| Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy | | | | | | | | | | | Date: February 2020 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development* | | | | | R-1 Program Element (Number/Name)<br>PE 0205633N *I Aviation Improvements* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2019** | **FY 2020** | **FY 2021 Base** | **FY 2021 OCO** | **FY 2021 Total** | **FY 2022** | **FY 2023** | **FY 2024** | **FY 2025** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,581.070 | 130.986 | 125.461 | 133.953 | - | 133.953 | 130.174 | 132.231 | 135.336 | 130.379 | Continuing | Continuing |
| 0601: *Acft Handling & Service Equip* | 36.822 | 6.166 | 6.711 | 1.417 | - | 1.417 | 3.643 | 5.529 | 4.976 | 5.077 | Continuing | Continuing |
| 0852: *Consolidated Auto Support System* | 174.162 | 3.223 | 13.858 | 13.178 | - | 13.178 | 14.387 | 7.180 | 7.029 | 7.172 | Continuing | Continuing |
| 1041: *Aircraft Equipment Reliability/Maintainability Improvement Program (AERMIP)* | 61.485 | 3.281 | 3.452 | 3.250 | - | 3.250 | 3.687 | 3.845 | 3.715 | 3.789 | Continuing | Continuing |
| 1355: *Propulsion and Power Component Improvement Program* | 1,235.054 | 102.231 | 99.372 | 115.751 | - | 115.751 | 107.957 | 115.677 | 119.616 | 114.341 | Continuing | Continuing |
| 2269: *Expeditionary Airfield Improvements* | 68.719 | 1.605 | 2.068 | 0.357 | - | 0.357 | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 73.249 |
| 9999: *Congressional Adds* | 4.828 | 14.480 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 19.308 |

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

Project 0601 - Common Ground Equipment is a Naval Aviation Project to apply new technology to common support equipment necessary to support multiple aircraft.

Project 0852: Consolidated Automated Support System is a standardized Automated Test Equipment with computer assisted, multi-function capabilities to support the maintenance of aircraft weapons systems and missiles.

Project 1041 - Aircraft Equipment Reliability/Maintainability Improvement Program is the only Navy program that provides engineering support for in-service out-of-production aircraft equipment, and provides increased readiness at reduced operational and support cost.

Project 1355 - Aircraft Engine Component Improvement Program develops reliability and maintainability and safety enhancements for in-service Navy aircraft engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, fuel systems, fuels, and lubricants.

Project 2269 - The Expeditionary Airfields (EAF) program designs, develops, tests and fields a sustainment lighting system to replace existing obsolete legacy EAF lighting system.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy | Date: February 2020 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development* | **R-1 Program Element (Number/Name)**<br>PE 0205633N *I Aviation Improvements* |

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate funding in the current or subsequent fiscal year.

| B. Program Change Summary ($ in Millions) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 134.823 | 125.461 | 139.748 | - | 139.748 |
| Current President's Budget | 130.986 | 125.461 | 133.953 | - | 133.953 |
| Total Adjustments | -3.837 | 0.000 | -5.795 | - | -5.795 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -3.837 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -5.295 | - | -5.295 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.500 | - | -0.500 |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2019 | FY 2020 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *F/A-18 E/F and E/A-18G Engine Enhancements* | 14.480 | 0.000 |
| Congressional Add Subtotals for Project: 9999 | 14.480 | 0.000 |
| Congressional Add Totals for all Projects | 14.480 | 0.000 |

**Change Summary Explanation**

Schedule:

Project 0852: The Fourth Generation Electro-Optic (EO4) development program will design, develop, integrate, and test a modernized electro-optic system to replace the legacy Third Generation Electro-Optic (EO3) systems, which are experiencing untenable obsolescence issues. The continuation of this repair capability at both shore-based and afloat sites is critical to sustain maintenance and repair capabilities for the F/A-18 Advanced Targeting Forward Looking Infrared (ATFLIR) and the H-60 Multi-Spectral Targeting (MTS) weapon systems. EO4 funds support development of tester to replace legacy EO3. Program schedule added to budget. EO3 Technology Development was delayed due to technical issues that required extending the integration phase, resulting in delays to the DT-B1 and DT-B2 test events. Furthermore, the Contractor's proposed unit costs significantly exceeded the Government cost estimate. Due to the unforeseen unit cost expense and updated reliability predictions of the legacy cameras, the MDA revised the acquisition strategy to procure only one full-rate production lot (of 10 cameras) vice three lots. EO4 Development experienced a $6 million reduction in FY21 since the previous President's Budget submission,

which caused extension of the development phase from a three-year Period of Performance (PoP) to a four-year PoP. The delay includes DT-B1 through DT-B3 test events, as well as subsequent FRP1 and FRP2 production orders.

The Test Technology development project includes continued development of technical solutions to meet emerging weapons system testing requirements and to resolve other imminent obsolescence issues. Emerging capability requirements include advanced inertial device, expanded high-speed bus, virtual instrument, cybersecurity, and other technology advancements required to address capability requirements.

Project 2269: Design maturity with the Lead System Integrator (LSI) for the Sustainment Lighting System (SLS) program was re-scoped in FY19 and out to focus on the development of a new Light Emitting Diode (LED) CAT I Visual Flight Rules (VFR) Approach Light System and a Night Vision Device (NVD) Compatible Runway Light System. The schedule has been updated to remove the previous SLS schedule and to add two new schedules for the LED CAT I VFR and the NVD Compatibility Runway Light System.

Technical:

Project 0601: Carrier/Amphibious Assault Ship Crash Crane (CV/AACC) contract modified to incorporate design changes that significantly reduces technical risks identified in the contractor's original proposal. The contract modification includes removing the active load management system, in favor of a fixed idler system, incorporating in-riggers on the L-Class variant, and fixing the rear steering axle to the crane's chassis. These technical changes mitigate the program's significant technical risks at a trade-off of approximately five months schedule.

Project 0601: The FY 2021 funding request was reduced by $1.435 million to account for the availability of prior year execution balances.

Project 0852: The FY 2021 funding request was reduced by $0.735 million to account for the availability of prior year execution balances.

Project 1041: The FY 2021 funding request was reduced by $0.274 million to account for the availability of prior year execution balances.

Project 2269: The FY 2021 funding request was reduced by $0.501 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>0601 / *Acft Handling & Service Equip* | |

| COST ($ in Millions) | Prior Years | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0601: *Acft Handling & Service Equip* | 36.822 | 6.166 | 6.711 | 1.417 | - | 1.417 | 3.643 | 5.529 | 4.976 | 5.077 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Common Ground Equipment is a Naval Aviation project to apply new technology to common support equipment necessary to support multiple systems/aircraft within the Navy. The common support equipment items developed with this budget are briefed to the Air Force, Army and Coast Guard for possible use in joint procurement in the production phase.

Crash cranes are used for lifting and moving disabled aircraft on CVN and L-Class ship flight decks. The Carrier/Amphibious Assault Ship Crash Crane (CV/AACC) will be a diesel powered lift system performing crash and salvage functions on board CVN and L-class ships. The CV/AACC will replace the legacy A/S32A-35A, Carrier Vessel Crash Crane (CVCC) and the A/S32A-36A Amphibious Assault Crash Crane (AACC). The CV/AACC will support all aircraft on CVN and L-Class ships.

Funding supports the evaluation, testing and integration to develop Portable Electronic Maintenance Aids (PEMA) Commercial solution for portable device deployments across the Naval Aviation Enterprise. PEMA is a portable device utilized by maintainers with the implementation of digital maintenance capabilities (digital publications, Interactive Electronic Technical Manuals, Internet Protocol based data uploads, Binary digit data downloads, automated diagnostics, and planeside Naval Aviation Logistics Command/Management Information System. PEMAs are mandatory display devices supporting modern day Automated Maintenance Environment implemented for weapon systems.

