgraduate School : Montery CA | 0.700 | - | | - | | - | | - | | - | - | 0.700 | 1.450 |
| Program Management | C/FFP | Naval Air Warfare Center Aircraft Division : Patuxent River MD | 0.250 | - | | - | | - | | - | | - | - | 0.250 | - |
| Program Management | C/FFP | Naval Surface Warfare Command : DahlgrenVA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Program Management | Various | Naval Surface Warfare Center : Corona CA | 0.000 | - | | - | | - | | - | | - | - | - | - |
| Program Management | MIPR | Defense Technical Information Center: VA : Ft Belvoir VA | 1.639 | - | | - | | - | | - | | - | - | 1.639 | - |
| | | **Subtotal** | 5.779 | - | | - | | - | | - | | - | - | 5.779 | - |

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 33.939 | 11.876 | | 5.158 | | 8.864 | | - | | 8.864 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604707N / *SEW Architecture/Eng Support* | **Project (Number/Name)**<br>3319 / *Fleet Experimentation* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Fleet Experimentation Efforts*** | | | | |
| Multi-Mission Strike Group Operations in a Complex ES Environment | 2 | 2015 | 4 | 2020 |
| Joint Assured Access DOTMLPF | 3 | 2015 | 4 | 2020 |
| Unmanned Systems Utilization | 2 | 2015 | 4 | 2020 |
| Naval Integrated Fire Control-Counter Air Interoperability | 2 | 2015 | 4 | 2020 |
| Introduction / Transition of New Platforms | 3 | 2015 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604786N *I (U)Offensive Anti-Surface Warfare Weapon Dev* |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 77.609 | 86.683 | 181.939 | 285.849 | - | 285.849 | 232.751 | 149.888 | 123.023 | - | - | 1,137.742 |
| 3337: *Offensive Anti-Surface Warfare (OASuW) Weapon* | 77.609 | 86.683 | 181.939 | 285.849 | - | 285.849 | 232.751 | 149.888 | 123.023 | - | - | 1,137.742 |

**MDAP/MAIS Code:**
**Other MDAP/MAIS Code(s):** 449

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

Offensive Anti-Surface Warfare (OASuW) will be an offensive weapon system that can be air, surface, and subsurface launched in the maritime battle space environment. OASuW will be a vital component of the Joint Force Anti-Surface Warfare capability and incorporate new and emergent technologies to support an increased offensive strike capability. Due to emerging threats, the fleet issued an Urgent Operational Needs Statement (UONS) that identified a capability gap for a long-range anti-ship missile to be filled by 2018. Directly supporting this UONS and significantly reducing Joint Force warfighting risks, the U.S. Navy initiated OASuW Increment 1, which leverages the Defense Advanced Research Projects Agency(DARPA)/Office of Naval Research Long Range Anti-Ship Missile (LRASM) demonstration program to deliver an Early Operational Capability (EOC) in the required timeframe. LRASM fills the most urgent air-launched capability gap to compliment, existing ASuW weapon systems and positions the Department of Defense to address evolving surface warfare threats. Longer term OASuW requirements will be addressed in the future by OASuW Increment II.

Budget Item Justification: OASuW (Increment I)
Funding supports the delivery of an EOC of OASuW Increment I's LRASM weapon system, including the transition of the LRASM demonstration design into a fielded air-launched weapon system, using an accelerated acquisition approach, with streamlined governance. The program is leveraging DoDI 5000.02i Model 4 to structure the acquisition strategy, which includes a highly integrated and concurrent transition design, integration, and developmental / operational test program to meet the EOC schedule required by the UONS. To manage the accelerated timeline and resulting concurrency, the program uses a structured Knowledge Point review process that support decisions regarding significant program events such as transition from design to integration phase and contract awards. These reviews also provide senior DoD leadership the opportunity to provide focused support and active management of technical and acquisition risk and are chaired by the Service Acquisition Executive, ASN(RDA), and the Deputy Director of DARPA. The knowledge points are similar to acquisition milestone reviews, but occur more frequently and are tailored to program-specific milestone events. Of note, the OASuW Increment I knowledge points are defined differently than GAO defines the same term and are tailored to program-specific milestone events. The program intends to meet the statutory requirements associated with Milestone B at Knowledge Point 3. In addition to the Knowledge Point reviews, Executive Steering Board reviews, chaired by the MDA, are held at least monthly. Supporting these reviews, the associated engineering approach is designed to mitigate resulting risk by implementing a rolling-wave engineering progression based on the NAVAIR Systems Engineering Technical Review (SETR) process to enable detailed planning and decisions as the system matures. This process includes capstone SETR events that are tailored reviews using standard design review criteria. SETR 2.0 in FY15 provided a Production Design Review level review of the system and supported the Knowledge Point 2 decision to continue toward the Integration and Test phase. The Technology Maturation effort in FY15 and FY16 culminates in a system Critical Design Review (CDR) level review at SETR

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604786N *I (U)Offensive Anti-Surface Warfare Weapon Dev* |

4.0. SETR 3.0 in late 2015 provides a CDR-level review and supports the Knowledge Point 3 decision to initiate the Integration and Test phase for the all-up-round components.

In FY16, engineering design to transition the DARPA demonstration design to a weaponized configuration continues at an accelerated pace during the Technology Maturation phase, and the Integration and Test phase will be initiated. The Technology Maturation phase will conduct two major design reviews in FY16, completing this phase and solidifying the design required for Integration and Test phase. As the Integration and Test phase begins, test articles will be procured to support system integration, ground test, and flight test. This creates a compressed, concurrent schedule in FY16, which is required to meet the fleet fielding requirement specified in the UONS that drives the need for increased funding levels in FY16.

This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 90.985 | 202.939 | 287.991 | - | 287.991 |
| Current President's Budget | 86.683 | 181.939 | 285.849 | - | 285.849 |
| Total Adjustments | -4.302 | -21.000 | -2.142 | - | -2.142 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -21.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.136 | - | | | |
| • SBIR/STTR Transfer | -4.166 | - | | | |
| • Rate/Misc Adjustments | - | - | -2.142 | - | -2.142 |

**Change Summary Explanation**

Schedule:
Updated to address accelerated acquisition approach to meet the urgent need for an air launched anti-surface warfare capability.
Knowledge Point 2 moved from 4th Qtr 2014 to 1st Qtr 2015 (update decision date).
SETR 3.0 (Production Design Review level)added 4th Qtr 2015.
Knowledge Point 3 moved from 4th Qtr 2015 to 1st Qtr 2016 (update decision need date).
Milestone B added, coincident with Knowledge Point 3 (MDA decision at Knowledge Point 2).
SETR 4.0 (Critical Design Review level) moved from 2nd Qtr 2016 to 3rd Qtr 2016 (Integrated Master Schedule forecast update).
Knowledge Point 5 moved from 2nd Qtr 2018 to 4th Qtr 2018 (updated decision need date).
Test assets added to FY2014-2018 with deliveries starting in 3rd Qtr 2015 through 2nd Qtr 2018 (updated fidelity of plan).

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604786N *I (U)Offensive Anti-Surface Warfare Weapon Dev* |

Production schedule added to FY2017-2020 with deliveries starting in 2nd Qtr 2018 through 1st Qtr 2022 (updated fidelity of plan).

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | | | | | R-1 Program Element (Number/Name)<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | | | | Project (Number/Name)<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 3337: *Offensive Anti-Surface Warfare (OASuW) Weapon* | 77.609 | 86.683 | 181.939 | 285.849 | - | 285.849 | 232.751 | 149.888 | 123.023 | - | - | 1,137.742 |
| Quantity of RDT&E Articles | | 2 | 28 | 24 | - | 24 | 8 | 2 | - | - | | |

**MDAP/MAIS Code:** 449

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

Offensive Anti-Surface Warfare (OASuW) will be an offensive weapon system that can be air, surface, and subsurface launched in the maritime battle space environment. OASuW will be a vital component of the Joint Force Anti-Surface Warfare capability and incorporate new and emergent technologies to support an increased offensive strike capability. Due to emerging threats, the fleet issued an Urgent Operational Needs Statement (UONS) that identified a capability gap for a long-range anti-ship missile to be filled by 2018. Directly supporting this UONS and significantly reducing Joint Force warfighting risks, the U.S. Navy initiated OASuW Increment 1, which leverages the Defense Advanced Research Projects Agency(DARPA)/Office of Naval Research Long Range Anti-Ship Missile (LRASM) demonstration program to deliver an Early Operational Capability (EOC) in the required timeframe. LRASM fills the most urgent air-launched capability gap to compliment, existing ASuW weapon systems and positions the Department of Defense to address evolving surface warfare threats. Longer term OASuW requirements will be addressed in the future by OASuW Increment II.

Budget Item Justification: OASuW (Increment I)
Funding supports the delivery of an EOC of OASuW Increment I's LRASM weapon system, including the transition of the LRASM demonstration design into a fielded air-launched weapon system, using an accelerated acquisition approach, with streamlined governance. The program is leveraging DoDI 5000.02i Model 4 to structure the acquisition strategy, which includes a highly integrated and concurrent transition design, integration, and developmental / operational test program to meet the EOC schedule required by the UONS. To manage the accelerated timeline and resulting concurrency, the program uses a structured Knowledge Point review process that support decisions regarding significant program events such as transition from design to integration phase and contract awards. These reviews also provide senior DoD leadership the opportunity to provide focused support and active management of technical and acquisition risk and are chaired by the Service Acquisition Executive, ASN(RDA), and the Deputy Director of DARPA. The knowledge points are similar to acquisition milestone reviews, but occur more frequently and are tailored to program-specific milestone events. Of note, the OASuW Increment I knowledge points are defined differently than GAO defines the same term and are tailored to program-specific milestone events. The program intends to meet the statutory requirements associated with Milestone B at Knowledge Point 3. In addition to the Knowledge Point reviews, Executive Steering Board reviews, chaired by the MDA, are held at least monthly. Supporting these reviews, the associated engineering approach is designed to mitigate resulting risk by implementing a rolling-wave engineering progression based on the NAVAIR Systems Engineering Technical Review (SETR) process to enable detailed planning and decisions as the system matures. This process includes capstone SETR events that are tailored reviews using standard design review criteria. SETR 2.0 in FY15 provided a Production Design Review level review of the system and supported the Knowledge Point 2 decision to continue toward the Integration and Test phase. The Technology Maturation effort in FY15 and FY16 culminates in a system Critical Design Review (CDR) level review at SETR 4.0. SETR 3.0 in late 2015 provides a CDR-level review and supports the Knowledge Point 3 decision to initiate the Integration and Test phase for the all-up-round components.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | **Project (Number/Name)**<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* |

In FY16, engineering design to transition the DARPA demonstration design to a weaponized configuration continues at an accelerated pace during the Technology Maturation phase, and the Integration and Test phase will be initiated. The Technology Maturation phase will conduct two major design reviews in FY16, completing this phase and solidifying the design required for Integration and Test phase. As the Integration and Test phase begins, test articles will be procured to support system integration, ground test, and flight test. This creates a compressed, concurrent schedule in FY16, which is required to meet the fleet fielding requirement specified in the UONS that drives the need for increased funding levels in FY16.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** OASuW Development Program | 86.683 | 181.939 | 285.849 | - | 285.849 |
| ***Articles:*** | 2 | 28 | 24 | - | 24 |

***FY 2014 Accomplishments:***
Completed technology transition risk reduction efforts and initiated accelerated program Technology Maturation phase, including design activity and risk reduction to transition the DARPA/ONR LRASM demonstration program into an early operational capability. This transition included a Request for Proposal and contract award for activities enabling completion of a preliminary design review in early FY15 that will support further sensor and avionics hardware development and fabrication of hardware for the subsystem and system qualification, integration and test. FY14 test assets are early units required for risk reduction activities in advance of testing mature system components in FY16 and beyond.

