| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604558N *I New Design SSN* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 2,341.657 | 117.887 | 180.233 | 121.010 | - | 121.010 | 201.638 | 248.406 | 277.648 | 283.190 | Continuing | Continuing |
| 1947: *New Design SSN HM&E* | 1,551.584 | 81.462 | 104.968 | 80.405 | - | 80.405 | 162.514 | 208.425 | 236.878 | 241.605 | Continuing | Continuing |
| 1950: *New Design SSN Combat Sys Dev* | 747.831 | 33.767 | 40.604 | 37.485 | - | 37.485 | 36.341 | 37.138 | 37.869 | 38.626 | Continuing | Continuing |
| 3062: *Submarine Multi-Mission Team Trainer* | 42.242 | 2.658 | 2.661 | 3.120 | - | 3.120 | 2.783 | 2.843 | 2.901 | 2.959 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 32.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 32.000 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 516 | | | | | | | | | | | | |

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

The U.S. Navy must maintain a submarine fleet that is of sufficient capability and numbers to defend American interests. The VIRGINIA Class Submarine, formerly the New Attack Submarine (New SSN), is being designed to fulfill this need. It will counter the potential threats of the next century in a multi- mission capable submarine that has the ability to provide covert, sustained combat presence in denied waters. The primary goal of the program is to develop an affordable yet capable submarine by evaluating a broad range of system and technology alternatives, and pursuing cost reduction, producibility improvement, and technical risk management. This Program Element (PE) provides the technology, prototype components, and systems engineering needed to design and construct the VIRGINIA Class Submarine and build its Command, Control, Communications, and Intelligence (C3I) System. This PE directly supports the following VIRGINIA Class Submarine missions: (1) covert strike warfare (STRIKE); (2) anti-submarine warfare (ASW); (3) covert intelligence collection/surveillance (ISR), indication and warning (I&W), and electronic warfare (EW); (4) anti-surface ship warfare (ASUW); (5) special warfare; (6) covert mine warfare; and (7) battle group support.

| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| Previous President's Budget | 120.087 | 148.233 | 118.539 | - | 118.539 |
| Current President's Budget | 117.887 | 180.233 | 121.010 | - | 121.010 |
| Total Adjustments | -2.200 | 32.000 | 2.471 | - | 2.471 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 32.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 1.800 | 0.000 | | | |
| • SBIR/STTR Transfer | -4.001 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 3.157 | - | 3.157 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0604558N *I New Design SSN* | | | |
| • Rate/Misc Adjustments | 0.001 | 0.000 | -0.686 | - | -0.686 |

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

| | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *New Design SSN SBIR (Cong)* | 0.000 | 20.000 |
| Congressional Add: *New Design SSN* | 0.000 | 12.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 32.000 |
| Congressional Add Totals for all Projects | 0.000 | 32.000 |

**Change Summary Explanation**

FY18 budget increased by $1.800M to fund implementation of Stern Area System
FY19 budget increased by $32.000M for Congressional adds
FY20 budget increased by $2.471M: +$2.850M to fund Test and Evaluation of South Dakota Insertion Program (SDIP) to meet Warfare Requirements by incorporating new state of the art technologies on a full scale platform to demonstrate the operation and effectiveness of the technologies (project 1947); + $.400M for Sub launched harpoon transfer from PMA201 to NAVSEA (project 3062); -$0.093M for other minor program changes; and -$.686M for miscellaneous rate adjustments.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | | | | Project (Number/Name)<br>1947 / *New Design SSN HM&E* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 1947: *New Design SSN HM&E* | 1,551.584 | 81.462 | 104.968 | 80.405 | - | 80.405 | 162.514 | 208.425 | 236.878 | 241.605 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 516