Future Readiness Initiative to Develop Standard PEMA Cyber Solution (SPECS) architecture for all Portable Electronic Maintenance Aids (PEMA)s to standardize software across NAE, leverage existing enterprise tools, and to correct cyber shortfalls identified by the Cyber Warfare Detachment (CWD). A Cyber Risk Assessment (CRA) identified vulnerabilities on the Portable Electronic Maintenance Aid system that could be exploited to threaten U.S. capabilities. A new software image and configuration management process has been identified to mitigate the top 60% of identified risk groups and 100% of penetration test findings from the CRA.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| ***Title:*** Carrier/Amphibious Assault Ship Crash Crane (CV/AACC) | 3.557 | 4.011 | 0.401 | 0.000 | 0.401 |
| ***Articles:*** | - | 2 | - | - | - |
| ***Description:*** Carrier/Amphibious Assault Ship Crash Cranes (CV/AACC) are required to remove damaged aircraft from the flight deck. Legacy crash cranes were designed in the late 1980's, major systems are beginning to experience the obsolescence of spare parts and are in need of updating. R&D resources are needed to identify not only replacements, but new technologies, which can increase the reliability and maintainability of this flight ops critical piece of equipment. Systems updates would include the engine/generator and electrical | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| updates to the motor drive/control system. An exploration of power sources other than diesel engines would be considered and a corrosion resistant boom.<br><br>***FY 2020 Plans:***<br>Manufacture 2 CV/AACC Prototype Cranes and begin contractor testing.<br><br>***FY 2021 Base Plans:***<br>Review EDM test reports, correct critical deficiencies from test, develop production acceptance test and manufacturing plans.<br><br>***FY 2021 OCO Plans:***<br>N/A<br><br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>The CVN configuration Crash Crane will complete the testing program and shift to low-rate initial production in FY21. The amphibious configuration Crash Crane will continue its testing program in FY21. | | | | | |
| ***Title:*** Standard PEMA Cyber Solution (SPECS) | 1.926 | 2.000 | 0.369 | 0.000 | 0.369 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Capability/Program Description: The Portable Electronic Maintenance Aid (PEMA) Cyber Risk Assessment (CRA) has identified cyber vulnerabilities that could be exploited to threaten US fighting forces. Implementation of mandatory Cyber Security (CS) requirements would decrease the CS attack surface. Develop Standard PEMA Cyber Solution (SPECS) architecture for all PEMAs to standardize software across NAE, leverage existing enterprise tools, and to correct cyber shortfalls identified by the Cyber Warfare Detachment (CWD) Cyber Risk Assessment (CRA). Implement CS enhancements to reduce risk from cyber-attack.<br><br>***FY 2020 Plans:***<br>Develop Standard PEMA Cyber Solution (SPECS) core software solution enhancements to correct cyber shortfalls, develop/enhance Enterprise products (CMDS, PREP, and CFE) for software standardization across NAE, and develop/integrate T/M/S unique applications to be hosted on a common image. Production delivery for group 1 SPECS to the fleet.<br><br>***FY 2021 Base Plans:***<br>Continue to develop standard PEMA Cyber Solution (SPECS) core software enhancements to correct cyber shortfalls and develop/integrate T/M/S unique applications to be hosted on a common image.<br><br>***FY 2021 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>FY2020 to FY2021 decrease for Standard PEMA Cyber Solution (SPECS) is due to a reduction in weapon system conversions to SPECS in FY21. | | | | | |
| ***Title:*** Portable Electronic Maintenance Aid (PEMA) | 0.683 | 0.700 | 0.647 | 0.000 | 0.647 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Portable Electronic Maintenance Aid (PEMA) funding supports the evaluation, testing and integration to develop PEMA Commercial Off-the-Shelf (COTS) solution for portable device deployments across the Naval Aviation Enterprise. PEMAs are portable devices utilized by maintainers with the implementation of digital maintenance capabilities (digital publications, Interactive Electronic Technical Manuals, Internet Protocol based data uploads, Binary digit data downloads, automated diagnostics, and planeside Naval Aviation Logistic Command Management Information System. PEMAs are a mandatory display device supporting modern day Automated Maintenance Environment implemented for weapon systems.<br><br>***FY 2020 Plans:***<br>Evaluate, test and integrate evolving COTS solutions. Conduct test & evaluation of T/M/S peculiar software/ hardware requirements and network connectivity compliance across the GIG prior to deployment to the fleet by a yearly release cycle.<br><br>***FY 2021 Base Plans:***<br>Continue to evaluate, test and integrate evolving COTS solutions. Conduct test & evaluation of T/M/S peculiar software/hardware requirements and network connectivity compliance across the GIG prior to deployment to the fleet by a yearly release cycle.<br><br>***FY 2021 OCO Plans:***<br>N/A<br><br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Decrease from FY 2020 to FY 2021 is due Rate Model Adjustments. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 6.166 | 6.711 | 1.417 | 0.000 | 1.417 |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |

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

| Line Item | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0705: *Ground Support Equipment - CSE/ICP* | 85.713 | 79.064 | 82.664 | - | 82.664 | 86.226 | 88.705 | 91.021 | 93.219 | Continuing | Continuing |
| • OPN/4268: *Aviation Support Equipment - PEMA* | 11.885 | 7.962 | 13.319 | - | 13.319 | 12.696 | 12.981 | 13.200 | 13.464 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Common Ground Equipment: This is a non ACAT program. Field activities propose tentative projects. Internal panel merits and selects projects. Field activities develop projects and submit results. Operational Advisory Group process selects projects to transition to procurement.

Carrier/Amphibious Assault Ship Crash Crane (CV/AACC): Market research results indicate that six (6) companies have the potential to develop (modified COTS) and manufacture crash cranes that meet the specification requirements, inclusive of the lift requirements and unique shipboard environmental requirements including shock, vibration, Electromagnetic Interference (EMI) and ship motion characteristics. The program will enter the acquisition process at Milestone B (MS-B). The contracting strategy consists of awarding a best value, competitive, Firm Fixed Price (FFP) Indefinite Delivery, Indefinite Quantity (IDIQ) contract.

The selected contractor will design, develop, manufacture, test, and deliver two (2) CCSCs and one (1) ACSC Engineering Development Model (EDM), along with all required technical data and logistics documentation. Following MS C approval, one (1) CCSC and one (1) ACSC LRIP will be procured to support DT-C1 testing and production. Following FRPDR approval, 25 additional production units consisting of 13 CCSCs and 12 ACSCs will be procured using priced delivery orders which will meet the total fleet inventory of 27 units.

Portable Electronic Maintenance Aids: The management approach includes the Program Management Office residing at NAVAIR with Milestone Decision Authority delegated to the Naval Air Systems Command Chief Information Officer. The evolutionary development approach will be used to execute requirements. Contracting for the prime integrator will be via competitively awarded Indefinite Delivery/Indefinite Quantity contracts.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>0601 / *Acft Handling & Service Equip* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hdw Dev - CV | C/FFP | Allied Systems Company : Sherwood, OR | 0.000 | 2.796 | Jul 2019 | 2.407 | Jan 2020 | 0.036 | Jan 2021 | - | | 0.036 | 0.000 | 5.239 | 5.239 |
| Systems Engineering - CV | WR | NAWCAD : LAKEHURST, NJ | 4.128 | 0.761 | Nov 2018 | 0.847 | Nov 2019 | 0.151 | Nov 2020 | - | | 0.151 | Continuing | Continuing | Continuing |
| Systems Engineering - SPECS | C/IDIQ | TBD : TBD | 0.000 | 1.335 | Dec 2018 | 1.400 | Dec 2019 | 1.002 | Dec 2020 | - | | 1.002 | 0.000 | 3.737 | 3.737 |
| Prior year Prod Dev cost no longer funded in the FYDP | Various | Various : Various | 19.692 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 19.692 | - |
| | | **Subtotal** | 23.820 | 4.892 | | 4.654 | | 1.189 | | - | | 1.189 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year Support cost no longer funded in the FYDP | Various | Various : Various | 8.857 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.857 | - |
| | | **Subtotal** | 8.857 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.857 | N/A |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C&G Test - CV | WR | NAWCAD : PAX RIVER, MD | 0.317 | 0.000 | | 0.757 | Nov 2019 | 0.228 | Nov 2020 | - | | 0.228 | Continuing | Continuing | Continuing |
| Operational T & E - PEMA | WR | NAWCAD : PAX RIVER, MD | 1.558 | 0.408 | Nov 2018 | 0.425 | Nov 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.391 | - |
| Operational T & E - PEMA | WR | FRC SE : Jacksonville, FL | 1.351 | 0.275 | Nov 2018 | 0.275 | Nov 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.901 | - |
| Operational T & E - SPECS | WR | FRC SE : Jacksonville, FL | 0.000 | 0.591 | Dec 2018 | 0.600 | Dec 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.191 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>0601 / *Acft Handling & Service Equip* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year T&E cost no longer funded in the FYDP | Various | Various : Various | 0.919 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.919 | - |
| | | **Subtotal** | 4.145 | 1.274 | | 2.057 | | 0.228 | | - | | 0.228 | Continuing | Continuing | N/A |