***FY 2015 Plans:***
Primary efforts include continued weapon system design and hardware development to support subsystem design reviews. Additional activities include identification and design of weapon system test sets required in support of subsystem and system level testing, and initial integration design/development on the USAF and USN launch platforms, which include mission planning development and environmental qualification. Test assets procured in FY15 will be utilized to test the separation qualities of the weapon off of the launch platforms, develop the interface between the weapon and the launch platforms, and qualify the weapon in the operational electro-magnetic environment.

***FY 2016 Base Plans:***
The Integration and Test phase of the program will be initiated in FY16, concurrently with the completion of the Technology Maturation phase. This program concurrency is required to meet the Early Operational Capability (EOC) fielding timeline identified by the fleet. Primary efforts include weapon system design maturation to support completion of full system critical design review and system qualification in preparation for a Production Readiness Review in FY17. These efforts will be supported by subsystem testing utilizing a Flying Test Bed,

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | **Project (Number/Name)**<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| laboratory assets and associated models. Additional activities include integration design/development on the launch platforms as well as procurement of free flight test items.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 86.683 | 181.939 | 285.849 | - | 285.849 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • WPN/2291: *LRASM* | - | - | - | - | - | 30.000 | 75.000 | 75.000 | 85.000 | - | 265.000 |
| • MPAF/8010: *LRASM* | - | - | - | - | - | 60.000 | 45.000 | 45.000 | - | - | 150.000 |

**Remarks**

**D. Acquisition Strategy**

OASuW Increment I is using an accelerated acquisition approach, with streamlined governance to transition the DARPA/ONR-demonstrated Long Range Anti-Ship Missile (LRASM) for use as an air-launched weapon from USAF and USN platforms. The program is leveraging DoDI 5000.02i Model 4 to structure the acquisition strategy, which includes a highly integrated and concurrent transition design, integration, and developmental / operational test program to meet the 2018 Early Operation Capability (EOC) fielding schedule required by an Urgent Operational Need Statement (UONS) issued by the fleet. The program is structured in three phases: Technology Maturation, Integration and Test, and Procurement. To manage the accelerated timeline and resulting concurrency, the program uses a structured Knowledge Point review process that support decisions regarding significant program events such as transition from design to integration phase and contract awards. These reviews also provide senior DoD leadership the opportunity to provide focused support and active management of technical and acquisition risk and are chaired by the Service Acquisition Executive, ASN(RDA) (delegated MDA), and the Deputy Director of DARPA. The knowledge points are similar to acquisition milestone reviews, but occur more frequently. Of note, the OASuW Increment I knowledge points are defined differently than GAO defines the same term. Knowledge Point 1 supported program initiation and approval of the acquisition strategy ; Knowledge Point 2 supported evaluation of the preliminary design of the weapon system as well as release of the Request for Proposal for the Integration and Test phase; Knowledge Point 3 supports evaluation of the final (critical design review level) weapon system design and initiation of/contract award for the Integration and Test phase; Knowledge Point 4 supports the procurement decision for EOC units for the B-1; and Knowledge Point 5 supports the procurement decision for EOC units for the F/A-18E/F. The program intends to meet the statutory requirements associated with Milestone B at Knowledge Point 3. In addition to the Knowledge Point reviews, Executive Steering Board reviews (also chaired by the MDA) are held at least monthly. Supporting these reviews, the associated engineering approach is designed to mitigate resulting risk by implementing a rolling-wave engineering progression based on the NAVAIR Systems Engineering Technical Review (SETR) process to enable detailed planning and decisions as the system matures. This process includes capstone SETR events that are tailored reviews using standard design review criteria. SETR 1.0 in FY14 provided a Systems Requirements Review. SETR 2.0 in FY15 provided a Preliminary Design Review level review of the system and supported Knowledge Point 2. SETR 3.0 in late 2015 will provide a Critical Design Review (CDR) level review

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | **Project (Number/Name)**<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* |

of the All-up Round in support of Knowledge Point 3, while SETR 4.0 in FY16 will provide a CDR level review of the entire weapon system in support of Knowledge Point 4 in early FY17, along with flight test information

**E. Performance Metrics**

The Knowledge Points are defined reviews with the Executive Steering Board comprised of Service Acquisition Executive, ASN(RDA) (delegated MDA) and the Deputy Director of DARPA to make program decisions at key points in the program life cycle in place of milestone reviews, but tailored to support the accelerated process. The acquisition program baseline will be established at Knowledge Point 3.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | Project (Number/Name)<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | C/CPIF | Lockheed Martin Missile and Fire Control : Orlando, FL | 47.563 | 56.812 | Apr 2014 | 130.025 | Oct 2014 | 214.812 | Oct 2015 | - | | 214.812 | 323.482 | 772.694 | 772.694 |
| Product Development | C/CPFF | Boeing : St. Louis, MO | 1.739 | 3.245 | Jun 2014 | 12.346 | Nov 2014 | 17.830 | Nov 2015 | - | | 17.830 | 30.714 | 65.874 | 65.874 |
| | | **Subtotal** | 49.302 | 60.057 | | 142.371 | | 232.642 | | - | | 232.642 | 354.196 | 838.568 | 838.568 |

**Remarks**

FY16 LMCO costs includes all product development by LMCO and associated sub-contractors to meet TRR, SETR 4.0, PRR and Knowledge Point 4.
FY16 Boeing costs includes all software development and integration onto the B-1B and the F/A-18 E/F to meet TRR, SETR 4.0, PRR and Knowledge Point 4.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Support | WR | NAWC AD : Patuxent River,MD | 0.000 | 0.311 | Dec 2013 | 1.520 | Dec 2014 | 1.568 | Nov 2015 | - | | 1.568 | 13.962 | 17.361 | - |
| Government Support | WR | NAWC WD : China Lake, CA | 5.027 | 9.233 | Dec 2013 | 13.244 | Jan 2015 | 13.641 | Nov 2015 | - | | 13.641 | 20.943 | 62.088 | - |
| Government Support | WR | NSWC : Various | 2.692 | 0.220 | Jan 2014 | 0.070 | Jan 2015 | 0.072 | Nov 2015 | - | | 0.072 | 3.201 | 6.255 | - |
| Development Support | C/FFP | NSMA : Washington, DC | 2.495 | 2.752 | Jan 2014 | 2.210 | Nov 2014 | 2.276 | Jan 2016 | - | | 2.276 | 6.332 | 16.065 | 16.065 |
| Development Support | MIPR | USAF : Various | 0.000 | 0.185 | Nov 2013 | 0.328 | Nov 2014 | 0.338 | Nov 2015 | - | | 0.338 | 10.000 | 10.851 | - |
| Development Support | MIPR | USA : White Sands, NM | 2.800 | - | | - | | - | | - | | - | - | 2.800 | - |
| Integrated Logistics Support | WR | NAWC AD : Patuxent River, MD | 0.000 | 0.165 | Dec 2013 | 0.168 | Nov 2014 | 0.171 | Nov 2015 | - | | 0.171 | 1.601 | 2.105 | - |
| Contractor Support | C/CPFF | JHU/APL : Laurel, MD | 5.450 | 3.091 | May 2014 | 2.299 | Dec 2014 | 2.368 | Dec 2015 | - | | 2.368 | 3.060 | 16.268 | 16.268 |
| Contractor Support | C/FFP | Schaffer Corporation : Arlington, VA | 0.685 | 3.365 | Mar 2014 | 3.508 | Dec 2014 | 3.613 | Dec 2015 | - | | 3.613 | 5.084 | 16.255 | 16.255 |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | **Project (Number/Name)**<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mission Planning Support | C/CPFF | Northrup Grummann : Bethpage, NY | 0.000 | 0.246 | Sep 2014 | 1.073 | Jan 2015 | 0.843 | Jan 2016 | - | | 0.843 | 5.432 | 7.594 | 7.594 |
| Contractor Support | Various | Various : Various | 5.270 | 0.272 | Mar 2014 | 0.367 | Nov 2014 | 0.379 | Nov 2015 | - | | 0.379 | 1.016 | 7.304 | 7.304 |
| | | **Subtotal** | 24.419 | 19.840 | | 24.787 | | 25.269 | | - | | 25.269 | 70.631 | 164.946 | - |

**Remarks**

FY16 Support costs consist of support from Government Technical Program Office (TPO) and Contractor Support experts associated with threat analysis, CONOPs, and Training and Tactical assessments in support of TRR, SETR 4.0, PRR and Knowledge Point 4.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | WR | NAWC WD : China Lake, CA | 2.109 | 1.788 | Dec 2013 | 5.842 | Jan 2015 | 20.000 | Nov 2015 | - | | 20.000 | 57.521 | 87.260 | - |
| Development Support | WR | NAWC AD : Patuxent River, MD | 0.102 | 0.252 | Dec 2013 | 0.738 | Dec 2014 | 5.028 | Nov 2015 | - | | 5.028 | 14.666 | 20.786 | - |
| Development Support | WR | NSWC : Various | 0.000 | - | | 0.064 | Nov 2014 | 0.066 | Nov 2015 | - | | 0.066 | 0.178 | 0.308 | - |
| Development Support | WR | COTF : Norfolk, VA | 0.000 | 0.055 | Jan 2014 | 0.050 | Nov 2014 | 0.052 | Nov 2015 | - | | 0.052 | 0.178 | 0.335 | - |
| Development Support | MIPR | USAF : Various | 0.000 | 0.191 | May 2014 | 0.085 | Nov 2014 | 0.088 | Nov 2015 | - | | 0.088 | 0.178 | 0.542 | - |
| Wind Tunnel Testing | MIPR | AEDC : Arnolds AFB, TN | 0.000 | 0.250 | May 2014 | 5.353 | Oct 2014 | - | | - | | - | - | 5.603 | - |
| | | **Subtotal** | 2.211 | 2.536 | | 12.132 | | 25.234 | | - | | 25.234 | 72.721 | 114.834 | - |