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

This project encompasses all the ship system development efforts for the VIRGINIA Class Submarine and the Technology Insertion Program for reducing costs and upgrading performance of future hulls by virtue of improvements in ship systems. Technology development implementation and logistics for developmental items, and VIRGINIA Class test & evaluation are included. The thrust of these efforts will be to develop and apply multiple advanced system technologies which are integrated into the design of the VIRGINIA Class Submarine. Technologies developed in this program will be considered for applicability to the COLUMBIA Program (CLB) for commonality opportunities. New technologies are being transitioned from industry and government research and development programs where doing so offers substantial performance improvement and/or affordability payoffs. Transition opportunities include those from the Defense Advanced Research Projects Agency (DARPA) and Office of Naval Research (ONR) Future Naval Capabilities Program.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** New Design SSN HM&E | 77.743 | 100.897 | 73.479 | 0.000 | 73.479 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Complete detailed planning for SDIP as part of planned PSA.<br>-Commence PSA and begin installation of SDIP components and modifications.<br>-Following pre-PSA ship trials, evaluate performance suitability of Improved Advance Hybrid (IAH) propulsor<br>-Further develop design details for SDIP technologies insertion into the VIRGINIA Class baseline for Block V.<br>-Finalize design integration and coordinate installation of SAS prototype into planned PSA per agreement with ONR and OPNAV.<br>-Continue development of HM&E systems concepts, technologies and obsolescence redesign for integration into VIRGINIA Class Block V Technical Baseline.<br>-Continue efforts based on OPNAV direction for integrating advanced payload systems into VIRGINIA Class platforms. Expand the scope of these efforts to include various options for leveraging increased vertical payload volume commensurate with insertion of VPM into Block V.<br>-Initiate design efforts to re-introduce Special Operations Forces (SOF) capabilities into Future VIRGINIA Class hulls (including BLK V).<br>-Initiate development of possible design options to support the Tactical Submarine Evolution Plan (TSEP). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Continue transition of products from the Office of Naval Research Manufacturing Technology Program (MANTECH).<br>-Continue the transition of products from ONR FNC Programs.<br><br>***FY 2020 Base Plans:***<br>-Complete PSA and installation of SDIP components and modifications.<br>-Complete SAS integration and installation during PSA.<br>-Complete design details for SDIP Technologies' insertion into the VIRGINIA Class baseline for Block V.<br>-Continue development of HM&E systems concepts, technologies including obsolescence redesign for integration into VIRGINIA Class Block V Technical Baseline.<br>-Continue efforts based on OPNAV direction for integrating advanced payload systems and SOF capabilities into VIRGINIA Class platforms.<br>-Continue efforts to include various options for leveraging increased vertical payload volume commensurate with insertion of VPM into Block V and other concepts beyond Block V for host ship interaction with large volume UUVs.<br>-Continue development of design options to support TSEP.<br>-Continue transition of products from the Office of Naval Research Manufacturing Technology Program (MANTECH).<br>-Continue the transition of products from ONR FNC Programs.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 to FY 2020 decrease due to the bulk of SDIP installation being funded in FY 2019. | | | | | |
| ***Title:*** TEST AND EVALUATION | 3.719 | 4.071 | 6.926 | 0.000 | 6.926 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Continue work associated with previous test events (IOT&E, Arctic, Low Frequency Active, Dry-Deck Shelter, Block III FOT&E). This consists of documenting and testing fixes to deficiencies identified during previously completed Developmental and Operational Testing as well as addressing recommendations noted by the Oversight Community from OSD.<br>-Complete and publish all final reports associated with the Block III FOT&E test events.<br>-Finalize test plans to conduct Pre-PSA test and evaluation of Acoustic Superiority insertions to meet current and future warfare requirements. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Continue efforts to develop the FOT&E plan, to include the Cybersecurity test strategy, for Block V. The Cybersecurity test strategy will be planned and executed in coordination with the USS COLUMBIA Class IOT&E Cybersecurity test strategy.<br>-Complete the development of the Block III Transient Shock Analysis Verification and Validation Plan.<br>-Continue efforts to conduct the Combined Shock and Submergence testing and development of the Verification and Validation Plan, as well as, development of the Block V Vulnerability Assessment Report to meet the LFT&E legislation mandated in Title 10 USC 2366. | | | | | |
| ***FY 2020 Base Plans:***<br>-Continue work associated with previous test events (IOT&E, Arctic, Low Frequency Active, Dry-Deck Shelter, Block III FOT&E). This consists of documenting and testing fixes to deficiencies identified during previously completed Developmental and Operational Testing as well as addressing recommendations noted by the Oversight Community from OSD.<br>-Analyze the data, and publish the reports, from the PCU SOUTH DAKOTA (SSN 790) pre-PSA new construction trials of the modified ship components, that were tested at-sea, in order to establish the baseline performance. These trials will consist of a Weapon System Accuracy Trial (WSAT 1), an Acoustic Trial (Actrl 1), an Underwater Electromagnetic Trial (UEM 1), and a Hydrodynamic Performance Trial (HPT 1). This information derived will be used to fully develop the next phase of testing which will be accomplished post-PSA. This post-PSA phase will include a Weapon System Accuracy Trial (WSAT 2), an Acoustic Trial (Actrl 2), an Underwater Electromagnetic Trial (UEM 2), and a Hydrodynamic Performance Trial (HPT 2). The post-PSA trials will be modified to ensure the full evaluation of the technology insertion changes that were made during PSA is done without repeating testing accomplished during the pre-PSA trials.<br>-Finalize plans for the test and evaluation phase of the Acoustic Superiority initiatives to meet current and future warfare requirements.<br>-Continue efforts to develop the FOT&E plan, to include the Cybersecurity test strategy, for Block V. The Cybersecurity test strategy will be planned and executed in coordination with the USS COLUMBIA Class IOT&E Cybersecurity test strategy.<br>-Complete the development of the Combined Shock and Submergence Test Report and Verification and Validation Report.<br>-Continue development of the Block V Transient Shock Analysis Verification and Validation Plan, as well as, the Block V Vulnerability Assessment Report to meet the LFT&E legislation mandated in Title 10 USC 2366. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 Test and Evaluation budget increased by $2.85M to Analyze the data, and publish the reports, from the PCU South Dakota (SSN 790) pre-PSA new construction trials of the modified ship components, that were tested at-sea, in order to establish the baseline performance. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 81.462 | 104.968 | 80.405 | 0.000 | 80.405 |

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

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2013: *Virginia Class Submarine* | 5,450.911 | 7,137.077 | 9,925.498 | - | 9,925.498 | 6,123.064 | 5,968.338 | 6,080.771 | 7,052.398 | 28,976.120 | 148,078.924 |
| • OMN/0204283N: *Sub Ops & Safety* | 10.496 | 11.038 | 11.462 | - | 11.462 | 12.003 | 12.131 | 12.357 | 12.604 | Continuing | Continuing |
| • OPN/0942: *Virginia Class Support Equipment* | 46.610 | 66.328 | 28.465 | - | 28.465 | 23.263 | 22.910 | 23.326 | 23.792 | Continuing | Continuing |
| • RDTEN/0604580N: *(U)Virginia Payload Module (VPM)* | 70.579 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.098 |

**Remarks**

**D. Acquisition Strategy**

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing General Dynamics Electric Boat (GDEB) and Northrop Grumman Newport News (NGNN), now Huntington Ingalls Industries - Newport News Shipbuilding (HII-NNS), to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, GDEB remained the design yard for the VIRGINIA Class Submarine and HII-NNS became a part of the IPPD process. The Program Office is managing two Multi-Year Procurement (MYP) contracts. The first is for the Block III (FY09-13) ships. The second is for the Block IV (FY14-18) ships awarded April 2014. All Block I & II ships (SSNs 774-783) have been delivered. The first seven Block III ships, SSN 784-790, have delivered, with one remaining ship under construction. Ten Block IV ships are awarded and under construction. The program is currently negotiating the fourth MYP (Block V) contract that will include 10 SSNs (FY19-23) and will incorporate acoustic superiority modifications on all SSNs and VPM on seven SSNs with an option to award a third SSN in FY20, FY22 and FY23. The third FY20 SSN was added during the PB2020 cycle however, without Advance Procurement or Economic Order Quantity funding in prior years, it will reflect a construction schedule more in line with an FY23 SSN.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