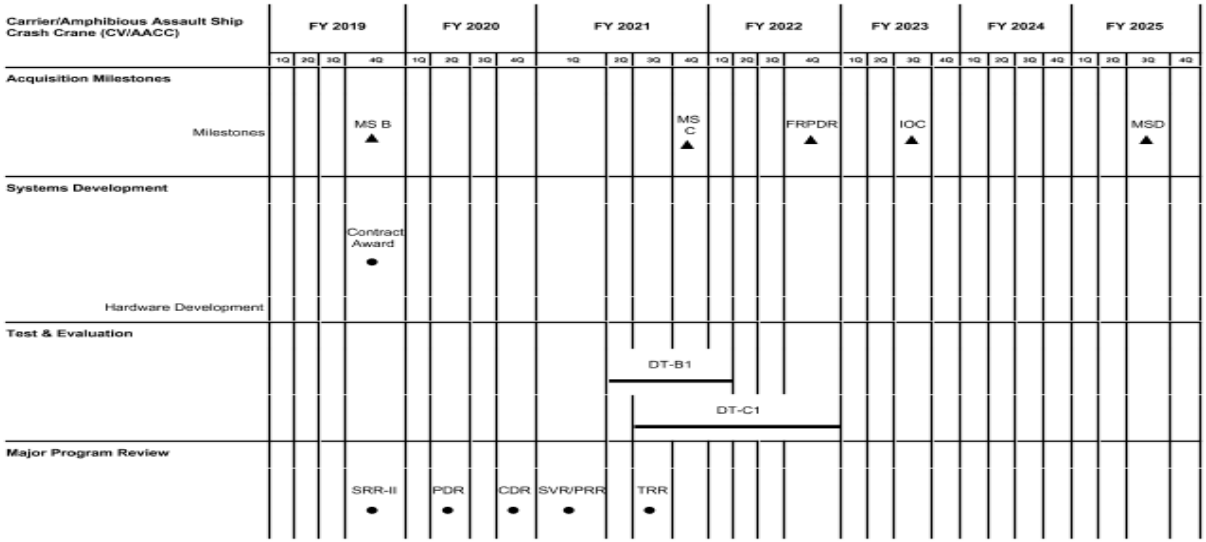
**Remarks**

C&G Test CV Decrease from FY20 to FY21: The FY 2021 funding request was reduced by ($1.435M) to account for the availability of prior year execution balances.

| | Prior Years | FY 2019 | | FY 2020 | | FY 2021 Base | | FY 2021 OCO | | FY 2021 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 36.822 | 6.166 | | 6.711 | | 1.417 | | - | | 1.417 | Continuing | Continuing | N/A |

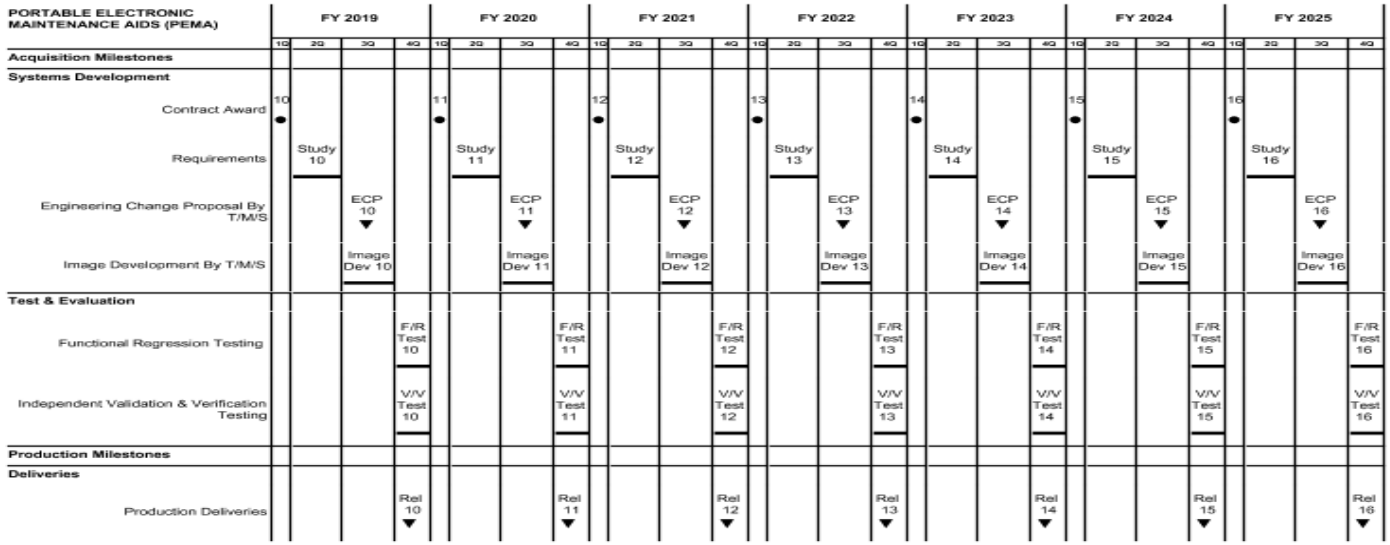
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |



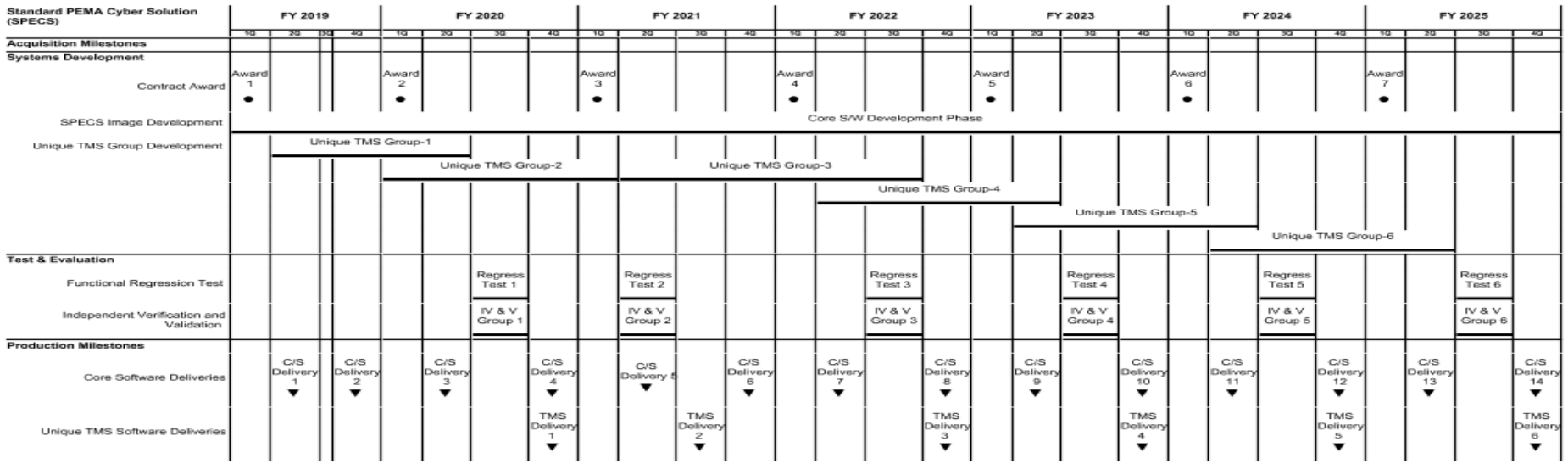

*2021PB - 0205633N - 0601*

| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |




*2021PB - 0205633N - 0601*

| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |




*2021PB - 0205633N - 0601*

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Carrier/Amphibious Assault Ship Crash Crane (CV/AACC)*** | | | | |
| Acquisition Milestones: Milestones: MILESTONE B | 4 | 2019 | 4 | 2019 |
| Acquisition Milestones: Milestones: MILESTONE C | 4 | 2021 | 4 | 2021 |
| Acquisition Milestones: Milestones: FRPDR | 4 | 2022 | 4 | 2022 |
| Acquisition Milestones: Milestones: IOC | 3 | 2023 | 3 | 2023 |
| Acquisition Milestones: Milestones: MSD | 3 | 2025 | 3 | 2025 |
| Systems Development: Contract Award | 4 | 2019 | 4 | 2019 |
| Test & Evaluation: DT-B1 | 2 | 2021 | 1 | 2022 |
| Test & Evaluation: DT-C1 | 3 | 2021 | 4 | 2022 |
| Major Program Review: SRR-II | 4 | 2019 | 4 | 2019 |
| Major Program Review: PDR | 2 | 2020 | 2 | 2020 |
| Major Program Review: CDR | 4 | 2020 | 4 | 2020 |
| Major Program Review: SVR/PRR | 1 | 2021 | 1 | 2021 |
| Major Program Review: TRR | 3 | 2021 | 3 | 2021 |
| ***PORTABLE ELECTRONIC MAINTENANCE AIDS (PEMA)*** | | | | |
| Systems Development: Contract Award: Contract Award 10 | 1 | 2019 | 1 | 2019 |
| Systems Development: Contract Award: Contract Award 11 | 1 | 2020 | 1 | 2020 |
| Systems Development: Contract Award: Contract Award 12 | 1 | 2021 | 1 | 2021 |
| Systems Development: Contract Award: Contract Award 13 | 1 | 2022 | 1 | 2022 |
| Systems Development: Contract Award: Contract Award 14 | 1 | 2023 | 1 | 2023 |
| Systems Development: Contract Award: Contract Award 15 | 1 | 2024 | 1 | 2024 |
| Systems Development: Contract Award: Contract Award 16 | 1 | 2025 | 1 | 2025 |
| Systems Development: Requirements: Requirements Study Complete 10 | 2 | 2019 | 2 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: Requirements: Requirements Study Complete 11 | 2 | 2020 | 2 | 2020 |
| Systems Development: Requirements: Requirements Study Complete 12 | 2 | 2021 | 2 | 2021 |
| Systems Development: Requirements: Requirements Study Complete 13 | 2 | 2022 | 2 | 2022 |
| Systems Development: Requirements: Requirements Study Complete 14 | 2 | 2023 | 2 | 2023 |
| Systems Development: Requirements: Requirements Study Complete 15 | 2 | 2024 | 2 | 2024 |
| Systems Development: Requirements: Requirements Study Complete 16 | 2 | 2025 | 2 | 2025 |
| Systems Development: Engineering Change Proposal By T/M/S: Engineering Change Proposal By T/M/S, ECP 10 | 3 | 2019 | 3 | 2019 |
| Systems Development: Engineering Change Proposal By T/M/S: Engineering Change Proposal By T/M/S, ECP 11 | 3 | 2020 | 3 | 2020 |
| Systems Development: Engineering Change Proposal By T/M/S: Engineering Change Proposal By T/M/S, ECP 12 | 3 | 2021 | 3 | 2021 |
| Systems Development: Engineering Change Proposal By T/M/S: Engineering Change Proposal By T/M/S, ECP 13 | 3 | 2022 | 3 | 2022 |
| Systems Development: Engineering Change Proposal By T/M/S: Engineering Change Proposal By T/M/S, ECP 14 | 3 | 2023 | 3 | 2023 |
| Systems Development: Engineering Change Proposal By T/M/S: Engineering Change Proposal By T/M/S, ECP 15 | 3 | 2024 | 3 | 2024 |
| Systems Development: Engineering Change Proposal By T/M/S: Engineering Change Proposal By T/M/S, ECP 16 | 3 | 2025 | 3 | 2025 |
| Systems Development: Image Development By T/M/S: Image Development By T/M/S 10 | 3 | 2019 | 3 | 2019 |
| Systems Development: Image Development By T/M/S: Image Development By T/M/S 11 | 3 | 2020 | 3 | 2020 |
| Systems Development: Image Development By T/M/S: Image Development By T/M/S 12 | 3 | 2021 | 3 | 2021 |
| Systems Development: Image Development By T/M/S: Image Development By T/M/S 13 | 3 | 2022 | 3 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: Image Development By T/M/S: Image Development By T/M/S 14 | 3 | 2023 | 3 | 2023 |
| Systems Development: Image Development By T/M/S: Image Development By T/M/S 15 | 3 | 2024 | 3 | 2024 |
| Systems Development: Image Development By T/M/S: Image Development By T/M/S 16 | 3 | 2025 | 3 | 2025 |
| Test & Evaluation: Functional Regression Testing: Functional/Regression Testing 10 | 4 | 2019 | 4 | 2019 |
| Test & Evaluation: Functional Regression Testing: Functional/Regression Testing 11 | 4 | 2020 | 4 | 2020 |
| Test & Evaluation: Functional Regression Testing: Functional/Regression Testing 12 | 4 | 2021 | 4 | 2021 |
| Test & Evaluation: Functional Regression Testing: Functional/Regression Testing 13 | 4 | 2022 | 4 | 2022 |
| Test & Evaluation: Functional Regression Testing: Functional/Regression Testing 14 | 4 | 2023 | 4 | 2023 |
| Test & Evaluation: Functional Regression Testing: Functional/Regression Testing 15 | 4 | 2024 | 4 | 2024 |
| Test & Evaluation: Functional Regression Testing: Functional/Regression Testing 16 | 4 | 2025 | 4 | 2025 |
| Test & Evaluation: Independent Validation & Verification Testing: Independent Validation & Verification Testing 10 | 4 | 2019 | 4 | 2019 |
| Test & Evaluation: Independent Validation & Verification Testing: Independent Validation & Verification Testing 11 | 4 | 2020 | 4 | 2020 |
| Test & Evaluation: Independent Validation & Verification Testing: Independent Validation & Verification Testing 12 | 4 | 2021 | 4 | 2021 |
| Test & Evaluation: Independent Validation & Verification Testing: Independent Validation & Verification Testing 13 | 4 | 2022 | 4 | 2022 |
| Test & Evaluation: Independent Validation & Verification Testing: Independent Validation & Verification Testing 14 | 4 | 2023 | 4 | 2023 |
| Test & Evaluation: Independent Validation & Verification Testing: Independent Validation & Verification Testing 15 | 4 | 2024 | 4 | 2024 |
| Test & Evaluation: Independent Validation & Verification Testing: Independent Validation & Verification Testing 16 | 4 | 2025 | 4 | 2025 |
| Deliveries: Production Deliveries: Production Delivery, Release 10 | 4 | 2019 | 4 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Deliveries: Production Deliveries: Production Delivery, Release 11 | 4 | 2020 | 4 | 2020 |
| Deliveries: Production Deliveries: Production Delivery, Release 12 | 4 | 2021 | 4 | 2021 |
| Deliveries: Production Deliveries: Production Delivery, Release 13 | 4 | 2022 | 4 | 2022 |
| Deliveries: Production Deliveries: Production Delivery, Release 14 | 4 | 2023 | 4 | 2023 |
| Deliveries: Production Deliveries: Production Delivery, Release 15 | 4 | 2024 | 4 | 2024 |
| Deliveries: Production Deliveries: Production Delivery, Release 16 | 4 | 2025 | 4 | 2025 |
| ***Standard PEMA Cyber Solution (SPECS)*** | | | | |
| Systems Development: Contract Award: Contract Award 1 | 1 | 2019 | 1 | 2019 |
| Systems Development: Contract Award: Contract Award 2 | 1 | 2020 | 1 | 2020 |
| Systems Development: Contract Award: Contract Award 3 | 1 | 2021 | 1 | 2021 |
| Systems Development: Contract Award: Contract Award 4 | 1 | 2022 | 1 | 2022 |
| Systems Development: Contract Award: Contract Award 5 | 1 | 2023 | 1 | 2023 |
| Systems Development: Contract Award: Contract Award 6 | 1 | 2024 | 1 | 2024 |
| Systems Development: Contract Award: Contract Award 7 | 1 | 2025 | 1 | 2025 |
| Systems Development: SPECS Image Development: SPECS Image | 1 | 2019 | 4 | 2025 |
| Systems Development: Unique TMS Group Development: Unique TMS Group-1 | 2 | 2019 | 2 | 2020 |
| Systems Development: Unique TMS Group Development: Unique TMS Group-2 | 1 | 2020 | 1 | 2021 |
| Systems Development: Unique TMS Group Development: Unique TMS Group-3 | 2 | 2021 | 3 | 2022 |
| Systems Development: Unique TMS Group Development: Unique TMS Group-4 | 2 | 2022 | 2 | 2023 |
| Systems Development: Unique TMS Group Development: Unique TMS Group-5 | 2 | 2023 | 2 | 2024 |
| Systems Development: Unique TMS Group Development: Unique TMS Group-6 | 2 | 2024 | 2 | 2025 |
| Test & Evaluation: Functional Regression Test: Group 1 | 3 | 2020 | 3 | 2020 |
| Test & Evaluation: Functional Regression Test: Group 2 | 2 | 2021 | 2 | 2021 |
| Test & Evaluation: Functional Regression Test: Group 3 | 3 | 2022 | 3 | 2022 |
| Test & Evaluation: Functional Regression Test: Group 4 | 3 | 2023 | 3 | 2023 |
| Test & Evaluation: Functional Regression Test: Group 5 | 3 | 2024 | 3 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluation: Functional Regression Test: Group 6 | 3 | 2025 | 3 | 2025 |
| Test & Evaluation: Independent Verification and Validation: Group 1 | 3 | 2020 | 3 | 2020 |
| Test & Evaluation: Independent Verification and Validation: Group 2 | 2 | 2021 | 2 | 2021 |
| Test & Evaluation: Independent Verification and Validation: Group 3 | 3 | 2022 | 3 | 2022 |
| Test & Evaluation: Independent Verification and Validation: Group 4 | 3 | 2023 | 3 | 2023 |
| Test & Evaluation: Independent Verification and Validation: Group 5 | 3 | 2024 | 3 | 2024 |
| Test & Evaluation: Independent Verification and Validation: Group 6 | 3 | 2025 | 3 | 2025 |
| Production Milestones: Core Software Deliveries: Deliveries 1 | 2 | 2019 | 2 | 2019 |
| Production Milestones: Core Software Deliveries: Deliveries 2 | 4 | 2019 | 4 | 2019 |
| Production Milestones: Core Software Deliveries: Deliveries 3 | 2 | 2020 | 2 | 2020 |
| Production Milestones: Core Software Deliveries: Deliveries 4 | 4 | 2020 | 4 | 2020 |
| Production Milestones: Core Software Deliveries: Deliveries 5 | 2 | 2021 | 2 | 2021 |
| Production Milestones: Core Software Deliveries: Deliveries 6 | 4 | 2021 | 4 | 2021 |
| Production Milestones: Core Software Deliveries: Deliveries 7 | 2 | 2022 | 2 | 2022 |
| Production Milestones: Core Software Deliveries: Deliveries 8 | 4 | 2022 | 4 | 2022 |
| Production Milestones: Core Software Deliveries: Deliveries 9 | 2 | 2023 | 2 | 2023 |
| Production Milestones: Core Software Deliveries: Deliveries 10 | 4 | 2023 | 4 | 2023 |
| Production Milestones: Core Software Deliveries: Deliveries 11 | 2 | 2024 | 2 | 2024 |
| Production Milestones: Core Software Deliveries: Deliveries 12 | 4 | 2024 | 4 | 2024 |
| Production Milestones: Core Software Deliveries: Deliveries 13 | 2 | 2025 | 2 | 2025 |
| Production Milestones: Core Software Deliveries: Deliveries 14 | 4 | 2025 | 4 | 2025 |
| Production Milestones: Unique TMS Software Deliveries: Deliveries 1 | 4 | 2020 | 4 | 2020 |
| Production Milestones: Unique TMS Software Deliveries: Deliveries 2 | 3 | 2021 | 3 | 2021 |
| Production Milestones: Unique TMS Software Deliveries: Deliveries 3 | 4 | 2022 | 4 | 2022 |
| Production Milestones: Unique TMS Software Deliveries: Deliveries 4 | 4 | 2023 | 4 | 2023 |
| Production Milestones: Unique TMS Software Deliveries: Deliveries 5 | 4 | 2024 | 4 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0601 / *Acft Handling & Service Equip* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Production Milestones: Unique TMS Software Deliveries: Deliveries 6 | 4 | 2025 | 4 | 2025 |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | | | | | | | | | Date: February 2020 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | | | | | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | | | | Project (Number/Name)<br>0852 / *Consolidated Auto Support System* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2019** | **FY 2020** | **FY 2021 Base** | **FY 2021 OCO** | **FY 2021 Total** | **FY 2022** | **FY 2023** | **FY 2024** | **FY 2025** | **Cost To Complete** | **Total Cost** |
| 0852: *Consolidated Auto Support System* | 174.162 | 3.223 | 13.858 | 13.178 | - | 13.178 | 14.387 | 7.180 | 7.029 | 7.172 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The electronic Consolidated Automated Support System (eCASS) project is the system design and development of the latest generation of the US Navy's CASS family of automatic test systems. The legacy CASS system was designed and developed in the 1980's and commenced fielding in 1992. As such, it is reaching the end of its useful life due to obsolescence issues. eCASS is the replacement system for legacy CASS systems, which provides Naval aircraft avionics component maintenance and repair support at Intermediate and Depot maintenance facilities both shore-based and afloat. As a CASS replacement program, the eCASS program objectives remain the same as that of CASS. Specifically: (1) increase material readiness; (2) reduce life cycle costs; (3) improve tester sustainability at depot and intermediate maintenance levels; (4) reduce proliferation of unique test equipment, and (5) provide test capability for existing and emerging avionics/electronics aircraft weapon systems.