**Remarks**

FY16 Test and Evaluation costs support the flight testing, system qualifications, range time and target costs needed for the B-1B and F/A-18 E/F to support TRR, SETR 4.0, PRR and Knowledge Point 4.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | Project (Number/Name)<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Support | WR | NAWC AD : Patuxent River, MD | 1.290 | 1.657 | Dec 2013 | 1.422 | Dec 2014 | 1.451 | Nov 2015 | - | | 1.451 | 4.353 | 10.173 | - |
| Government Support | WR | NAWC WD : China Lake, CA | 0.000 | 1.234 | Dec 2013 | 0.888 | Jan 2015 | 0.907 | Nov 2015 | - | | 0.907 | 2.721 | 5.750 | - |
| Project Management Support | C/CPFF | NAWC AD : Patuxent River, MD | 0.362 | 1.179 | Dec 2013 | 0.104 | Dec 2014 | 0.106 | Dec 2015 | - | | 0.106 | 0.320 | 2.071 | 2.071 |
| Travel | Various | NAWC AD : Patuxent River, MD | 0.025 | 0.180 | Nov 2013 | 0.235 | Oct 2014 | 0.240 | Oct 2015 | - | | 0.240 | 0.720 | 1.400 | - |
| | | **Subtotal** | 1.677 | 4.250 | | 2.649 | | 2.704 | | - | | 2.704 | 8.114 | 19.394 | - |

**Remarks**

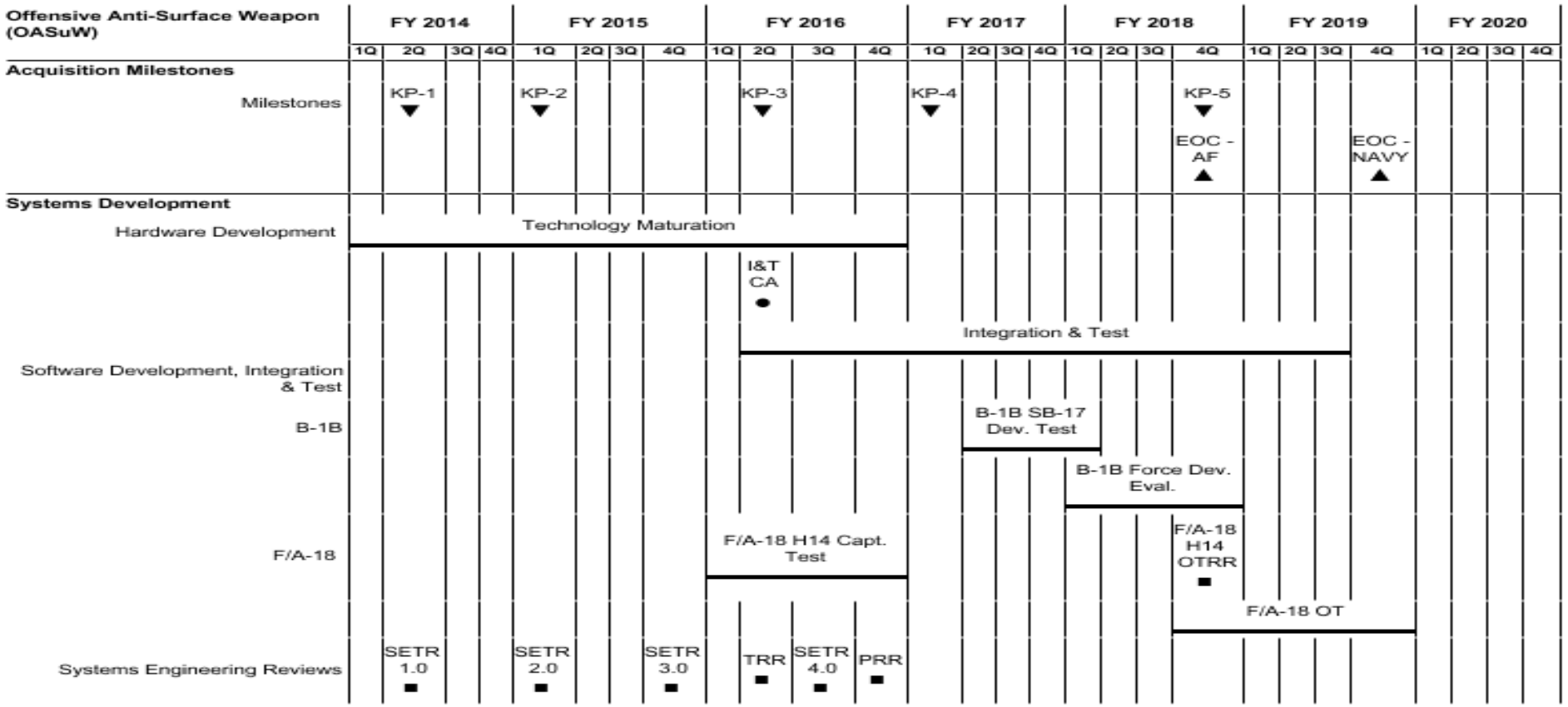
FY16 Management Services costs consist of Non-Headquarters Program Office Management team (Government labor and Contractor support services) required for the management of the program.

| | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 77.609 | 86.683 | | 181.939 | | 285.849 | | - | | 285.849 | 505.662 | 1,137.742 | - |

**Remarks**

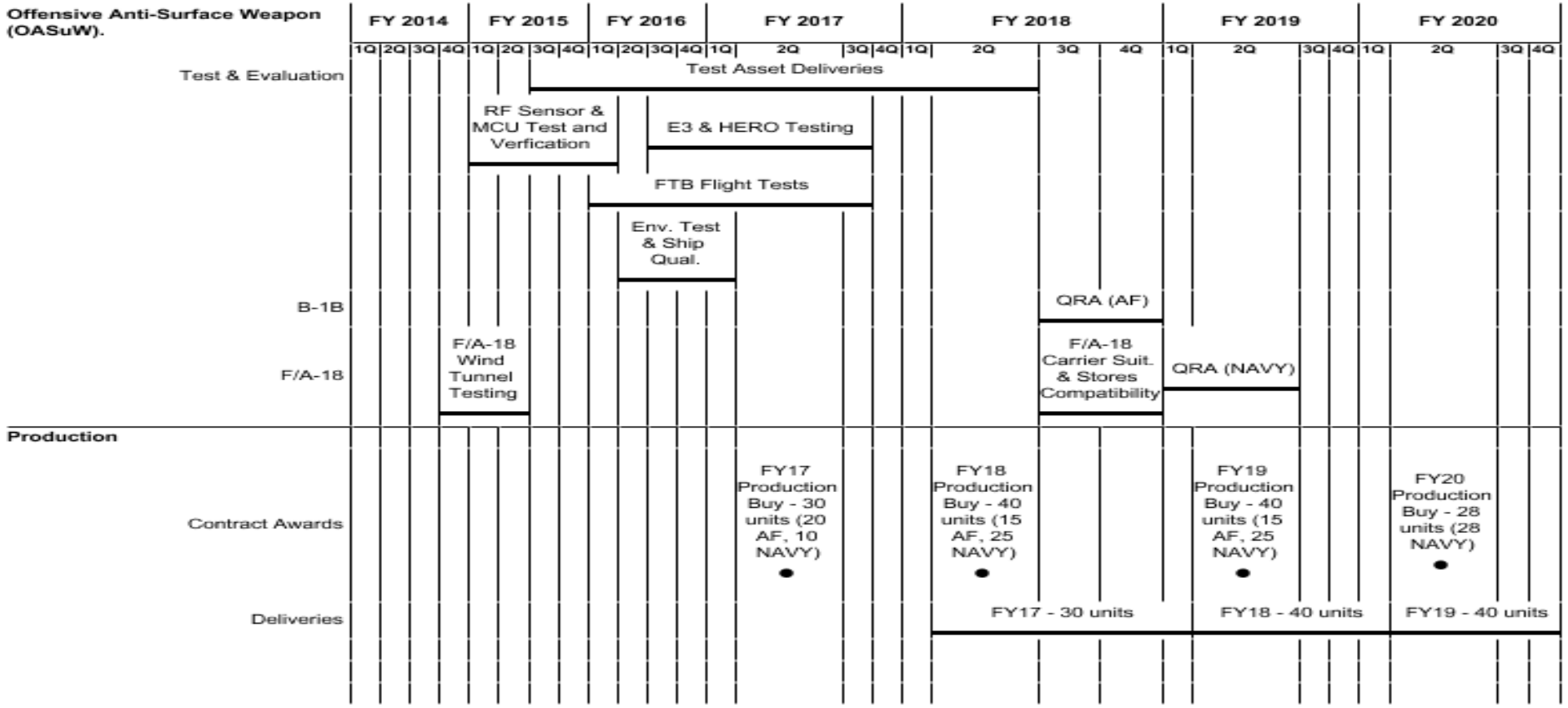
Prior year and FY14 updated for actuals.