**E. Performance Metrics**

Successful completion of the SSN 790 Baseline Assessment. SDIP design completion and installation. Design completion and integration of future payloads.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1947 / *New Design SSN HM&E* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component Development | WR | NSWC : Carderock, MD | 258.629 | 5.936 | Nov 2017 | 8.318 | Nov 2018 | 5.266 | Nov 2019 | - | | 5.266 | Continuing | Continuing | Continuing |
| Component Development | WR | NUWC : Newport, RI | 117.865 | 1.599 | Nov 2017 | 2.237 | Nov 2018 | 1.480 | Nov 2019 | - | | 1.480 | Continuing | Continuing | Continuing |
| Component Development | WR | NRL : Washington, DC | 8.530 | 0.370 | Nov 2017 | 0.516 | Nov 2018 | 0.360 | Nov 2019 | - | | 0.360 | Continuing | Continuing | Continuing |
| Component Development | C/CPFF | Electric Boat : Groton, CT | 851.997 | 67.181 | Nov 2017 | 87.117 | Nov 2018 | 64.401 | Nov 2019 | - | | 64.401 | Continuing | Continuing | Continuing |
| Component Development | SS/CPFF | Applied Research Laboratory : Penn State University | 24.188 | 1.085 | Dec 2017 | 1.520 | Dec 2018 | 0.990 | Dec 2019 | - | | 0.990 | Continuing | Continuing | Continuing |
| Component Development | SS/FP | National Shipbuilding Research Program : Not Specified | 4.739 | 0.500 | Mar 2018 | 0.500 | Mar 2019 | 0.500 | Mar 2020 | - | | 0.500 | Continuing | Continuing | Continuing |
| Component Development | Various | Miscellaneous : Not Specified | 23.951 | 0.720 | Dec 2017 | 0.689 | Dec 2018 | 0.482 | Dec 2019 | - | | 0.482 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1,289.899 | 77.391 | | 100.897 | | 73.479 | | - | | 73.479 | Continuing | Continuing | N/A |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation - DT&E | WR | NSWC : Carderock, MD | 93.208 | 0.153 | Nov 2017 | 0.248 | Nov 2018 | 2.010 | Nov 2019 | - | | 2.010 | Continuing | Continuing | Continuing |
| Test and Evaluation - LFT&E | WR | NSWC : Carderock, MD | 4.747 | 0.530 | Nov 2017 | 0.530 | Nov 2018 | 0.650 | Nov 2019 | - | | 0.650 | 1.700 | 8.157 | - |
| Test and Evaluation - DT&E | WR | NUWC : Newport, RI | 137.655 | 0.502 | Nov 2017 | 0.501 | Dec 2018 | 0.966 | Nov 2019 | - | | 0.966 | Continuing | Continuing | Continuing |
| Test and Evaluation - OT&E | PO | COMOPTEVFOR : Norfolk, VA | 18.173 | 0.711 | Nov 2017 | 0.313 | Nov 2018 | 0.374 | Nov 2019 | - | | 0.374 | Continuing | Continuing | Continuing |
| Test and Evaluation - LFT&E | C/CPFF | Electric Boat : Groton, CT | 2.120 | 0.250 | Dec 2017 | 0.250 | Jan 2019 | 0.325 | Dec 2019 | - | | 0.325 | Continuing | Continuing | Continuing |
| Test and Evaluation - LFT&E | WR | NUWC : Newport,RI | 0.000 | 0.125 | Nov 2017 | 0.125 | Nov 2018 | 0.125 | Nov 2019 | - | | 0.125 | 0.000 | 0.375 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1947 / *New Design SSN HM&E* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation - DT&E | C/CPFF | NUWC : Newport, RI - CORE Team | 5.782 | 1.800 | Jan 2018 | 2.104 | Jan 2019 | 2.476 | Dec 2019 | - | | 2.476 | 0.000 | 12.162 | - |
| | | **Subtotal** | 261.685 | 4.071 | | 4.071 | | 6.926 | | - | | 6.926 | Continuing | Continuing | N/A |