The Test Technology development project includes analysis, application, maturation, integration and testing of emerging electronic, mechanical, and optical test technologies for potential military utility for emerging requirements or obsolescence resolution in support of Naval avionics testing and repair. Specifically included are next-generation electro-optics, synthetic instruments, high-speed bus technologies, inertial device technologies, and various other elements of modernization for the Consolidated Automated Support System (CASS) family of automated test equipment, including associated Test Program Sets (TPSs) and ancillary equipment.

The Third Generation Electro-Optical (EO3) Technology Development project consists of the design and development of technology solutions, including a near-infrared camera solution to replace the existing obsolete EO3 console camera, for use in 65 fielded Navy test systems at both shore-based and afloat sites. The EO3 console subsystem is hosted by the US Navy Consolidated Automated Support System (CASS/eCASS) family of automatic test systems and is used to test, diagnose and repair the H-60 Multi-spectral Targeting System (MTS) and F/A-18 Advanced Targeting Forward Looking Infrared (ATFLIR) weapon systems. The objective of the EO3 Technology Development project is to extend the useful life of fielded EO3 systems in order to sustain H-60 MTS and F/A-18 ATFLIR weapon system readiness until the EO4 replacement system can be designed, developed, produced, and fielded.

The Fourth Generation Electro-Optical (EO4) development project consists of the design and development of the latest generation electro-optic test console for use with the electronic CASS (eCASS) automatic test system. The EO4 system will replace the legacy Third Generation Electro-Optical (EO3) system, which is facing imminent obsolescence, in providing test, repair, and maintenance capability for Naval and Marine Corps electro-optic weapon systems at both shore-based and afloat sites. As an EO3 replacement program, the EO4 program objectives remain the same as EO3. Specifically: (1) provide test capability for existing and emerging electro-optic weapon systems and components; (2) increase ready basic aircraft (RBA) metrics (operational availability); (3) reduce life-cycle costs; (4) improve sustainability at intermediate and depot levels of maintenance; and (5) reduce proliferation of unique test equipment.