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | **Project (Number/Name)**<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* |




*2016PB - 0604786N - 3337*

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | **Project (Number/Name)**<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* |




*2016PB - 0604786N - 3337 Schedule changes reflect program decisions based on current approved Acquisition Strategy.*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | **Project (Number/Name)**<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Offensive Anti-Surface Weapon (OASuW)*** | | | | |
| Acquisition Milestones: Milestones: Knowledge Point 1 | 2 | 2014 | 2 | 2014 |
| Acquisition Milestones: Milestones: Knowledge Point 2 | 1 | 2015 | 1 | 2015 |
| Acquisition Milestones: Milestones: Knowledge Point 3 | 2 | 2016 | 2 | 2016 |
| Acquisition Milestones: Milestones: Knowledge Point 4 | 1 | 2017 | 1 | 2017 |
| Acquisition Milestones: Milestones: Knowledge Point 5 | 4 | 2018 | 4 | 2018 |
| Acquisition Milestones: Milestones: Early Operational Capability (EOC) Air Force | 4 | 2018 | 4 | 2018 |
| Acquisition Milestones: Milestones: Early Operational Capability (EOC) Navy | 4 | 2019 | 4 | 2019 |
| Systems Development: Hardware Development: Technology Maturation Phase | 1 | 2014 | 4 | 2016 |
| Systems Development: Hardware Development: Integration & Test Contract Award | 2 | 2016 | 2 | 2016 |
| Systems Development: Hardware Development: Integration & Test | 2 | 2016 | 3 | 2019 |
| Systems Development: B-1B: B-1B SB-17 Software Development Test | 2 | 2017 | 1 | 2018 |
| Systems Development: B-1B: B-1B Force Development Evaluation | 1 | 2018 | 4 | 2018 |
| Systems Development: F/A-18: F/A-18 H14 Captive Carriage Test | 1 | 2016 | 4 | 2016 |
| Systems Development: F/A-18: F/A-18 H14 Operational Test Readiness Review | 4 | 2018 | 4 | 2018 |
| Systems Development: F/A-18: F/A-18 H14 Operational Test | 4 | 2018 | 4 | 2019 |
| Systems Development: Systems Engineering Reviews: System Engineering Technical Review 1.0 | 2 | 2014 | 2 | 2014 |
| Systems Development: Systems Engineering Reviews: System Engineering Technical Review 2.0 | 1 | 2015 | 1 | 2015 |
| Systems Development: Systems Engineering Reviews: System Engineering Technical Review 3.0 | 4 | 2015 | 4 | 2015 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604786N / *(U)Offensive Anti-Surface Warfare Weapon Dev* | **Project (Number/Name)**<br>3337 / *Offensive Anti-Surface Warfare (OASuW) Weapon* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: Systems Engineering Reviews: System Engineering Technical Review 4.0 | 3 | 2016 | 3 | 2016 |
| Systems Development: Systems Engineering Reviews: Technical Readiness Review | 2 | 2016 | 2 | 2016 |
| Systems Development: Systems Engineering Reviews: Production Readiness Review | 4 | 2016 | 4 | 2016 |
| ***Offensive Anti-Surface Weapon (OASuW).*** | | | | |
| Test & Evaluation: Test Asset Deliveries | 3 | 2015 | 2 | 2018 |
| Test & Evaluation: E3 & HERO Testing | 3 | 2016 | 3 | 2017 |
| Test & Evaluation: RF Sensor and MCU Testing and Verification | 1 | 2015 | 1 | 2016 |
| Test & Evaluation: Flying Test Bed Flight Tests | 1 | 2016 | 3 | 2017 |
| Test & Evaluation: Environmental Test & Ship Qualification | 2 | 2016 | 1 | 2017 |
| B-1B: Quick Reaction Assessment Testing (AF) | 3 | 2018 | 4 | 2018 |
| F/A-18: F/A-18 Wind Tunnel Testing | 4 | 2014 | 2 | 2015 |
| F/A-18: Quick Reaction Assessment Testing (Navy) | 1 | 2019 | 2 | 2019 |
| F/A-18: F/A-18 Carrier Suitability & Stores Compatibility | 3 | 2018 | 4 | 2018 |
| Production: Contract Awards: FY17 Production Buy - 30 units (20 AF, 10 NAVY) | 2 | 2017 | 2 | 2017 |
| Production: Contract Awards: FY18 Production Buy - 40 units (15 AF, 25 NAVY) | 2 | 2018 | 2 | 2018 |
| Production: Contract Awards: FY19 Production Buy - 40 units (15 AF, 25 NAVY) | 2 | 2019 | 2 | 2019 |
| Production: Contract Awards: FY20 Production Buy - 28 units (28 NAVY) | 2 | 2020 | 2 | 2020 |
| Production: Deliveries: FY17 Deliveries - 30 units | 2 | 2018 | 1 | 2019 |
| Production: Deliveries: FY18 Deliveries - 40 units | 2 | 2019 | 1 | 2020 |
| Production: Deliveries: FY19 Deliveries - 40 units | 2 | 2020 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605812M *I (U)Joint Light Tactical Vehicle(JLTV) EMD* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 35.563 | 50.251 | 9.445 | 36.656 | - | 36.656 | 23.614 | 2.109 | 2.892 | 1.965 | Continuing | Continuing |
| 3209: *Joint Light Tactical Vehicle* | 35.563 | 50.251 | 9.445 | 36.656 | - | 36.656 | 23.614 | 2.109 | 2.892 | 1.965 | Continuing | Continuing |
| **MDAP/MAIS Code:** 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 the new JLTV PE 0605812M was effective beginning in FY 2013.

Hardware requirements for EMD include vehicles, trailers, ballistic hulls, and kits (including armor). The U.S. Marine Corps' share of the prototypes was awarded in FY 2012, and the prototypes were fabricated and delivered in FY 2013.

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

Funding supports the development and testing of the Joint Light Tactical Vehicle (JLTV) Family of Vehicles (FoV). 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 objectives include increased protection and performance 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, is expected to be inherent in FoV solutions across mission variants to minimize total ownership cost. Unique service requirements have been minimized.

Major FY 2016 budget activities include the continued monitoring of contractor performance, continued fabrication of Live Fire Test Assets and the initialization of the LRIP test program to include ballistic, performance and RAM testing scheduled to start in 3Q FY 2016.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0605812M *I (U)Joint Light Tactical Vehicle(JLTV) EMD* |

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 50.362 | 11.450 | 34.325 | - | 34.325 |
| Current President's Budget | 50.251 | 9.445 | 36.656 | - | 36.656 |
| Total Adjustments | -0.111 | -2.005 | 2.331 | - | 2.331 |
| • Congressional General Reductions | - | -0.005 | | | |
| • Congressional Directed Reductions | - | -2.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 1.675 | - | | | |
| • SBIR/STTR Transfer | -1.785 | - | | | |
| • Program Adjustments | - | - | 3.000 | - | 3.000 |
| • Rate/Misc Adjustments | -0.001 | - | -0.669 | - | -0.669 |

**Change Summary Explanation**

The FY 2016 funding request was reduced by $0.388M to account for the availability of prior year execution balances. Funding increased ($27.211M) from FY 2015 to FY 2016 due to the initiation of the LRIP test program and continued procurement of Live Fire Test Assets.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | Project (Number/Name)<br>3209 / *Joint Light Tactical Vehicle* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3209: *Joint Light Tactical Vehicle* | 35.563 | 50.251 | 9.445 | 36.656 | - | 36.656 | 23.614 | 2.109 | 2.892 | 1.965 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | 8 | 2 | - | 2 | - | 1 | - | - | | |

**Note**

The FY 2011 NDAA directed the Services to separate the Joint Light Tactical Vehicle (JLTV) program into a separate PE to provide Congress with increased transparency and allow for more effective oversight. Transition of funding from PE 0603635M to the new JLTV PE 0605812M was effective beginning in FY 2013.

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

Funding supports the development and testing of the Joint Light Tactical Vehicle (JLTV) Family of Vehicles (FoV). 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 objectives include increased protection and performance 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, is expected to be inherent in FoV solutions across mission variants to minimize total ownership cost. Unique service requirements have been minimized.

Major FY 2016 budget activities include the continued monitoring of contractor performance, continued fabrication of Live Fire Test Assets and the initialization of the LRIP test program to include ballistic, performance and RAM testing scheduled to start in 3Q FY 2016.

Funding increased ($27.211M) from FY 2015 to FY 2016 due to the initiation of the LRIP test program and continued procurement of Live Fire Test Assets.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Primary and Ancillary Hardware Development - AM General | 5.591 | - | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Continued participation in government testing and vendor systems engineering. Test events included performance, reliability, live fire, roof crush and corrosion. | | | | | |
| ***FY 2015 Plans:***<br>N/A | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|---|
| N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | | |
| ***Title:*** Primary and Ancillary Hardward Development - Lockheed Martin | | 5.591 | - | - | - | - |
| | ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Continued participation in government testing and vendor systems engineering. Test events included performance, reliability, live fire, roof crush and corrosion.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | | |
| ***Title:*** Primary and Ancillary Hardware Development - Oshkosh Corporation | | 5.591 | - | - | - | - |
| | ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Continued participation in government testing and vendor systems engineering. Test events included performance, reliability, live fire, roof crush and corrosion.<br>***FY 2015 Plans:***<br>N/A<br>***FY 2016 Base Plans:***<br>N/A<br>***FY 2016 OCO Plans:***<br>N/A | | | | | | |
| ***Title:*** Live Fire Test Assets | | - | 6.528 | 7.737 | - | 7.737 |
| | ***Articles:*** | - | 8 | 2 | - | 2 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Description:*** Contract and support for development and fabrication of Live Fire Test Assets<br><br>***FY 2014 Accomplishments:***<br>N/A<br><br>***FY 2015 Plans:***<br>-Initiate contract award efforts for Live Fire Test Assets. Assets will be destroyed during ballistic testing.<br><br>***FY 2016 Base Plans:***<br>-Initate efforts in support of the fabrication of Live Fire Test Assets that will be destroyed during ballistic testing and FSR support for live fire testing.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Product Development Systems Engineering | 0.760 | 0.185 | - | - | - |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Continued the systems engineering evaluation of human systems integration of the three EMD vendor designs.<br><br>***FY 2015 Plans:***<br>-Continue the systems engineering evaluation of human systems integration of the three EMD vendor designs.<br><br>***FY 2016 Base Plans:***<br>N/A<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** ILS, Facilities Documentation/Analysis and Support Engineering | 1.768 | 0.430 | 9.607 | - | 9.607 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Continued logistics support (i.e. training) for the limited user testing (LUT).<br>-Developed logistics documentation, GFE management, and provided oversight of programmatic and contractual issues related to logistics.<br><br>***FY 2015 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Continue logistics support.<br>-Continue the development of logistics documentation and oversight of programmatic and contractual issues related to logistics.<br>***FY 2016 Base Plans:***<br>-Continue logistics support.<br>-Continue the development of logistics documentation and oversight of programmatic and contractual issues related to logistics to include the requirement to purchase GFE which will be destroyed during live fire test events.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Test and Evaluation Events and Analysis | 22.999 | 0.916 | 17.179 | - | 17.179 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>-Completed EMD prototype testing to include (but not limited to) Automated Fire Extinguishing System (AFES), ballistic, corrosion, performance and RAM testing.<br>-Completed Limited User Testing upon the completion of the previous test events.<br>***FY 2015 Plans:***<br>-Complete EMD test reports in support of MS C and LRIP source selection.<br>-Initiate development of the LRIP test plan and conduct ballistic testing.<br>***FY 2016 Base Plans:***<br>-Complete the development of the LRIP test plan.<br>-Initiate the LRIP test program to include (but not limited to) AFES, ballistic, corrosion, performance, RAM testing, logistics demonstration and operational testing.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Program Management Support | 7.951 | 1.386 | 2.133 | - | 2.133 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| -Continued support of EMD phase program operations, including the ramp-up of onsite test representatives that supported EMD phase testing.<br>-Continued monitoring contract performance of the EMD vendors.<br>-Initiated analysis and documentation efforts in support of MS C in 4Q FY 2015.<br>***FY 2015 Plans:***<br>-Continue support of EMD phase program operations and planning activities for MS C and LRIP.<br>-Complete EMD contracting efforts to include closeout activities.<br>-Continue analysis and documentation efforts in support of MS C in 4Q FY 2015 and the subsequent LRIP source selection.<br>-Initiate monitoring of vendor performance for the Live Fire Test Asset effort.<br>***FY 2016 Base Plans:***<br>-Initiate support of LRIP phase program operations.<br>-Continue monitoring of vendor performance for the Live Fire Test Asset effort.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 50.251 | 9.445 | 36.656 | - | 36.656 |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/5095: *0206211M- JLTV* | - | 7.500 | 79.429 | - | 79.429 | 155.280 | 540.770 | 615.741 | 678.749 | 545.254 | 2,622.723 |
| • OPA/D15603: *JLTV (Army)* | - | 164.615 | 308.336 | - | 308.336 | 598.549 | 837.043 | 1,092.066 | 1,113.019 | Continuing | Continuing |
| • RDTEA/VU9: *0605812A-JLTV (Army)* | 81.388 | 45.694 | 32.486 | - | 32.486 | 25.566 | 3.213 | 3.085 | 3.143 | Continuing | Continuing |
| • RDTEN/3209: *0603635M-JLTV* | - | - | - | - | - | - | - | - | - | - | 191.686 |
| • RDTEA/L04: *0603804A-JLTV (Army)* | - | - | - | - | - | - | - | - | - | - | 185.468 |
| • RDTEA/L50: *0604804A-JLTV (Army)* | - | - | - | - | - | - | - | - | - | - | 84.484 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