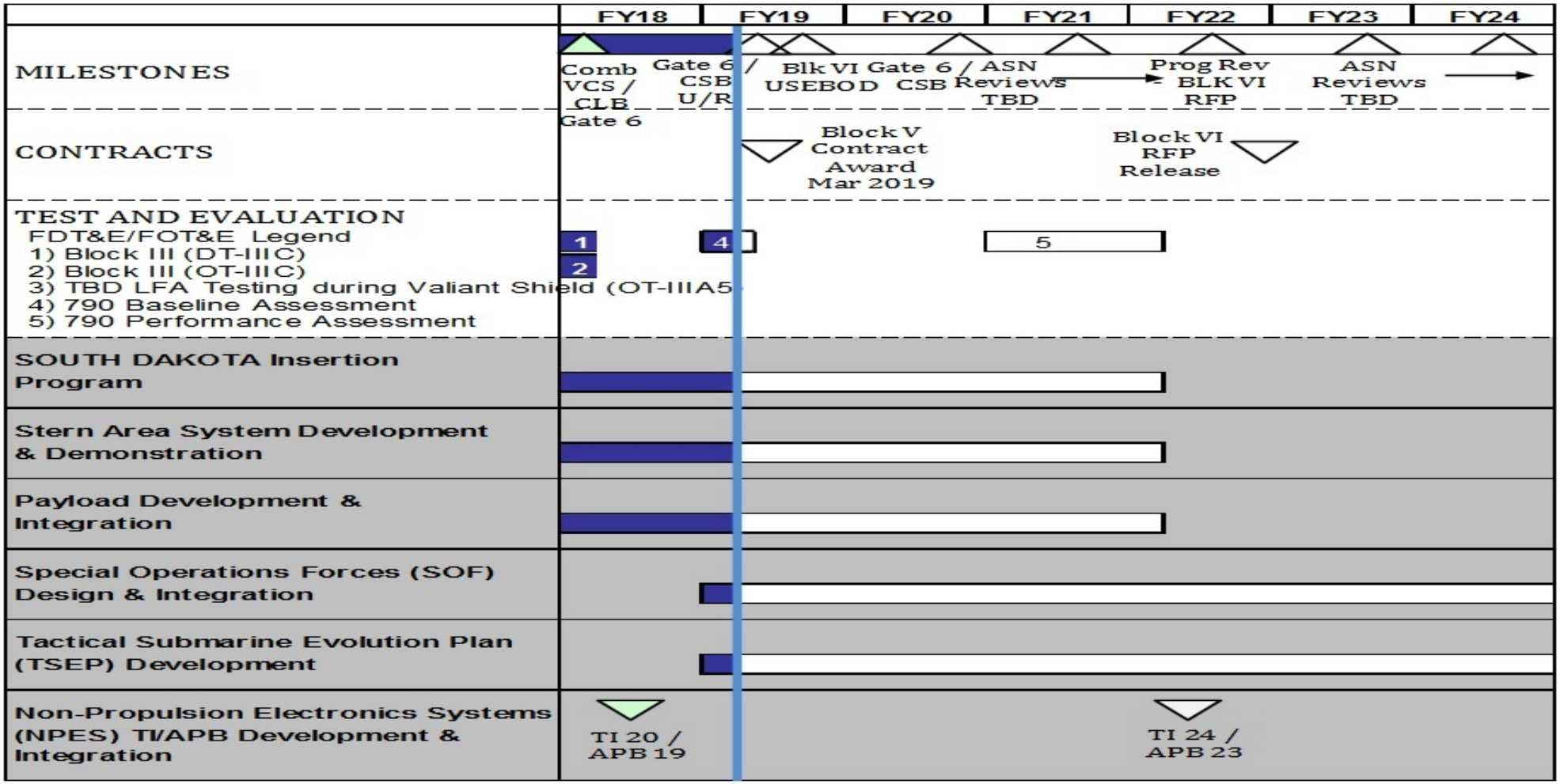
**Remarks**

FY20 Test and Evaluation budget increased by $2.85M to Analyze the data, and publish the reports, from the PCU South Dakota (SSN 790) pre-PSA new construction trials of the modified ship components, that were tested at-sea, in order to establish the baseline performance.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,551.584 | 81.462 | | 104.968 | | 80.405 | | - | | 80.405 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1947*** | | | | |
| MILESTONE: Comb VCS/CLB Gate 6 | 1 | 2018 | 1 | 2018 |
| MILESTONE: VCS FY 19 Gate 6 U/R | 2 | 2019 | 2 | 2019 |
| MILESTONE: VCS Block VI USEBOD | 3 | 2019 | 3 | 2019 |
| MILESTONE: VCS FY 20 Gate 6 | 2 | 2020 | 2 | 2020 |
| MILESTONE: VCS FY 21 Gate 6 | 2 | 2021 | 2 | 2021 |
| MILESTONE: VCS FY 22 Gate 6 | 2 | 2022 | 2 | 2022 |
| MILESTONE: Prog Rev Block VI RFP | 3 | 2022 | 3 | 2022 |
| MILESTONE: VCS FY 23 Gate 6 | 2 | 2023 | 2 | 2023 |
| MILESTONE: VCS FY 24 Gate 6 | 2 | 2024 | 2 | 2024 |
| CONTRACTS: Block V Contract Award | 2 | 2019 | 2 | 2019 |
| CONTRACTS: Block VI RFP Release | 4 | 2022 | 4 | 2022 |
| TEST & EVALUATION: Block III (DT-IIIC) | 1 | 2018 | 1 | 2018 |
| TEST & EVALUATION: Block III (OT-IIIC) | 1 | 2018 | 1 | 2018 |
| TEST & EVALUATION: U/R 790 Baseline Assessment | 1 | 2019 | 2 | 2019 |
| TEST & EVALUATION: U/R 790 Performance Assessment | 1 | 2021 | 1 | 2022 |
| SOUTH DAKOTA Insertion Program | 1 | 2018 | 1 | 2022 |
| Stern Area System Development & Demonstration | 1 | 2018 | 1 | 2022 |
| Payload Development & Integration | 1 | 2018 | 4 | 2024 |
| Special Operations Forces (SOF) Design & Integration | 1 | 2019 | 4 | 2024 |
| Tactical Submarine Evolution Plan (TSEP) Development | 1 | 2019 | 4 | 2024 |
| Non-Propulsion Electronics Systems (NPES) TI20/APB19 Development & Integration | 1 | 2018 | 1 | 2018 |
| NPES TI24/APB23 Development & Integration | 1 | 2022 | 1 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1950 / *New Design SSN Combat Sys Dev* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1950: *New Design SSN Combat Sys Dev* | 747.831 | 33.767 | 40.604 | 37.485 | - | 37.485 | 36.341 | 37.138 | 37.869 | 38.626 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 516

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

This project provides the engineering development required to outfit each ship of the VIRGINIA Class Submarine with a combat system which satisfies ORD requirements in all 7 mission areas, namely; ASW, STRIKE, ISR, Covert Mine Warfare, Battle Group Support, ASUW, and Special Warfare. The fully integrated combat system, otherwise referred to as the Non-Propulsion Electronics System (NPES), is composed of a collection of functional sub-systems, such as sonar, navigation, exterior communications, weapons launch, Large Vertical Array, Submarine Warfare Federated Tactical System (SWFTS) virtualization, Electronic Warfare Next Generation Architecture, etc., which evolve over the life of the program due to either competitive selection of new suppliers, component obsolescence replacement, increased technical performance, or improvements in reliability. Non-recurring engineering activity is needed to perform platform integration of the components, software modification to accommodate electronic data exchange, unique submarine environment qualification and update of all logistics products.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Sonar, Combat Control, and Architecture (S/CC/A) Subsystems | 19.659 | 24.103 | 22.469 | 0.000 | 22.469 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Continue development of S/CC/A System Improvements necessary to maintain VIRGINIA Class ORD compliance, counter CYBER threats, and maintain commonality with in-service submarine designs. | | | | | |
| ***FY 2019 Plans:***<br>-Initiate TI-20 S/CC/A detailed design, programmed to be the configuration for the first 8 VCS Blk V hulls (SSN802-SSN809) and leveraged by the Columbia Class for lead ship (SSBN 826).<br>-Continue to design virtualization enabling system architectures and bench test technologies which support CYBER defense, increased suitability, rapid modernization, and affordable procurement.<br>-Conduct platform level integration testing of the first Large Vertical Array sonar sensor on SSN790 during PSA installation. | | | | | |
| ***FY 2020 Base Plans:***<br>-Initiate TI-24 S/CC/A detailed design, programmed to be the configuration for the last 2 VCS Blk V hulls (SSN810 & SSN811) and leveraged by the Columbia Class 2nd hull (SSBN 827).<br>-Complete the design of the virtualization enabling system architecture and select tested technologies which support incorporation of CYBER defense as one of the design pillars. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1950 / *New Design SSN Combat Sys Dev* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Complete platform level integration of the first Large Vertical Array sonar sensor on SSN790 and conduct at-sea performance testing.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Slight reduction in the budget from FY19 to FY20 reflects estimates associated with the time varying non-recurring developmental scope of work tied to this project, not indices tied to inflation. | | | | | |
| ***Title:*** C3I Systems Engineering | 14.108 | 16.501 | 15.016 | 0.000 | 15.016 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Conduct TI-16 integration testing of the BPS-17 Radar on SSN796 at COATS.<br>-Conduct platform level integration of the Low Profile Photonics Mast dockside on SSN794.<br>-Develop and integrate an inertial navigation system replacement to theWSN-7 Ring Laser Gyro-navigator.<br>-Initiate forward compartment SECRET level wireless Local Area Network (LAN) design.<br>***FY 2020 Base Plans:***<br>-Initiate design of next generation displays in the Command and Control Center to mitigate obsolescence risk associated with existing glass.<br>-Complete design of improved speed log automated sensor fail-over and integrate within the inertial navigation suite & NPES network.<br>-Complete design of the fiber optic backbone and Command and Control System Module (CCSM) power distribution for the virtualization enabled, CYBER hardened TI-24 and beyond architecture.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Slight reduction in the budget from FY19 to FY20 reflects estimates associated with the time varying non-recurring developmental scope of work tied to this project, not indices tied to inflation. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 33.767 | 40.604 | 37.485 | 0.000 | 37.485 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1950 / *New Design SSN Combat Sys Dev* |

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

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2013: *VA CL* | 5,450.911 | 7,137.077 | 9,925.498 | - | 9,925.498 | 6,123.064 | 5,968.338 | 6,080.771 | 7,052.398 | 28,976.120 | 148,078.924 |
| • O&M,N/0204283N: *Sub Ops & Safety* | 10.496 | 11.038 | 11.462 | - | 11.462 | 12.003 | 12.131 | 12.357 | 12.604 | Continuing | Continuing |
| • OPN/0942: *VA CL Support Equipment* | 46.610 | 66.328 | 28.465 | - | 28.465 | 23.263 | 22.910 | 23.326 | 23.792 | Continuing | Continuing |
| • RDT&E/0604580N: *Virginia Payload Module* | 70.579 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.098 |