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0852 / *Consolidated Auto Support System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| ***Title:*** Test Technology Development | 2.323 | 3.295 | 2.345 | 0.000 | 2.345 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develops, integrates, and evolves enhanced test capabilities and technologies for insertion into the Consolidated Automated Support System (CASS) family of test systems. As weapon system electronics evolve, new test capabilities are required to support advanced systems. Existing test capabilities must be extended in range, accuracy, time and frequency domains in order to sustain the required test accuracy ratios for weapon systems support (the automatic test system must be four times as accurate as the asset being tested).<br>***FY 2020 Plans:***<br>Research and evaluate high-power and fiber-optic test requirements with a focus on Joint Strike Fighter. Analyze required incremental enhancements for Rack 1 of the eCASS automatic test systems.<br>***FY 2021 Base Plans:***<br>Continue evaluation of advanced technologies to support Joint Strike Fighter test requirements. Analyze incremental enhancements for Rack 2 of eCASS automatic test systems.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Test Technology Development budget requirements decreased from FY20 to FY21 because the activities for exploration and development of advanced electro-optic capabilities within the Test Technology Budget transitioned to the Fourth-Generation Electro Optic (EO4) Development budget. | | | | | |
| ***Title:*** EO3 Technology Development | 0.900 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This project will develop, integrate and test technical solutions to resolve EO3 obsolescence issues, including a near infrared camera, that are capable of supporting the maintenance and repair of the F/A-18 ATFLIR and H-60 MTS weapon systems.<br>***FY 2020 Plans:***<br>N/A<br>***FY 2021 Base Plans:***<br>N/A<br>***FY 2021 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0852 / *Consolidated Auto Support System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** EO4 Development | 0.000 | 10.563 | 10.833 | 0.000 | 10.833 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Design, develop, integrate, and test a Fourth Generation Electro-Optics (EO4) test system to replace the legacy EO3 test system. EO4 systems will provide the capability to test and diagnose an array of electro-optic weapons systems on F/A-18, H-60, JSF, and other aircraft platforms to support visual imaging, target identification and tracking, range finding, night-vision, and other electro-optic weapon system capabilities.<br>***FY 2020 Plans:***<br>Award an engineering and manufacturing development contract to design and develop an EO4 test system. Analyze the EO4 preliminary design to ensure it provides the capabilities required to test the requisite emerging weapon systems, including the enhanced version of the F/A-18 ATFLIR, JSF Distributed Aperature System (DAS), and the H-60 MTS electro-optic weapon systems.<br>***FY 2021 Base Plans:***<br>Finalize the preliminary design review (PDR) and resolve any PDR action items. Complete the EO4 technical data package (TDP) and subsequently conduct the critical design review (CDR) to establish the initial product baseline. Place orders for 5 engineering development models.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Fourth-Generation Electro Optic (EO4) Development budget requirements increased from FY20 to FY21 because the activities for exploration and development of advance electro-optic capabilities that were occurring within the Test Technology Development budget transitioned to the EO4 Development budget. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.223 | 13.858 | 13.178 | 0.000 | 13.178 |

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

| Line Item | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0705: *Common Ground Equipment-CASS/ATE* | 111.816 | 109.599 | 118.057 | - | 118.057 | 120.562 | 121.966 | 123.988 | 125.766 | Continuing | Continuing |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0852 / *Consolidated Auto Support System* |

**D. Acquisition Strategy**

Formal test technology reviews with industry are conducted annually (cooperative Joint Services initiative) to define maturity of needed technologies. Further studies are conducted as needed. Procurement strategy is determined by market survey and cooperative opportunities.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>0852 / *Consolidated Auto Support System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hdw Dev - Test Technology | C/CPFF | Various : Various | 5.444 | 1.530 | Dec 2018 | 1.966 | Dec 2019 | 1.170 | Dec 2020 | - | | 1.170 | Continuing | Continuing | Continuing |
| Primary Hdw Dev - EO3 | SS/CPFF | Northrop Grumman : Rolling Meadows, IL | 3.221 | 0.623 | Dec 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.844 | 3.844 |
| Primary Hdw Dev - EO4 | C/CPIF | TBD : TBD | 0.000 | 0.000 | | 7.919 | Feb 2020 | 8.579 | Feb 2021 | - | | 8.579 | 13.581 | 30.079 | 30.079 |
| Prior Year Prod Dev no longer funded in the FYDP | Various | Various : Various | 132.305 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 132.305 | - |
| | | **Subtotal** | 140.970 | 2.153 | | 9.885 | | 9.749 | | - | | 9.749 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Technology Support | WR | NAWC AD : Lakehurst, NJ | 1.934 | 0.689 | Dec 2018 | 1.280 | Dec 2019 | 0.523 | Dec 2020 | - | | 0.523 | Continuing | Continuing | Continuing |
| EO3 Support | WR | NAWC AD : Lakehurst, NJ | 0.497 | 0.280 | Dec 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.777 | - |
| EO4 Support | WR | NAWC AD : Lakehurst, NJ | 0.000 | 0.000 | | 2.567 | Dec 2019 | 2.792 | Dec 2020 | - | | 2.792 | 5.453 | 10.812 | - |
| Prior Year Support no longer funded in the FYDP | Various | Various : Various | 27.703 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 27.703 | - |
| | | **Subtotal** | 30.134 | 0.969 | | 3.847 | | 3.315 | | - | | 3.315 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Tech Travel | WR | Various : Various | 0.350 | 0.048 | Nov 2018 | 0.050 | Nov 2019 | 0.037 | Nov 2020 | - | | 0.037 | Continuing | Continuing | Continuing |
| EO3 Travel | WR | Various : Various | 0.049 | 0.053 | Nov 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.102 | - |
| EO4 Travel | WR | Various : Various | 0.000 | 0.000 | | 0.076 | Nov 2019 | 0.077 | Nov 2020 | - | | 0.077 | 0.000 | 0.153 | - |
| Prior Year Mgmt no longer funded in the FYDP | Various | Various : Various | 2.659 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.659 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>0852 / *Consolidated Auto Support System* | |