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

| Line Item | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

Joint Program Live Fire Test Asset/LRIP contract award planned for 4Q FY 2015.

**D. Acquisition Strategy**

Joint Light Tactical Vehicle (JLTV) is a Joint Service Program with the U.S. Army and Marine Corps as the two main components. The U.S. Army is the JLTV service lead. In addition, the Navy anticipates procuring JLTV vehicles upon successful Full Rate Production (FRP) decision.

The program will use an evolutionary approach to deliver capabilities in increments based on program priorities. All technologies entering the Engineering and Manufacturing Development (EMD) phase were Technology Readiness Level 6 or higher to achieve Capabilities Development Document (CDD) requirements. Increment I will produce two Mission Role Variant (MRV) configurations (Combat Tactical Vehicle (CTV) and Combat Support Vehicle (CSV)) with mission packages (General Purpose, Heavy Guns Carrier, Close Combat Weapons Carrier and Utility/Shelter Carrier). Increment 2 is undefined.

The program revised the acquisition strategy in the first quarter of FY 2012, addressing better buying power initiatives and reduced the program schedule by fifteen (15) months to enable a 33-month Non-Development Item approach for EMD, with Milestone B approved on 9 August 2012. The program anticipates Milestone C decision in July 2015. Through a full and open competition, the program awarded three fixed price contracts for EMD phase on 22 August 2012 to AM General, Lockheed Martin and Oshkosh Corporations.

EMD vendors fabricated a total of 66 vehicles (22 test assets per vendor) representing mission packages for both MRVs which the Government will fully test during EMD.

Vehicles were delivered in the fourth quarter of FY 2013 to begin the fourteen (14) month government performance and reliability testing, which focused on demonstrating Key Performance Parameters/Key System Attributes (KPP/KSA) and safety requirements. Test strategy represented a mix of vendor risk reduction testing and formal government testing.

The JLTV Joint Program Office (JPO) intends to award a Low Rate Initial Production (LRIP)/Full Rate Production (FRP) contract under a limited competition between the three JLTV EMD contractors. An approved Justification and Approval (J&A) signed by the Army Acquisition Executive on 8 May 2014, supported the release of the draft Request for Proposal (RFP) on 26 June 2014 and limited the competition for the LRIP/FRP contract to the three EMD vendors. The JLTV JPO made adjustments to the draft RFP as directed by the Defense Acquisition Executive and the OSD peer review. The final RFP was released on 12 December 2014 and the solicitation is scheduled to close on 10 February 2015. The Milestone C Defense Acquisition Board is scheduled for July 2015 and LRIP/FRP contract award in the 4th quarter of FY 2015. It is intended to be a single award, fixed price contract consisting of a three year LRIP period with options for five additional years of FRP deliveries. The Government also intends to request 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 as well as spares.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

**E. Performance Metrics**

Milestone Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - EMD | C/FFP | AM General : South Bend, IN | 0.000 | 5.591 | Nov 2013 | - | | - | | - | | - | - | 5.591 | 63.808 |
| Primary Hardware Development - EMD | C/FFP | Lockheed Martin : Grand Prairie, TX | 15.423 | 5.591 | Nov 2013 | - | | - | | - | | - | - | 21.014 | 65.106 |
| Primary Hardware Development - EMD | C/FFP | Oshkosh Corporation : Oshkosh, WI | 4.467 | 5.591 | Nov 2013 | - | | - | | - | | - | - | 10.058 | 56.663 |
| Systems Engineering - Human Systems Integration | WR | NSWC : Dahlgren, VA | 0.590 | 0.760 | Nov 2013 | 0.185 | Nov 2014 | - | | - | | - | - | 1.535 | - |
| Prior Years Cumulative Funding | Various | Various : Various | 0.155 | - | | - | | - | | - | | - | - | 0.155 | - |
| Live Fire Test Assets | C/FFP | TBD : TBD | 0.000 | - | | 6.528 | Jul 2015 | 7.737 | Dec 2015 | - | | 7.737 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 20.635 | 17.533 | | 6.713 | | 7.737 | | - | | 7.737 | - | - | - |

**Remarks**

EMD contracts are jointly funded with the U.S. Army; contracts were executed in FY 2012 and U.S. Marine Corps funding was provided in PE 0603635M. Target value of the contract includes obligations incurred by both services.

FY 2015 funding will provide for the fabrication of eight Live Fire Test Assets. FY 2016 funding has increased from FY 2015 and includes fabrication of two Live Fire Test Assets and vendor support for live fire test events.

Total estimated target value of the Live Fire Test contract is shared between the U.S. Army and the U.S. Marine Corps. The U.S. Army funds are under PE 0605812A Project VU9.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | Various | Various : Various | 0.500 | 0.143 | Feb 2014 | - | | - | | - | | - | - | 0.643 | - |
| SPAWAR GFE Management | MIPR | SPAWAR : Charleston, SC | 0.150 | 0.191 | May 2014 | - | | - | | - | | - | - | 0.341 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Manpower, Personnel, Training | Various | Various : MCSC : Various | 0.314 | - | | 0.430 | Feb 2015 | - | | - | | - | - | 0.744 | - |
| Corrosion Impact Mitigation & Analysis | C/FFP | JHU : Baltimore, MD | 0.000 | 1.434 | Aug 2014 | - | | - | | - | | - | - | 1.434 | - |
| GFE | Various | Various : Various | 0.000 | - | | - | | 9.607 | Mar 2016 | - | | 9.607 | - | 9.607 | - |
| | | **Subtotal** | 0.964 | 1.768 | | 0.430 | | 9.607 | | - | | 9.607 | - | 12.769 | - |

**Remarks**

Funding increases between FY 2015 and FY 2016 due to requirements to purchase GFE which will be destroyed during live fire test events.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation (Performance, RAM, Ballistic, Report Generation) | MIPR | Govt Proving Grounds : Aberdeen, MD | 2.393 | 4.183 | Jan 2014 | - | | 1.722 | Jan 2016 | - | | 1.722 | 0.092 | 8.390 | - |
| Developmental Test & Evaluation (Performance, RAM, Ballistic, Report Generation) | MIPR | Govt Proving Grounds : Yuma, AZ | 4.742 | 10.071 | Nov 2013 | - | | 4.147 | Jan 2016 | - | | 4.147 | 0.222 | 19.182 | - |
| Developmental Test & Evaluation (Performance, RAM, Ballistic, Report Generation) | MIPR | Govt Proving Grounds : Various | 1.967 | 5.062 | Dec 2013 | - | | 3.350 | Jan 2016 | - | | 3.350 | 0.190 | 10.569 | - |
| Operational Testing (Planning, Conduct, Evaluation and Report Generation) | MIPR | Govt Proving Grounds : Various | 0.000 | 3.165 | Dec 2013 | - | | 2.707 | Mar 2016 | - | | 2.707 | 6.359 | 12.231 | - |
| Developmental Test & Evaluation (Oversight) | WR | MCOTEA : Quantico, VA | 0.258 | 0.518 | Feb 2014 | - | | 0.200 | Feb 2016 | - | | 0.200 | - | 0.976 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Live Fire Test & Evaluation | MIPR | Govt Proving Grounds : Aberdeen, MD | 0.000 | - | | 0.916 | Feb 2015 | 5.053 | Jan 2016 | - | | 5.053 | 6.443 | 12.412 | - |
| | | **Subtotal** | 9.360 | 22.999 | | 0.916 | | 17.179 | | - | | 17.179 | 13.306 | 63.760 | - |

**Remarks**

FY 2015 funding provides for the completion of EMD testing and support of MS C documentation. FY 2016 funding increases due to the finalization of the LRIP test plan and the initiation of the LRIP test program which will include ramp-up of test efforts. LRIP Testing is scheduled to start 3Q FY 2016.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | BAH : McLean, VA | 3.268 | 6.471 | Jan 2014 | 1.090 | Jan 2015 | 2.033 | Jan 2016 | - | | 2.033 | 1.848 | 14.710 | - |
| Program Management Support | C/CPFF | Various : Various | 1.028 | 0.312 | Jan 2014 | - | | - | | - | | - | - | 1.340 | - |
| Program Management Support | C/CPFF | MITRE : Stafford, VA | 0.237 | 0.816 | Jan 2014 | - | | - | | - | | - | - | 1.053 | - |
| Travel | Various | MCSC : Quantico, VA | 0.071 | 0.352 | Oct 2013 | 0.296 | Oct 2014 | 0.100 | Oct 2015 | - | | 0.100 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 4.604 | 7.951 | | 1.386 | | 2.133 | | - | | 2.133 | - | - | - |