**Remarks**

**D. Acquisition Strategy**

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing General Dynamics Electric Boat (GDEB) and Northrop Grumman Newport News (NGNN), now Huntington Ingalls Industries - Newport News Shipbuilding (HII-NNS), to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, GDEB remained the design yard for the VIRGINIA Class Submarine and HII-NNS became a part of the IPPD process. The Program Office is managing two Multi-Year Procurement (MYP) contracts. The first is for the Block III (FY09-13) ships. The second is for the Block IV (FY14-18) ships awarded April 2014. All Block I & II ships (SSNs 774-783) have been delivered. The first seven Block III ships, SSN 784-790, have delivered, with one remaining ship under construction. Ten Block IV ships are awarded and under construction. The program is currently negotiating the fourth MYP (Block V) contract that will include 10 SSNs (FY19-23) and will incorporate acoustic superiority modifications on all SSNs and VPM on seven SSNs with an option to award a third SSN in FY20, FY22 and FY23. The third FY20 SSN was added during the PB2020 cycle however, without Advance Procurement or Economic Order Quantity funding in prior years, it will reflect a construction schedule more in line with an FY23 SSN.

**E. Performance Metrics**

Successful completion of the SSN 790 Baseline Assessment. SDIP design completion and installation. Design completion and integration of future payloads.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1950 / *New Design SSN Combat Sys Dev* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unique Virginia Class Improvements | Various | Various : Various | 86.576 | 3.845 | Feb 2018 | 3.750 | Feb 2019 | 3.750 | Feb 2020 | - | | 3.750 | Continuing | Continuing | Continuing |
| Tech Insertion/Advanced Processing Build (TI/APB) Integration | Various | Various : TBD | 0.000 | 3.949 | Nov 2017 | 7.195 | Nov 2018 | 6.950 | Nov 2019 | - | | 6.950 | Continuing | Continuing | Continuing |
| Photonics | C/CPIF | Kollmorgen : Northampton, MA | 61.701 | 0.000 | | 0.635 | Jan 2019 | 0.808 | Jan 2020 | - | | 0.808 | 0.000 | 63.144 | - |
| Large Vertical Array South Dakota Improvement Program | Various | Various : TBD | 0.000 | 4.518 | Nov 2017 | 6.925 | Nov 2018 | 4.800 | Nov 2019 | - | | 4.800 | Continuing | Continuing | Continuing |
| Platform Integration | SS/CPFF | Electric Boat : Groton, CT | 55.010 | 2.621 | Nov 2017 | 6.370 | Nov 2018 | 6.100 | Nov 2019 | - | | 6.100 | Continuing | Continuing | Continuing |
| Photonics | C/CPIF | Lockheed Martin : Manassas, VA | 0.000 | 0.500 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Virtualization Enabling Architecture Development | Various | Various : TBD | 0.000 | 4.318 | Nov 2017 | 5.850 | Nov 2018 | 4.551 | Nov 2019 | - | | 4.551 | Continuing | Continuing | Continuing |
| Technical Direction Agent | WR | NUWC : Newport, RI | 318.178 | 5.922 | Nov 2017 | 5.174 | Nov 2018 | 5.481 | Nov 2019 | - | | 5.481 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC : Carderock, MD | 14.449 | 0.220 | Nov 2017 | 0.220 | Nov 2018 | 0.420 | Nov 2019 | - | | 0.420 | Continuing | Continuing | Continuing |
| Acoustic Intercept & Sonar | C/CPFF | Progeny Applied : Manassas, VA | 0.000 | 0.500 | Nov 2017 | 0.635 | Nov 2018 | 0.400 | Jan 2020 | - | | 0.400 | Continuing | Continuing | Continuing |
| High Frequency & Sonar Sensors | C/CPFF | Applied Research Lab : University of Texas | 0.000 | 0.300 | Nov 2017 | 0.400 | Nov 2018 | 0.455 | Nov 2019 | - | | 0.455 | Continuing | Continuing | Continuing |
| Next Generation Architecture - Electronic Warfare System | WR | NSMA : Various | 0.000 | 3.799 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | SSC : Charleston, SC | 9.277 | 0.800 | Nov 2017 | 1.300 | Nov 2018 | 1.345 | Nov 2019 | - | | 1.345 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NUWC : Keyport, WA | 12.785 | 0.800 | Nov 2017 | 0.650 | Nov 2018 | 0.875 | Nov 2019 | - | | 0.875 | Continuing | Continuing | Continuing |
| Miscellaneous | Various | Various : Various | 145.692 | 0.675 | Feb 2018 | 0.700 | Nov 2018 | 0.600 | Dec 2019 | - | | 0.600 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 703.668 | 32.767 | | 39.804 | | 36.535 | | - | | 36.535 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1950 / *New Design SSN Combat Sys Dev* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

Estimates associated with the time varying non-recurring developmental scope of work tied to this project, not indices tied to inflation.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Various | Various | Various : TBD | 6.212 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.212 | - |
| | | **Subtotal** | 6.212 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.212 | N/A |