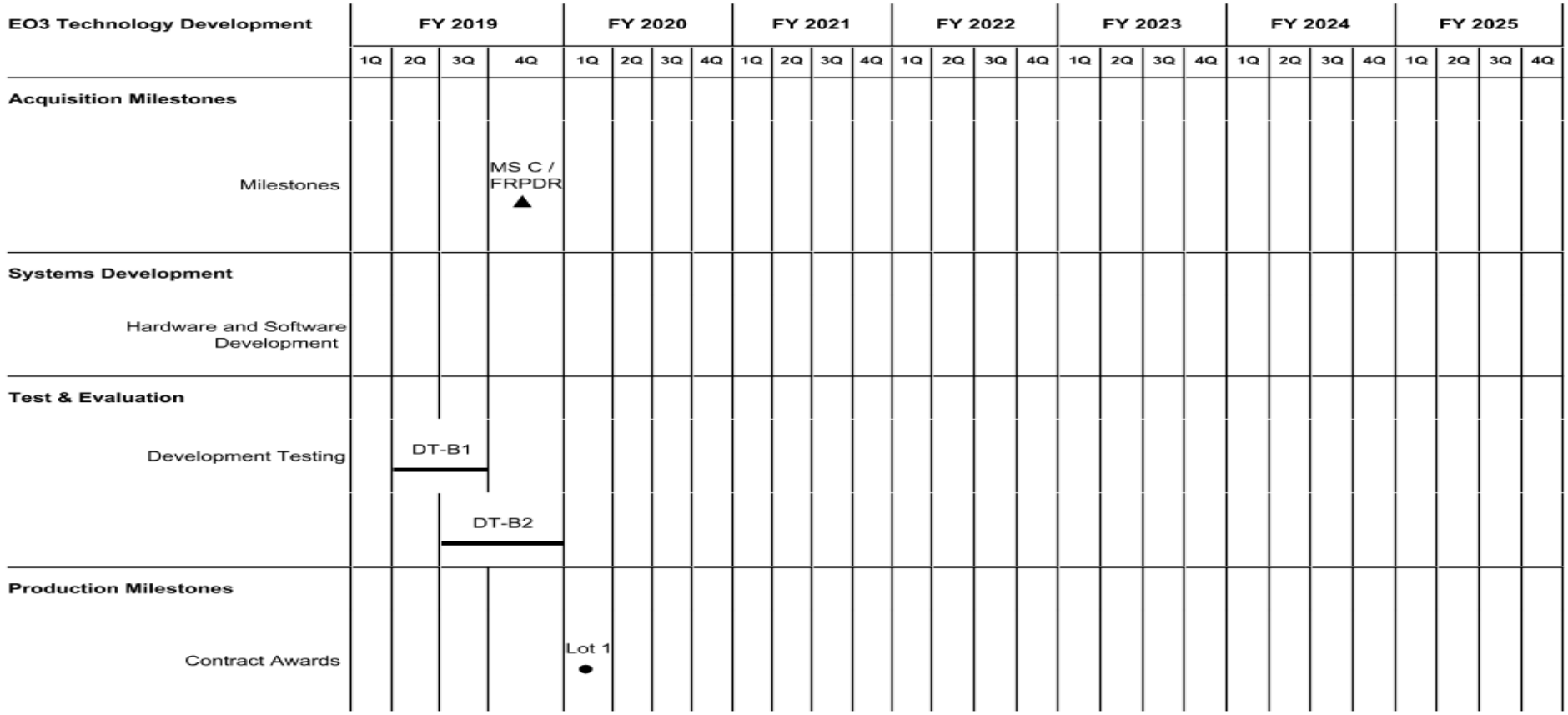
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Subtotal** | | | 3.058 | 0.101 | | 0.126 | | 0.114 | | - | | 0.114 | Continuing | Continuing | N/A |

| | Prior Years | FY 2019 | | FY 2020 | | FY 2021 Base | | FY 2021 OCO | | FY 2021 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 174.162 | 3.223 | | 13.858 | | 13.178 | | - | | 13.178 | Continuing | Continuing | N/A |

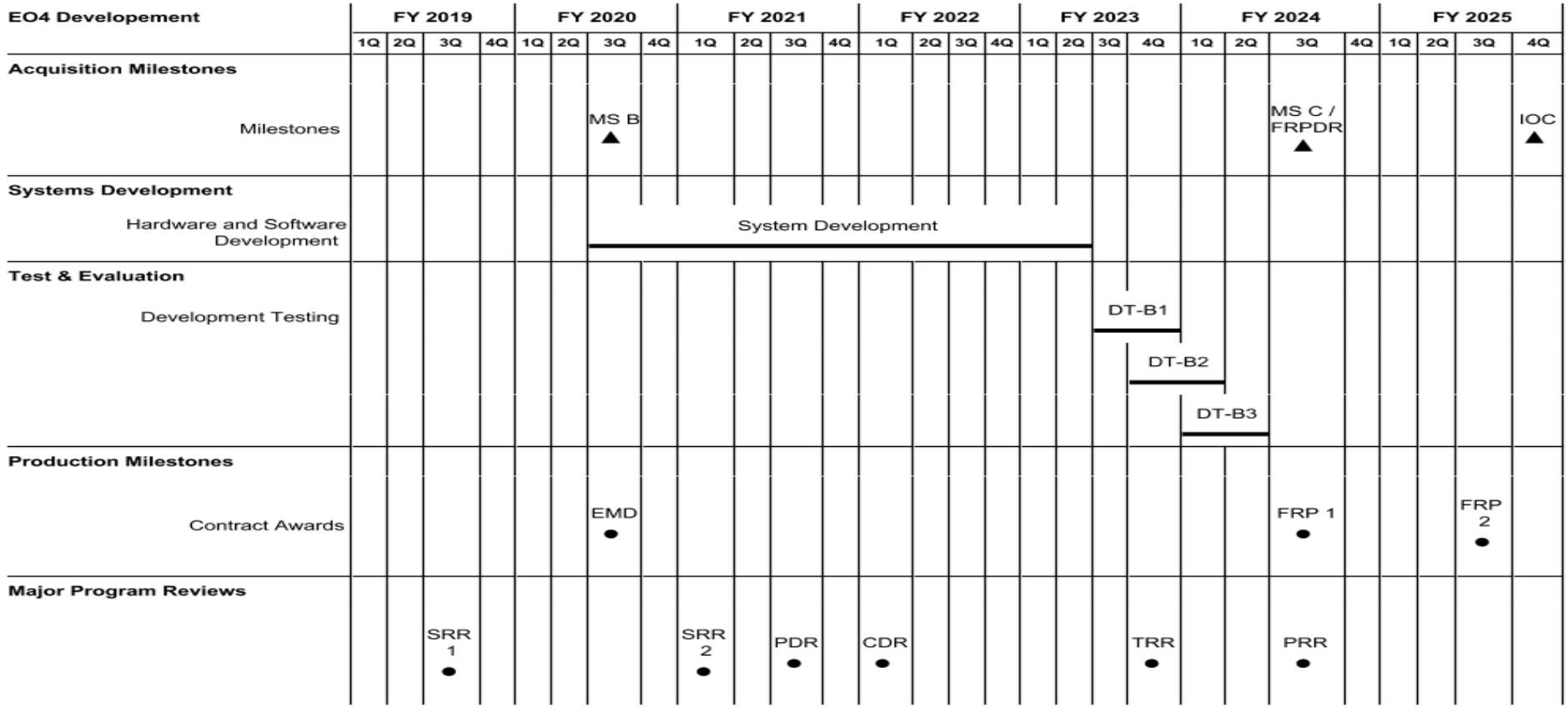
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0852 / *Consolidated Auto Support System* |




*2021PB - 0205633N - 0852*

| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0852 / *Consolidated Auto Support System* |




*2021PB - 0205633N - 0852*

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>0852 / *Consolidated Auto Support System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***EO3 Technology Development*** | | | | |
| Acquisition Milestones: Milestones: Milestone C / FRPDR | 4 | 2019 | 4 | 2019 |
| Test & Evaluation: Development Testing: Design Verification Testing: DT-B1 | 2 | 2019 | 3 | 2019 |
| Test & Evaluation: Development Testing: Regression Testing: DT-B2 | 3 | 2019 | 4 | 2019 |
| Production Milestones: Contract Awards: Lot 1 - 10 Units-APN | 1 | 2020 | 1 | 2020 |
| ***EO4 Developement*** | | | | |
| Acquisition Milestones: Milestones: Milestone B | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: Milestones: Milestone C / FRPDR | 3 | 2024 | 3 | 2024 |
| Acquisition Milestones: Milestones: IOC | 4 | 2025 | 4 | 2025 |
| Systems Development: Hardware and Software Development: System Development | 3 | 2020 | 2 | 2023 |
| Test & Evaluation: Development Testing: Design Verification Testing: DT-B1 | 3 | 2023 | 4 | 2023 |
| Test & Evaluation: Development Testing: Environmental Testing: DT-B2 | 4 | 2023 | 1 | 2024 |
| Test & Evaluation: Development Testing: Government Testing: DT-B3 | 1 | 2024 | 2 | 2024 |
| Production Milestones: Contract Awards: EMD | 3 | 2020 | 3 | 2020 |
| Production Milestones: Contract Awards: FRP1-APN | 3 | 2024 | 3 | 2024 |
| Production Milestones: Contract Awards: FRP2-APN | 3 | 2025 | 3 | 2025 |
| Major Program Reviews: SRR 1 | 3 | 2019 | 3 | 2019 |
| Major Program Reviews: SRR 2 | 1 | 2021 | 1 | 2021 |
| Major Program Reviews: PDR | 3 | 2021 | 3 | 2021 |
| Major Program Reviews: CDR | 1 | 2022 | 1 | 2022 |
| Major Program Reviews: TRR | 4 | 2023 | 4 | 2023 |
| Major Program Reviews: PRR | 3 | 2024 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)* | |