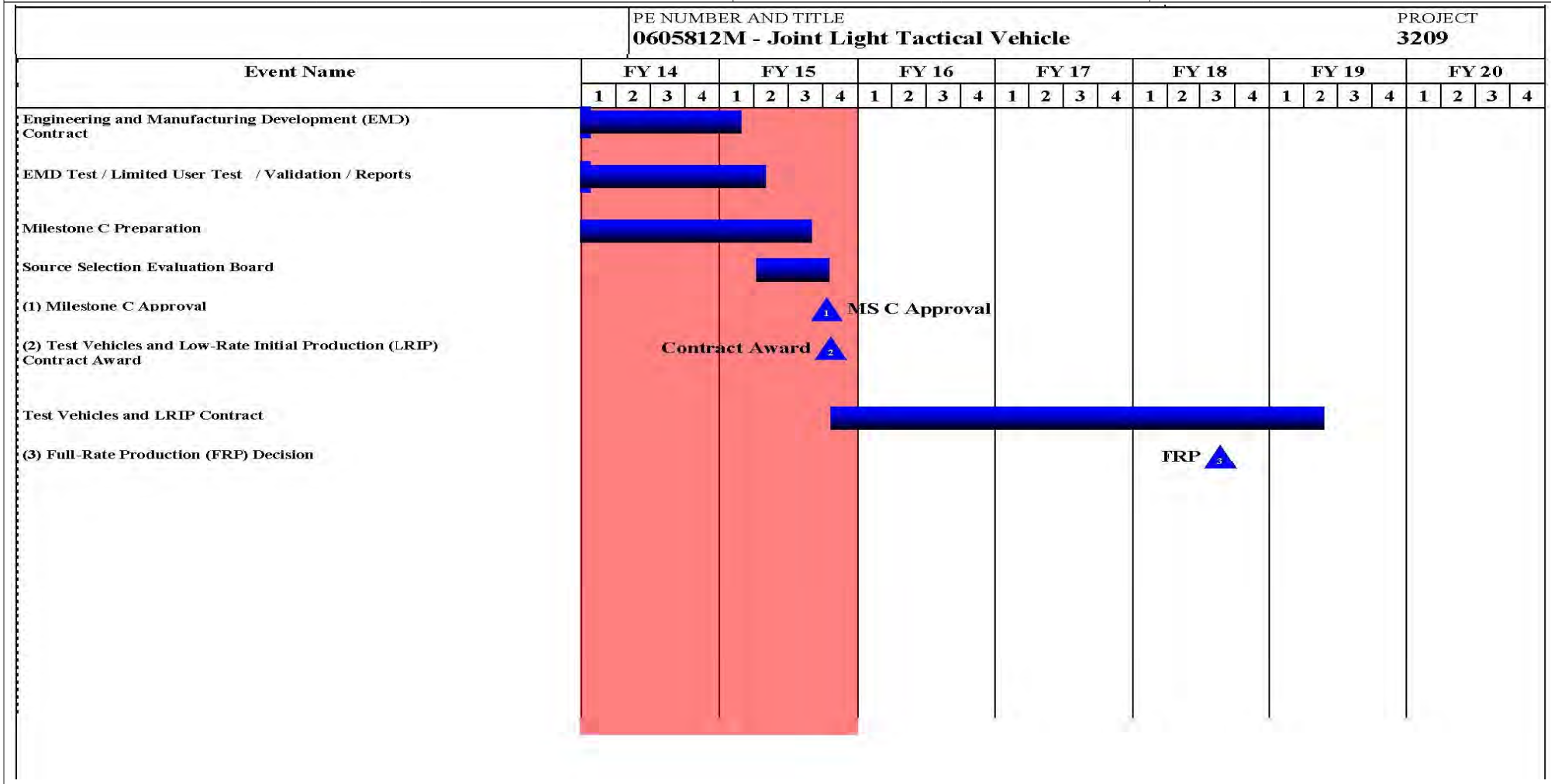
**Remarks**

Funding for Management Services temporarily increases between FY 2015 and FY 2016 due to support activities associated with the Live Fire Test Asset contract activities, including live fire and ballistic testing commencing 1Q and concluding 3Q FY 2016. In FY 2017, funding for Management Services is planned to decrease based on the conclusion of these test activities.

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 35.563 | 50.251 | | 9.445 | | 36.656 | | - | | 36.656 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0605812M / *(U)Joint Light Tactical Vehicle(JLTV) EMD* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3209*** | | | | |
| EMD Contract (Contract Awarded 4Q FY12) | 1 | 2014 | 1 | 2015 |
| EMD Government Test Program and Reporting | 1 | 2014 | 2 | 2015 |
| Milestone C Preparation | 1 | 2014 | 3 | 2015 |
| LRIP Source Selection Evaluation Board | 2 | 2015 | 4 | 2015 |
| Milestone C Decision | 4 | 2015 | 4 | 2015 |
| Live Fire Test Assets and LRIP Contract Award | 4 | 2015 | 4 | 2015 |
| Test Vehicles and LRIP Contract | 4 | 2015 | 2 | 2019 |
| Full Rate Production Decision | 3 | 2018 | 3 | 2018 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0303354N *I ASW Systems Development - MIP* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 15.305 | 4.908 | 6.495 | 9.835 | - | 9.835 | 9.535 | 8.364 | 9.056 | 9.169 | Continuing | Continuing |
| 0490: *Airborne Acoustic Intelligence (AAI)* | 15.305 | 4.908 | 6.495 | 9.835 | - | 9.835 | 9.535 | 8.364 | 9.056 | 9.169 | Continuing | Continuing |

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

The mission of Airborne Acoustic Intelligence (AAI) (CNO Project K-0416) is to provide advanced antisubmarine warfare capabilities through rapid development of new technology and prototype mechanisms for the collection of antisubmarine warfare (ASW) related intelligence. This includes full spectrum intelligence collections and cataloging of current targets of interest. The program develops and swiftly deploys disruptive innovation to counter emerging threats in order to maintain the United States' current undersea warfare superiority. AAI employs the capability to quickly reconstruct and analyze passive and active measurements of submarine vulnerabilities providing actionable intelligence to fleet commanders. The AAI data collection program provides full spectrum intelligence data essential for the design and development of advanced sensors, weapon systems, environmental models, and tactical decision aids. AAI collection systems are installed and employed on uniquely configured aircraft, specially configured ground support facilities, ships, and other assets as required for the collection, processing, exfiltration, and dissemination of undersea intelligence. AAI includes recording systems, advanced detection and tracking systems, specially designed sensors, advanced processing systems and techniques, and specially derived tactics.

This is a Military Intelligence Program (MIP).

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 4.908 | 6.495 | 9.907 | - | 9.907 |
| Current President's Budget | 4.908 | 6.495 | 9.835 | - | 9.835 |
| Total Adjustments | - | - | -0.072 | - | -0.072 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Rate/Misc Adjustments | - | - | -0.072 | - | -0.072 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0303354N *I ASW Systems Development - MIP* |

**Change Summary Explanation**

Technical: Not Applicable

Schedule: Not applicable

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0303354N / *ASW Systems Development - MIP* | Project (Number/Name)<br>0490 / *Airborne Acoustic Intelligence (AAI)* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0490: *Airborne Acoustic Intelligence (AAI)* | 15.305 | 4.908 | 6.495 | 9.835 | - | 9.835 | 9.535 | 8.364 | 9.056 | 9.169 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The mission of Airborne Acoustic Intelligence (AAI) (CNO Project K-0416) is to provide advanced antisubmarine warfare capabilities through rapid development of new technology and prototype mechanisms for the collection of antisubmarine warfare (ASW) related intelligence. This includes full spectrum intelligence collections and cataloging of current targets of interest. The program develops and swiftly deploys disruptive innovation to counter emerging threats in order to maintain the United States' current undersea warfare superiority. AAI employs the capability to quickly reconstruct and analyze passive and active measurements of submarine vulnerabilities providing actionable intelligence to fleet commanders. The AAI data collection program provides full spectrum intelligence data essential for the design and development of advanced sensors, weapon systems, environmental models, and tactical decision aids. AAI collection systems are installed and employed on uniquely configured aircraft, specially configured ground support facilities, ships, and other assets as required for the collection, processing, exfiltration, and dissemination of undersea intelligence. AAI includes recording systems, advanced detection and tracking systems, specially designed sensors, advanced processing systems and techniques, and specially derived tactics.