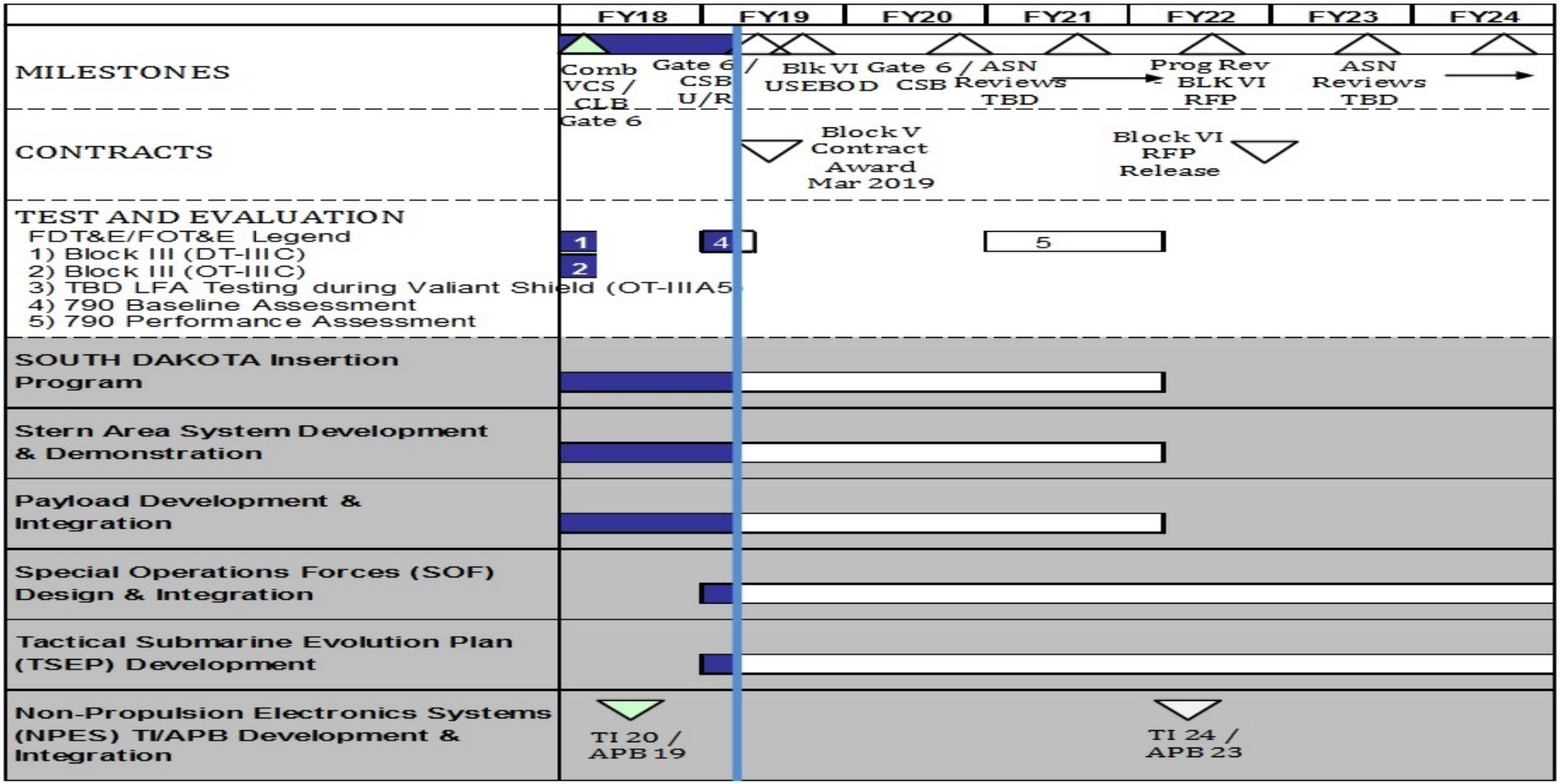
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Support Services/ETS | C/CPAF | SEAPORT : Rockville, MD | 37.756 | 1.000 | Dec 2017 | 0.800 | Dec 2018 | 0.950 | Dec 2019 | - | | 0.950 | Continuing | Continuing | Continuing |
| DAWDF | Various | Various : Various | 0.195 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.195 | - |
| | | **Subtotal** | 37.951 | 1.000 | | 0.800 | | 0.950 | | - | | 0.950 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 747.831 | 33.767 | | 40.604 | | 37.485 | | - | | 37.485 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1950 / *New Design SSN Combat Sys Dev* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1950 / *New Design SSN Combat Sys Dev* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1950*** | | | | |
| MILESTONE: Comb VCS/CLB Gate 6 | 1 | 2018 | 1 | 2018 |
| MILESTONE: VCS FY 19 Gate 6 U/R | 1 | 2019 | 1 | 2019 |
| MILESTONE: VCS Block VI USEBOD | 3 | 2019 | 3 | 2019 |
| MILESTONE: VCS FY20 Gate 6 | 2 | 2020 | 2 | 2020 |
| MILESTONE: VCS FY21 Gate 6 | 2 | 2021 | 2 | 2021 |
| MILESTONE: VCS FY22 Gate 6 | 2 | 2022 | 2 | 2022 |
| MILESTONE: Prog Rev Block VI RFP | 3 | 2022 | 3 | 2022 |
| MILESTONE: VCS FY23 Gate 6 | 2 | 2023 | 2 | 2023 |
| MILESTONE: VCS FY24 Gate 6 | 2 | 2024 | 2 | 2024 |
| CONTRACTS: Block V Contract Award | 2 | 2019 | 2 | 2019 |
| CONTRACTS: Block VI RFP Release | 4 | 2022 | 4 | 2022 |
| TEST & EVALUATION: Block III (DT-IIIC) | 1 | 2018 | 1 | 2018 |
| TEST & EVALUATION: Block III (OT-IIIC) | 1 | 2018 | 1 | 2018 |
| TEST & EVALUATION: U/R 790 Baseline Assessment | 1 | 2019 | 2 | 2019 |
| TEST & EVALUATION: U/R 790 Performance Assessment | 1 | 2021 | 1 | 2022 |
| SOUTH DAKOTA Improvement Program | 1 | 2018 | 1 | 2022 |
| Stern Area System Development & Demonstration | 1 | 2018 | 1 | 2022 |
| Payload Development & Integration | 1 | 2018 | 4 | 2024 |
| Special Operations Forces (SOF) Design & Integration | 1 | 2019 | 4 | 2024 |
| Tactical Submarine Evolution Plan (TSEP) Development | 1 | 2019 | 4 | 2024 |
| Non-Propulsion Electronics Systems (NPES) TI20/APB19 Development & Integration | 1 | 2018 | 1 | 2018 |
| NPES TI24/APB 23 Development & Integration | 1 | 2022 | 1 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>3062 / *Submarine Multi-Mission Team Trainer* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3062: *Submarine Multi-Mission Team Trainer* | 42.242 | 2.658 | 2.661 | 3.120 | - | 3.120 | 2.783 | 2.843 | 2.901 | 2.959 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

To achieve desired submarine force readiness levels, it is necessary to construct highly sophisticated shore based Combat System Team Trainers capable of training personnel in all aspects of submarine approach, attack and surveillance operations in a controlled, simulated environment. The Combat Control System (CCS) AN/BYG-1 and sonar system AN/BQQ-10 are installed on SSN, SSBN and SSGN class submarines. These tactical systems are planned for future upgrades with the next hardware and software revisions which will provide enhanced War Fighter capabilities. The Tactical Acoustic Rapid COTS (commercial-off-the-shelf) Insertion (ARCI) phased upgrades are also being installed with future revisions. The Advanced Processing Builds (APB) and Technical Insertion (TI) sensors, which feed technology insertion into the CCS/Acoustic development, directly impact the trainers.

The Submarine Multi-Mission Team Trainer (SMMTT) supports operator, employment, strike, and Battle Group training for enlisted and officer pipelines. The SMMTT provides operators and combat teams the opportunity to train ashore, prior to, and between deployments. The shore based training provides a means of maintaining team proficiency in stand alone or in combined team mode prior to ship deployment.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Submarine Multi-Mission Team Trainer | 2.658 | 2.661 | 3.120 | 0.000 | 3.120 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** To achieve desired submarine force readiness levels, it is necessary to construct highly sophisticated shore based Combat System Team Trainers capable of training personnel in all aspects of submarine approach, attack and surveillance operations in a controlled, simulated environment. | | | | | |
| ***FY 2019 Plans:***<br>Develop implementation of latest Advanced Processor Build 15 (APB15), Technical Insertion 16 (TI16) and associated training displays. These efforts include new sensor developments and simulations to match advancements in tactical systems supported by SMMTT. These efforts will also integrate the APB into the SMMTT baseline. This also includes the development and integration of APB software into the SSGN 726 build. | | | | | |
| ***FY 2020 Base Plans:***<br>Develop implementation of latest Advanced Processor Build (APB), Technical Insertion (TI) and associated training displays. These efforts include new sensor developments and simulations to match advancements | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>3062 / *Submarine Multi-Mission Team Trainer* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| in tactical systems supported by SMMTT. These efforts will also integrate the APB into the SMMTT baseline along with integrating the Sonar Sensors LCCA and Large Vertical Array (LVA). FY2020 also adds Harpoon Simulation/Stimulation to the portfolio.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from $2.661 to $3.120 is due to additional funds needed to develop interfaces for LVA sensor. LVA sensor is twice size the of any previously developed sensor developments and simulations to match advancements in tactical systems supported by SMMTT. The additional funds also adds Harpoon Simulation/ Stimulation in FY2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.658 | 2.661 | 3.120 | 0.000 | 3.120 |

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

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/5661: *Submarine Training Device Mods* | 72.756 | 56.834 | 75.057 | - | 75.057 | 68.858 | 78.270 | 79.794 | 81.394 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The SMMTT program software development is accounted for in this RDTEN line. All production kits are procured in OPN PE 0804731N BLI 566100.

**E. Performance Metrics**

Within 90 days of introduction to the Fleet, this RDTEN project shall develop required changes to the Control and Display Documentation and Interface Description Language (IDL) Interfaces for the initial development for new sensors that are required to simulate/stimulate the TI/APB for the AN/BQQ-10 and AN/BYG-1 in the SMMTT Trainer.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>3062 / *Submarine Multi-Mission Team Trainer* |

**Product Development ($ in Millions)**

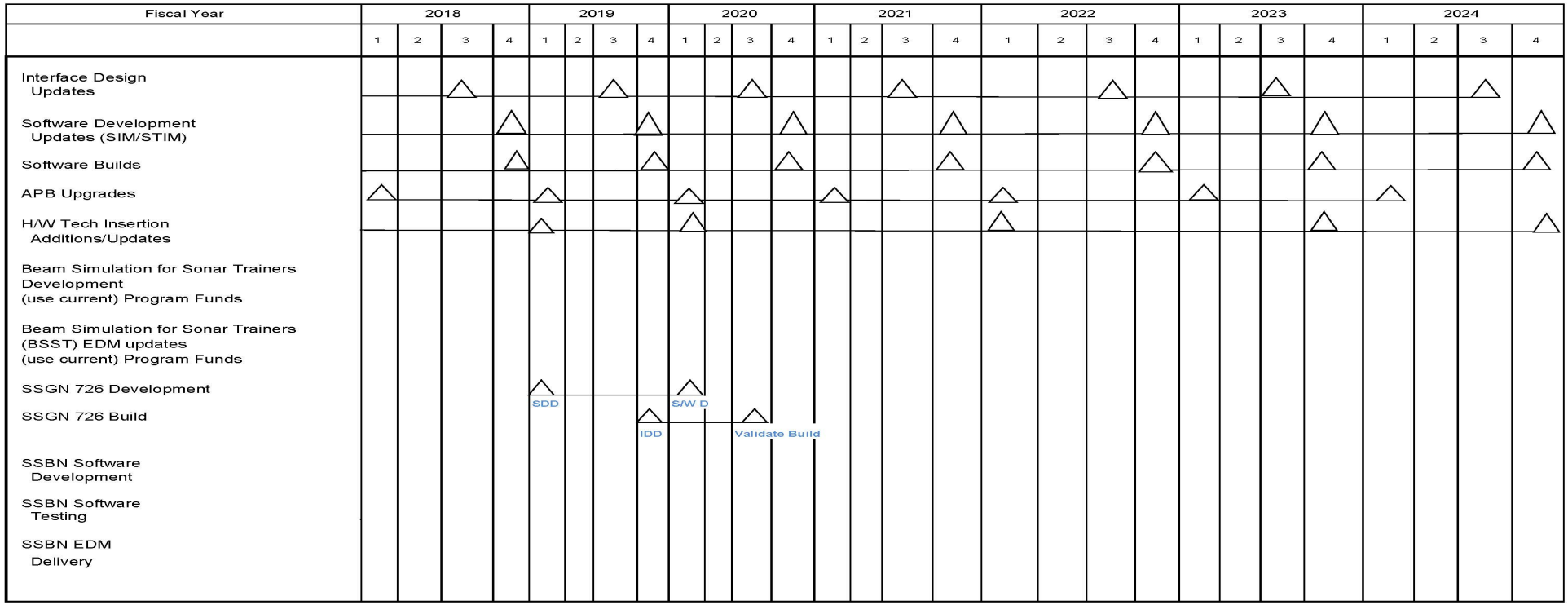
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component Development | Reqn | NSWC/CD : Bethesda, MD | 30.950 | 1.213 | Jan 2018 | 1.300 | Jan 2019 | 1.438 | Dec 2019 | - | | 1.438 | Continuing | Continuing | Continuing |
| Component Development | C/CPFF | ARL : UT Austin | 2.995 | 0.298 | Feb 2018 | 0.300 | Feb 2019 | 0.336 | Jan 2020 | - | | 0.336 | Continuing | Continuing | Continuing |
| Component Development | Reqn | NUWC/NPT : Newport, RI | 8.297 | 1.147 | Jan 2018 | 1.061 | Jan 2019 | 1.346 | Jan 2020 | - | | 1.346 | 0.000 | 11.851 | - |
| | | **Subtotal** | 42.242 | 2.658 | | 2.661 | | 3.120 | | - | | 3.120 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 42.242 | 2.658 | | 2.661 | | 3.120 | | - | | 3.120 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>3062 / *Submarine Multi-Mission Team Trainer* |

PB20_RDTEN_0604558N_31JAN2019 3062 R4 NATIVE SUBMIT.JPG R4 3062-SMMTT (21) Native



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>3062 / *Submarine Multi-Mission Team Trainer* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3062*** | | | | |
| Interface design updates: Interface Design Updates | 3 | 2018 | 3 | 2024 |
| Software Development Updates: Software Development Updates (SIM/STIM) | 4 | 2018 | 4 | 2024 |
| Software Builds: Software Builds | 4 | 2018 | 4 | 2024 |
| Advanced Processing Build(APB) Upgrades: Advanced Processing Build (APB) Upgrades | 1 | 2018 | 1 | 2024 |
| Hardware Tech Insertion Updates: Hardware Tech Insertion Updates | 1 | 2019 | 4 | 2024 |
| SSGN 726 Software Development: SSSGN Development | 1 | 2019 | 1 | 2020 |
| SSGN 726 Software Build: SSGN 726 Build | 4 | 2019 | 3 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 32.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 32.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The FY19 RDT&E program increase is to continue payload system integration and electronic support measure full spectrum digitization.