This is a Military Intelligence Program (MIP).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** Systems Engineering / Aircraft Mods Active Acoustic Program | 2.469 | 3.540 | 4.037 | - | 4.037 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Post Mission processor upgrades for Calibrated Acoustic Intelligence (ACINT). SH-60B certified to collect calibrated ACINT. P-8A authorized to collect "as-if" certified calibrated ACINT. Engineering support of the Active Target Strength sensor program. Conducted initial design of Acoustic Intelligence Collection suites (ACS). | | | | | |
| ***FY 2015 Plans:***<br>Engineering to support full spectrum ASW intelligence collections. Post mission processor upgrades for Calibrated ACINT. Airborne avionics unit development and enhancements. Field initial prototypes of ACS in support of P-8A deployments. | | | | | |
| ***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0303354N / *ASW Systems Development - MIP* | **Project (Number/Name)**<br>0490 / *Airborne Acoustic Intelligence (AAI)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Engineering support of Acoustic Intelligence (ACINT) Collection Suites for certified AAI collection platforms and management of full spectrum database. Continued upgrades for unique airborne avionics and post mission processing capabilities for ACINT/MASINT (Measurement and Signature Intelligence) requirements. Science and technology research in development of new systems.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Data Collection and Analysis | 0.838 | 0.745 | 0.932 | - | 0.932 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Data collection support at Operational Wings. Ongoing collection of high interest acoustic and non-acoustic data in support of MASINT/ONI threat assessment requirements. Reduction, Analysis and Fleet Rapid Feedback. Conduct special operations support. Essential performance modeling and evaluation for advanced technology sensor systems design and Fleet tactics development.<br>***FY 2015 Plans:***<br>Data collection support at Operational Wings. Ongoing collection of high interest acoustic and non-acoustic data in support of MASINT/ONI threat assessment requirements. Characterization, analysis and certification of the upgraded Fleet MASINT collection assets. Reduction, Analysis and Fleet Rapid Feedback. Conduct special operations support. Essential performance modeling and evaluation for advanced technology sensor systems design and Fleet tactics development. Develop post mission analysis hardware, software and processes in response to evolving enemy capabilities.<br>***FY 2016 Base Plans:***<br>Data collection support at Operational Wings. Ongoing collection of high interest acoustic and non-acoustic data in support of MASINT/ONI threat assessment requirements. Characterization, analysis and certification of the upgraded Fleet MASINT collection assets. Reduction, Analysis and Fleet Rapid Feedback. Conduct special operations support. Essential performance modeling and evaluation for advanced technology sensor systems design and Fleet tactics development. Develop post mission analysis hardware, software and processes in response to evolving enemy capabilities.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Active Measurement Validation | 0.450 | 0.150 | 0.150 | - | 0.150 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0303354N / *ASW Systems Development - MIP* | **Project (Number/Name)**<br>0490 / *Airborne Acoustic Intelligence (AAI)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Active Measurement Validation of targets of interest. Provides the acoustic analysis of echo characterization (which includes: signal excess measurements, peak frequency, trend analysis and pulse duration measurements) and target strength.<br>***FY 2015 Plans:***<br>Active Measurement Validation of targets of interest. Provides the acoustic analysis of echo characterization (which includes: signal excess measurements, peak frequency, trend analysis and pulse duration measurements) and target strength.<br>***FY 2016 Base Plans:***<br>Active Measurement Validation of targets of interest. Provides the acoustic analysis of echo characterization (which includes: signal excess measurements, peak frequency, trend analysis and pulse duration measurements) and target strength.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Navy Underwater Active Multiple Ping (NUAMP) Product Development | 1.151 | 2.060 | 4.716 | - | 4.716 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2014 Accomplishments:***<br>Continued initial engineering development for the production of coherent active sources of mid-sonic frequency and high sonic frequency to meet fleet operational Navy Underwater Active Multiple Ping (NUAMP) requirements. Awarded contract and began sonic frequency design, development and integration for the initial NUAMP sonic frequencies. Procured 48 prototype sonobuoys to test the initial NUAMP sonic frequencies.<br>***FY 2015 Plans:***<br>Continue sonic frequency design, development, integration, and test for additional sonic frequencies. Procure 30 prototype sonobuoys for certification of the initial NUAMP sonic frequencies.<br>***FY 2016 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0303354N / *ASW Systems Development - MIP* | **Project (Number/Name)**<br>0490 / *Airborne Acoustic Intelligence (AAI)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Complete full qualification and certification efforts for the initial Navy Underwater Active Multiple Ping (NUAMP) sonic frequencies. Continue sonic frequency design, development, integration and test for the remaining sonic frequencies for the entire NUAMP sonobuoy family.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.908 | 6.495 | 9.835 | - | 9.835 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Airborne ASW Intelligence is a CNO Special Project. The included technology developments are primarily in-house with contractor participation through existing vehicles.

**E. Performance Metrics**

Provide engineering to support Sound Pressure Level (SPL) recording. Provide data collection support at Operation Wings. Perform Active Measurement Validation of targets of interest.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0303354N / *ASW Systems Development - MIP* | **Project (Number/Name)**<br>0490 / *Airborne Acoustic Intelligence (AAI)* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Active Measurement Validation | WR | NAWCAD : PATUXENT RIVER, MD | 0.993 | 0.450 | Dec 2013 | 0.150 | Dec 2014 | 0.150 | Dec 2015 | - | | 0.150 | Continuing | Continuing | Continuing |
| Ancillary Hdw Development | WR | NAWCAD : PATUXENT RIVER, MD | 1.580 | 0.410 | Dec 2013 | 0.395 | Dec 2014 | 0.425 | Dec 2015 | - | | 0.425 | Continuing | Continuing | Continuing |
| Ancillary Hdw Development Cont | Various | VARIOUS : VARIOUS | 0.000 | 0.397 | Dec 2013 | 0.350 | Dec 2014 | 0.507 | Dec 2015 | - | | 0.507 | Continuing | Continuing | Continuing |
| Systems Eng | WR | NAWCAD : PATUXENT RIVER, MD | 1.048 | 1.831 | Dec 2013 | 2.674 | Dec 2014 | 3.111 | Dec 2015 | - | | 3.111 | Continuing | Continuing | Continuing |
| Primary Hdw Development | SS/CPIF | ERAPSCO : FT. WAYNE IN | 9.820 | 1.050 | Dec 2013 | 2.000 | Dec 2014 | 4.656 | Dec 2015 | - | | 4.656 | 10.729 | 28.255 | 32.480 |
| | | **Subtotal** | 13.441 | 4.138 | | 5.569 | | 8.849 | | - | | 8.849 | - | - | - |

**Management Services ($ in Millions)**

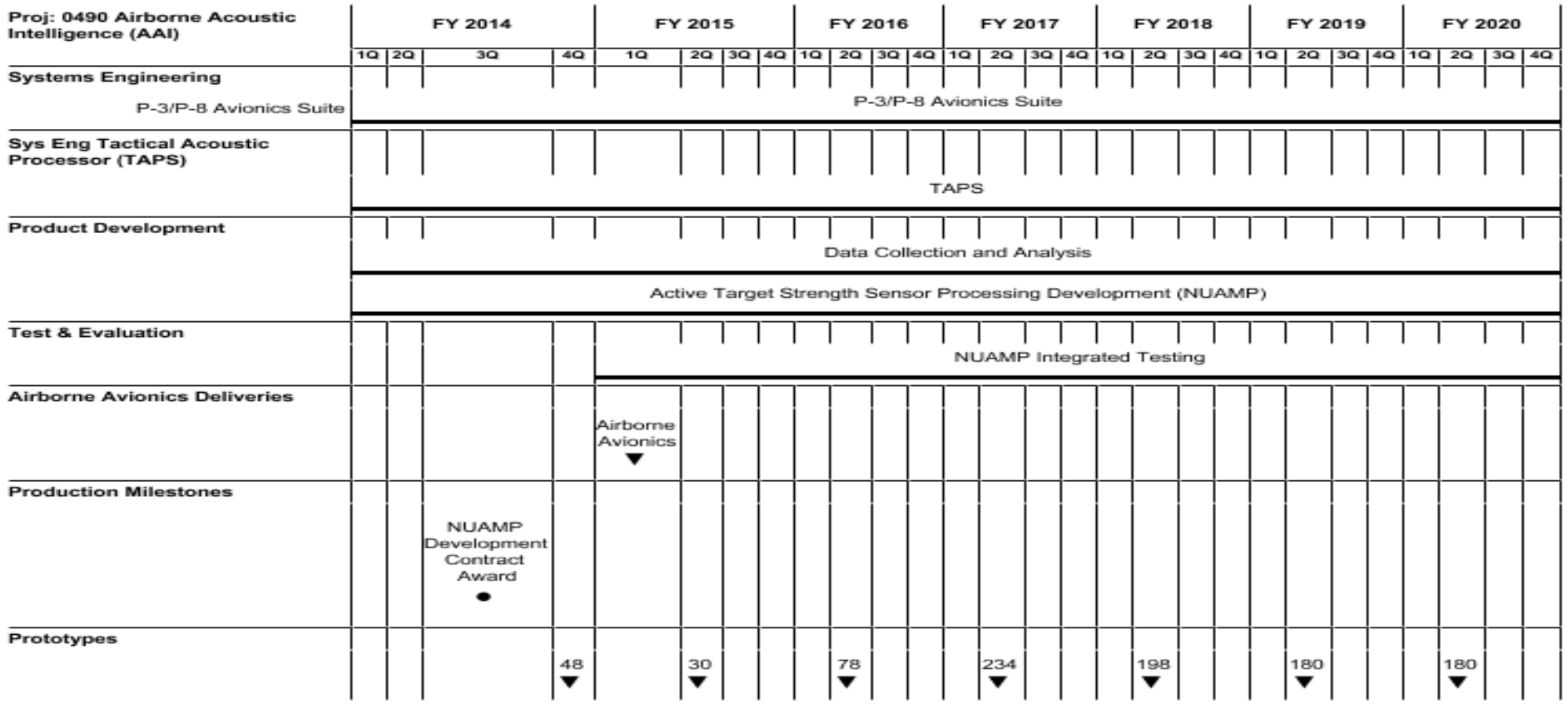
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mgt & Prof Spt Svcs (Non-FFRDC) | Various | VARIOUS : VARIOUS | 1.864 | 0.638 | Dec 2013 | 0.866 | Dec 2014 | 0.926 | Dec 2015 | - | | 0.926 | Continuing | Continuing | Continuing |
| Contractor Eng Spt | Various | VARIOUS : VARIOUS | 0.000 | 0.037 | Dec 2013 | - | Dec 2014 | - | Dec 2015 | - | | - | Continuing | Continuing | Continuing |
| Government Eng Spt | WR | NAWCAD : PATUXENT RIVER, MD | 0.000 | 0.031 | Dec 2013 | - | | - | | - | | - | - | 0.031 | - |
| Travel | Various | VARIOUS : VARIOUS | 0.000 | 0.064 | Dec 2013 | 0.060 | Dec 2014 | 0.060 | Dec 2015 | - | | 0.060 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.864 | 0.770 | | 0.926 | | 0.986 | | - | | 0.986 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0303354N / *ASW Systems Development - MIP* | Project (Number/Name)<br>0490 / *Airborne Acoustic Intelligence (AAI)* | |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 15.305 | 4.908 | | 6.495 | | 9.835 | | - | | 9.835 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0303354N / *ASW Systems Development - MIP* | **Project (Number/Name)**<br>0490 / *Airborne Acoustic Intelligence (AAI)* |




*2016PB - 0303354N - 0490*

| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0303354N / *ASW Systems Development - MIP* | **Project (Number/Name)**<br>0490 / *Airborne Acoustic Intelligence (AAI)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj: 0490 Airborne Acoustic Intelligence (AAI)*** | | | | |
| Systems Engineering: P-3/P-8 Avionics Suite: P-3/P-8 Avionics Suite | 1 | 2014 | 4 | 2020 |
| Sys Eng Tactical Acoustic Processor (TAPS): Sys Eng Tactical Acoustic Processor (TAPS) | 1 | 2014 | 4 | 2020 |
| Product Development: Data Collection and Analysis | 1 | 2014 | 4 | 2020 |
| Product Development: Active Target Strength sensor processing development | 1 | 2014 | 4 | 2020 |
| Test & Evaluation: Technical Evaluation | 1 | 2015 | 4 | 2020 |
| Airborne Avionics Deliveries: Airborne Avionics | 1 | 2015 | 1 | 2015 |
| Production Milestones: NUAMP Contract Award | 3 | 2014 | 3 | 2014 |
| Prototypes: Prototype 1 | 4 | 2014 | 4 | 2014 |
| Prototypes: Prototype 2 | 2 | 2015 | 2 | 2015 |
| Prototypes: Prototype 3 | 2 | 2016 | 2 | 2016 |
| Prototypes: Prototype 4 | 2 | 2017 | 2 | 2017 |
| Prototypes: Prototype 5 | 2 | 2018 | 2 | 2018 |
| Prototypes: Prototype 6 | 2 | 2019 | 2 | 2019 |
| Prototypes: Prototype 7 | 2 | 2020 | 2 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0304270N *I Electronic Warfare Development - MIP* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 3.466 | 0.153 | 0.332 | 0.580 | - | 0.580 | 0.465 | 0.465 | 0.477 | 0.486 | Continuing | Continuing |
| 2260: *Specific Emitter ID* | 3.466 | 0.153 | 0.332 | 0.580 | - | 0.580 | 0.465 | 0.465 | 0.477 | 0.486 | Continuing | Continuing |

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

This project supports systems development and collection of Specific Emitter Identification (SEI) information from National Technical Means (NTM) to track commercial ships over 200 gross registered tons world-wide. Research and development will cover improvements and enhancements to Electronic Intelligence technology. This will include improved/next generation SEI technology for miniaturization and automation of hardware, national collection systems, signal processing and analysis, and de-interleaving of signals. Propagation in a multi-path signal environment will also be assessed. All work on this project will be undertaken in pursuit of goals stated by the Office of Naval Intelligence and the National Security Agency in support of the Worldwide Ship Tracking Program.