The FY19 RDT&E Congressional add for small business technology insertion will be applied to further development in the areas of payloads integration and delivery; anti-submarine warfare enhancements; advanced submarine control; and non-tactical software applications. Funding will be obligated via existing SBIR contracts.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** New Design SSN SBIR (Cong)<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** - Perform systems engineering of the changes needed to the Payload Control System and the Common Weapon Launcher for integration of key submarine payloads identified within the Tactical Submarine Evolution Plan.<br>- Perform systems engineering of advanced Anti-Submarine Warfare (ASW) / SONAR Initiatives to support future capabilities improvements for the VIRGINIA Class Submarine.<br>- Perform systems engineering of the NOSIS mobile application development suite and potential changes to Consolidated Afloat Network Enterprise System (CANES) in support of the introduction of mobile applications with the fielding of the SECRET Wireless LAN (SWLAN). | 0.000 | 20.000 |
| ***Congressional Add:*** New Design SSN<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** - Perform systems engineering of the changes needed to the Payload Control System and the Common Weapon Launcher for integration of key submarine payloads identified within the Tactical Submarine Evolution Plan.<br>- Expand the Advanced Technology Acquisition System (ATLAS) architecture to support Electronic Support Measure (ESM) Full Spectrum Digitization. | 0.000 | 12.000 |
| **Congressional Adds Subtotals** | 0.000 | 32.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

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

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2013: *Virginia Class Submarine* | 5,450.911 | 7,137.077 | 9,925.498 | - | 9,925.498 | 6,123.064 | 5,968.338 | 6,080.771 | 7,052.398 | 28,976.120 | 148,078.924 |
| • OMN/0204283N: *Sub Ops & Safety* | 10.496 | 11.038 | 11.462 | - | 11.462 | 12.003 | 12.131 | 12.357 | 12.604 | Continuing | Continuing |
| • OPN/0942: *Virginia Class Support Equipment* | 46.610 | 66.328 | 28.465 | - | 28.465 | 23.263 | 22.910 | 23.326 | 23.792 | Continuing | Continuing |
| • RDTEN/0604580N: *(U)Virginia Payload Module (VPM)* | 70.579 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.098 |

**Remarks**

**D. Acquisition Strategy**

Maximizing leverage of Congressional adds to support small business and incorporate advanced technology into the program of record.

**E. Performance Metrics**

Successful design enhancements to program of record efforts related to payload integration and electronics support measure full spectrum digitalization.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

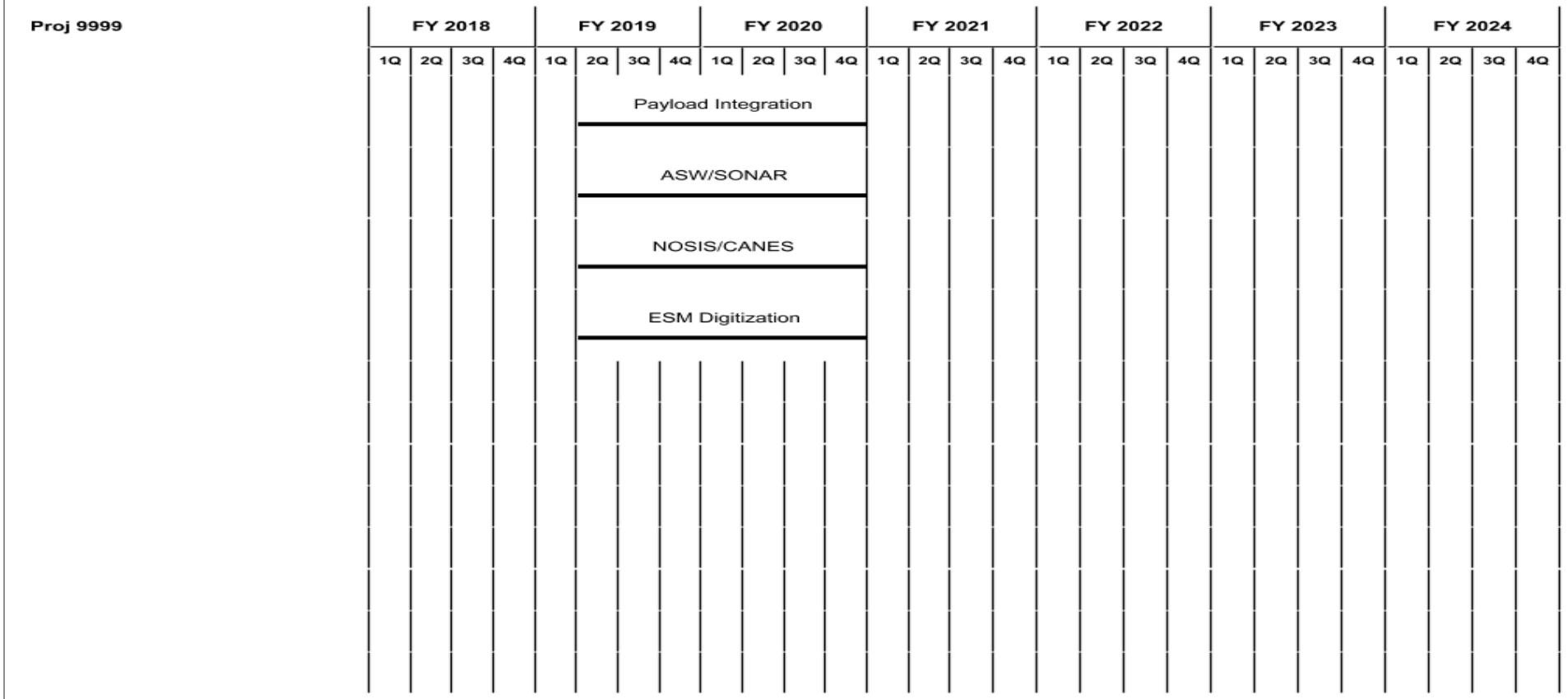
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Electronic support measure full spectrum digitalization | C/CPFF | Progeny Systems : Manassas, VA | 0.000 | 0.000 | | 12.000 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 12.000 | - |
| SBIR Increase | TBD | Various : Various | 0.000 | 0.000 | | 20.000 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 20.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 32.000 | | 0.000 | | - | | 0.000 | 0.000 | 32.000 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 32.000 | | 0.000 | | - | | 0.000 | 0.000 | 32.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604558N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Payload Integration Systems Engineering | 2 | 2019 | 4 | 2020 |
| ASW/SONAR Systems Engineering | 2 | 2019 | 4 | 2020 |
| NOSIS/CANES Systems Engineering | 2 | 2019 | 4 | 2020 |
| ESM Full Spectrum Digitization | 2 | 2019 | 4 | 2020 |