This PE is a Military Intelligence Program.

| B. Program Change Summary ($ in Millions) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.153 | 0.332 | 0.575 | - | 0.575 |
| Current President's Budget | 0.153 | 0.332 | 0.580 | - | 0.580 |
| Total Adjustments | - | - | 0.005 | - | 0.005 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Rate/Misc Adjustments | - | - | 0.005 | - | 0.005 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0304270N / *Electronic Warfare Development - MIP* | Project (Number/Name)<br>2260 / *Specific Emitter ID* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2260: *Specific Emitter ID* | 3.466 | 0.153 | 0.332 | 0.580 | - | 0.580 | 0.465 | 0.465 | 0.477 | 0.486 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

This project supports systems development and collection of Specific Emitter Identification (SEI) information from National Technical Means (NTM) to track commercial ships over 200 gross registered tons world-wide. Research and development will cover improvements and enhancements to Electronic Intelligence technology. This will include improved/next generation SEI technology for miniaturization and automation of hardware, national collection systems, signal processing and analysis, and de-interleaving of signals. Propagation in a multi-path signal environment will also be assessed. All work on this project will be undertaken in pursuit of goals stated by the Office of Naval Intelligence and the National Security Agency in support of the Worldwide Ship Tracking Program.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Title:*** SENSOR FUSION | 0.048 | 0.100 | 0.187 | - | 0.187 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This effort supports systems development and information fusion of improved SEI technology for automation of hardware, national collection systems, signal processing and analysis, and de-interleaving of signals.<br><br>***FY 2014 Accomplishments:***<br>- Continued task to fuse additional sources of data with SEI data for automation of hardware, national collection systems, signal processing and analysis, and de-interleaving of signals. Work toward increasing sensor fusion, collection and reporting automation helped reduce staffing and support remote access and control capability.<br><br>***FY 2015 Plans:***<br>- Continue all efforts of FY 2014.<br><br>***FY 2016 Base Plans:***<br>- Continue all efforts of FY 2015<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** SYSTEM AUTOMATION | 0.052 | 0.132 | 0.201 | - | 0.201 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0304270N / *Electronic Warfare Development - MIP* | **Project (Number/Name)**<br>2260 / *Specific Emitter ID* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| ***Description:*** This effort supports development of an autonomous surveillance system capable of providing emitter signal information to a central location.<br><br>***FY 2014 Accomplishments:***<br>- Continued task to develop an unmanned, autonomous, remote collection and surveillance system.<br>- Continued task to automate fusion of other sensor information with SEI data collection.<br><br>***FY 2015 Plans:***<br>- Continue all efforts of FY 2014.<br><br>***FY 2016 Base Plans:***<br>- Continue all efforts of FY 2015.<br><br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** TECHNOLOGY REFRESH & COMMUNICATION ENHANCEMENT | 0.053 | 0.100 | 0.192 | - | 0.192 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This effort improves SEI system performance, real-time communication and tactical use of SEI which will be expanded with next generation SEI technology.<br><br>***FY 2014 Accomplishments:***<br>- Continued task to incorporate other SEI algorithms into deployed processing software<br>- Continued task on integrating advanced SEI hardware with WinSEI software to support improved SEI system performance and capabilities for tactical and technical use, and which can be expanded with next generation SEI algorithms.<br>- Continued task to incorporate further message reporting formats for dissemination of SEI data and improve SEI interoperability.<br>- Continued task to expand collection capability to support additional radar types.<br><br>***FY 2015 Plans:***<br>- Continue all efforts of FY 2014.<br><br>***FY 2016 Base Plans:***<br>- Continue all efforts of FY 2015. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0304270N / *Electronic Warfare Development - MIP* | **Project (Number/Name)**<br>2260 / *Specific Emitter ID* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| - Complete task to incorporate further message reporting formats for dissemination of SEI data and improve SEI interoperability.<br>- Initiate task to provide software enhancements to improve SEI system performance based on mission needs and requirements, user inputs, and platform environment.<br>***FY 2016 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.153 | 0.332 | 0.580 | - | 0.580 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable.

**E. Performance Metrics**

MIP Program.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 4 | R-1 Program Element (Number/Name)<br>PE 0304270N / *Electronic Warfare Development - MIP* | Project (Number/Name)<br>2260 / *Specific Emitter ID* | |

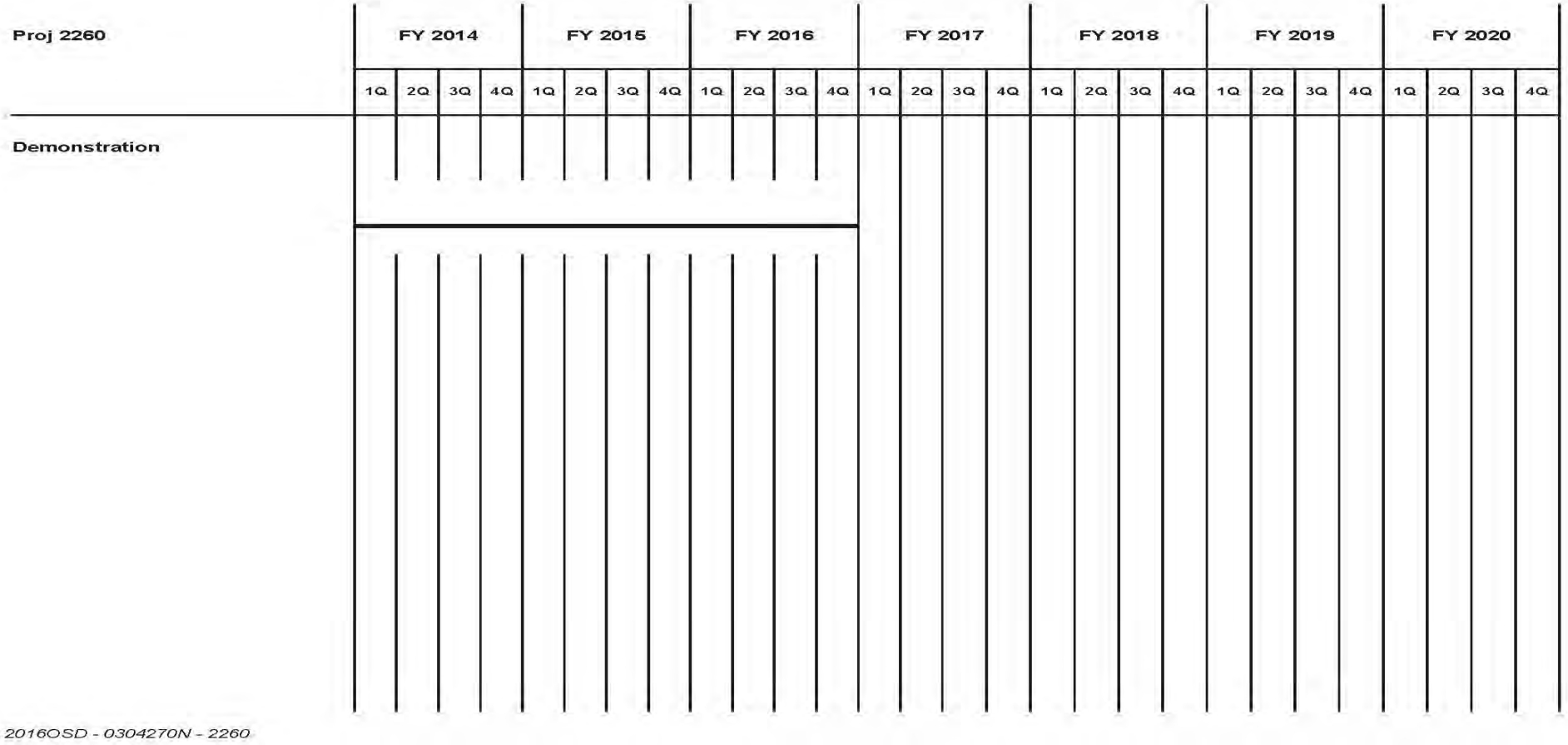
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2014 Cost | FY 2014 Award Date | FY 2015 Cost | FY 2015 Award Date | FY 2016 Base Cost | FY 2016 Base Award Date | FY 2016 OCO Cost | FY 2016 OCO Award Date | FY 2016 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NRL | TBD | Not Specified : Not Specified | 3.466 | 0.153 | Jan 2014 | 0.332 | Jan 2015 | 0.580 | Jan 2016 | - | | 0.580 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.466 | 0.153 | | 0.332 | | 0.580 | | - | | 0.580 | - | - | - |

| | Prior Years | FY 2014 | | FY 2015 | | FY 2016 Base | | FY 2016 OCO | | FY 2016 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 3.466 | 0.153 | | 0.332 | | 0.580 | | - | | 0.580 | - | - | - |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0304270N / *Electronic Warfare Development - MIP* | **Project (Number/Name)**<br>2260 / *Specific Emitter ID* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0304270N / *Electronic Warfare Development - MIP* | **Project (Number/Name)**<br>2260 / *Specific Emitter ID* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2260*** | | | | |
| Demonstration: Installatioon and Testing | 1 | 2014 | 4 | 2016 |

THIS PAGE INTENTIONALLY LEFT BLANK