| COST ($ in Millions) | Prior Years | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1041: *Aircraft Equipment Reliability/Maintainability Improvement Program (AERMIP)* | 61.485 | 3.281 | 3.452 | 3.250 | - | 3.250 | 3.687 | 3.845 | 3.715 | 3.789 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Aircraft Equipment Reliability/Maintainability Improvement Program (AERMIP) is the only Navy program which provides Research, Development, Test & Evaluation engineering support specifically for in-service, out-of-production aircraft equipment. AERMIP increases readiness through reliability, maintainability, and safety improvements to existing systems and equipment installed in Naval aircraft. It also provides a transition vehicle to deploy Total Ownership Cost reduction initiatives through flight-test support and Fleet Test & Evaluation. It meets affordable readiness objectives by providing a cost-effective solution to obsolescence problems encountered when service lives are extended. AERMIP promotes commonality and standardization across aircraft platform lines and among the services through extension of application and use of non-developmental items. AERMIP also decreases life cycle costs through reduced operational and support costs. AERMIP facilitates the Operational, Safety and Improvement Program by applying proven low-risk solutions to current fleet problems. AERMIP also funds high-priority flight testing which is not associated with any acquisition or development program under the Flight Test General task.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| ***Title:*** Avionics and Wiring | 0.368 | 0.440 | 0.440 | 0.000 | 0.440 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Test and evaluate equipment for effectiveness of wiring diagnostics and prognostics. Address avionics related reliability/maintainability issues impacting multiple aircraft platforms while continuing to investigate high value return on investment initiatives. Qualify additional material or pieces of equipment and the procedures or processes required for implementation. | | | | | |
| ***FY 2021 Base Plans:***<br>Test and evaluate equipment for effectiveness of wiring diagnostics and prognostics. Address avionics related reliability/maintainability issues impacting multiple aircraft platforms while continuing to investigate high value | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| return on investment initiatives. Qualify additional material or pieces of equipment and the procedures or processes required for implementation.<br>***FY 2021 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Air Vehicle<br>***Articles:***<br>***FY 2020 Plans:***<br>Based on advancement in technology, test and qualify new materials or equipment and the procedures/process required for their implementation to improve operational reliability, while containing cost growth. Continue to test and qualify improved corrosion preventative compounds. Address subsystem related reliability/maintainability issues impacting multiple aircraft platforms while continuing to investigate high value return on investment initiatives. Maintain efforts to qualify improved methods of structural component repair.<br>***FY 2021 Base Plans:***<br>Based on advancement in technology, test and qualify new materials or equipment and the procedures/process required for their implementation to improve operational reliability, while containing cost growth. Continue to test and qualify improved corrosion preventative compounds. Address subsystem related reliability/maintainability issues impacting multiple aircraft platforms while continuing to investigate high value return on investment initiatives. Maintain efforts to qualify improved methods of structural component repair.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>The FY 2021 funding request was reduced by $0.151 to account for the availability of prior year execution balances. | 2.035<br>- | 2.069<br>- | 1.917<br>- | 0.000<br>- | 1.917<br>- |
| ***Title:*** Systems Engineering Revitalization<br>***Articles:***<br>***FY 2020 Plans:***<br>Continue the transition to model based system engineering methodology. Continue to develop and establish | 0.878<br>- | 0.943<br>- | 0.893<br>- | 0.000<br>- | 0.893<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| infrastructure and tools for an Integrated Modeling Environment. Establish processes and procedures for developing and extending systems models. Develop standard model libraries and stereotypes for NAVAIR use. Continue research in relevant technical areas.<br>***FY 2021 Base Plans:***<br>Continue research in relevant technical areas for refining use of system models for linkages to physics based models for PLM systems. Continue the transition to model based systems engineering methodology. Refine processes and procedures for developing and extending systems models. Continue development of standard model libraries and stereotypes for reuse across system models.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>The FY 2021 funding request was reduced by $0.050 to account for the availability of prior year execution balances. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.281 | 3.452 | 3.250 | 0.000 | 3.250 |

**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.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sys Eng - Avionics/Wiring | WR | NAWCAD : Patuxent River, MD | 9.341 | 0.233 | Oct 2018 | 0.270 | Oct 2019 | 0.290 | Oct 2020 | - | | 0.290 | Continuing | Continuing | Continuing |
| Sys Eng - Avionics/Wiring | C/FFP | Various : Various | 2.810 | 0.050 | Jan 2019 | 0.080 | Jan 2020 | 0.060 | Jan 2021 | - | | 0.060 | 0.000 | 3.000 | 3.000 |
| Sys Eng - Avionics/Wiring | WR | FRC-E : Cherry Point, NC | 0.120 | 0.010 | Nov 2018 | 0.020 | Nov 2019 | 0.010 | Nov 2020 | - | | 0.010 | Continuing | Continuing | Continuing |
| Sys Eng - Avionics/Wiring | WR | FRC-SE : Jacksonville, FL | 0.020 | 0.010 | Nov 2018 | 0.010 | Nov 2019 | 0.010 | Nov 2020 | - | | 0.010 | Continuing | Continuing | Continuing |
| Sys Eng - Avionics/Wiring | WR | FRC-SW : San Diego, CA | 0.020 | 0.010 | Nov 2018 | 0.010 | Nov 2019 | 0.020 | Nov 2020 | - | | 0.020 | Continuing | Continuing | Continuing |
| Sys Eng - Air Vehicle | WR | NAWCAD : Patuxent River, MD | 12.926 | 0.240 | Nov 2018 | 1.119 | Nov 2019 | 0.842 | Oct 2020 | - | | 0.842 | Continuing | Continuing | Continuing |
| Sys Eng - Air Vehicle | WR | FRC-SW : San Diego, CA | 2.406 | 0.175 | Nov 2018 | 0.300 | Nov 2019 | 0.400 | Nov 2020 | - | | 0.400 | Continuing | Continuing | Continuing |
| Sys Eng - Air Vehicle | WR | FRC-E : Cherry Point, NC | 2.126 | 0.060 | Nov 2018 | 0.150 | Nov 2019 | 0.150 | Nov 2020 | - | | 0.150 | Continuing | Continuing | Continuing |
| Sys Eng - Air Vehicle | WR | FRC-SE : Jacksonville, FL | 1.236 | 0.020 | Nov 2018 | 0.100 | Nov 2019 | 0.225 | Nov 2020 | - | | 0.225 | Continuing | Continuing | Continuing |
| Sys Eng - Air Vehicle | C/FFP | Various : Various | 1.762 | 1.390 | Jan 2019 | 0.250 | Dec 2019 | 0.150 | Jan 2021 | - | | 0.150 | 0.000 | 3.552 | 3.552 |
| Sys Eng - SE Revitalization | WR | NAWCAD : Patuxent River, MD | 1.015 | 0.006 | Dec 2018 | 0.019 | Dec 2019 | 0.006 | Oct 2020 | - | | 0.006 | Continuing | Continuing | Continuing |
| Sys Eng - SE Revitalization | C/FFP | Engility Corp. : Chantilly, VA | 5.352 | 0.232 | May 2019 | 0.234 | Feb 2020 | 0.281 | Feb 2021 | - | | 0.281 | 0.000 | 6.099 | 6.099 |
| Sys Eng - SE Revitalization | C/CPFF | Stevens Inst of Technology : Hoboken, NJ | 2.599 | 0.645 | Jan 2019 | 0.690 | Feb 2020 | 0.606 | Feb 2021 | - | | 0.606 | 0.000 | 4.540 | 4.590 |
| Prior Year Sys Eng NAE/ Prod Dev no longer funded in the FYDP | Various | Various : Various | 2.813 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.813 | - |
| | | **Subtotal** | 44.546 | 3.081 | | 3.252 | | 3.050 | | - | | 3.050 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

All prior year lines have been consolidated

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year Support cost no longer funded in the FYDP | Various | Various : Various | 12.480 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.480 | - |
| | | **Subtotal** | 12.480 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.480 | N/A |

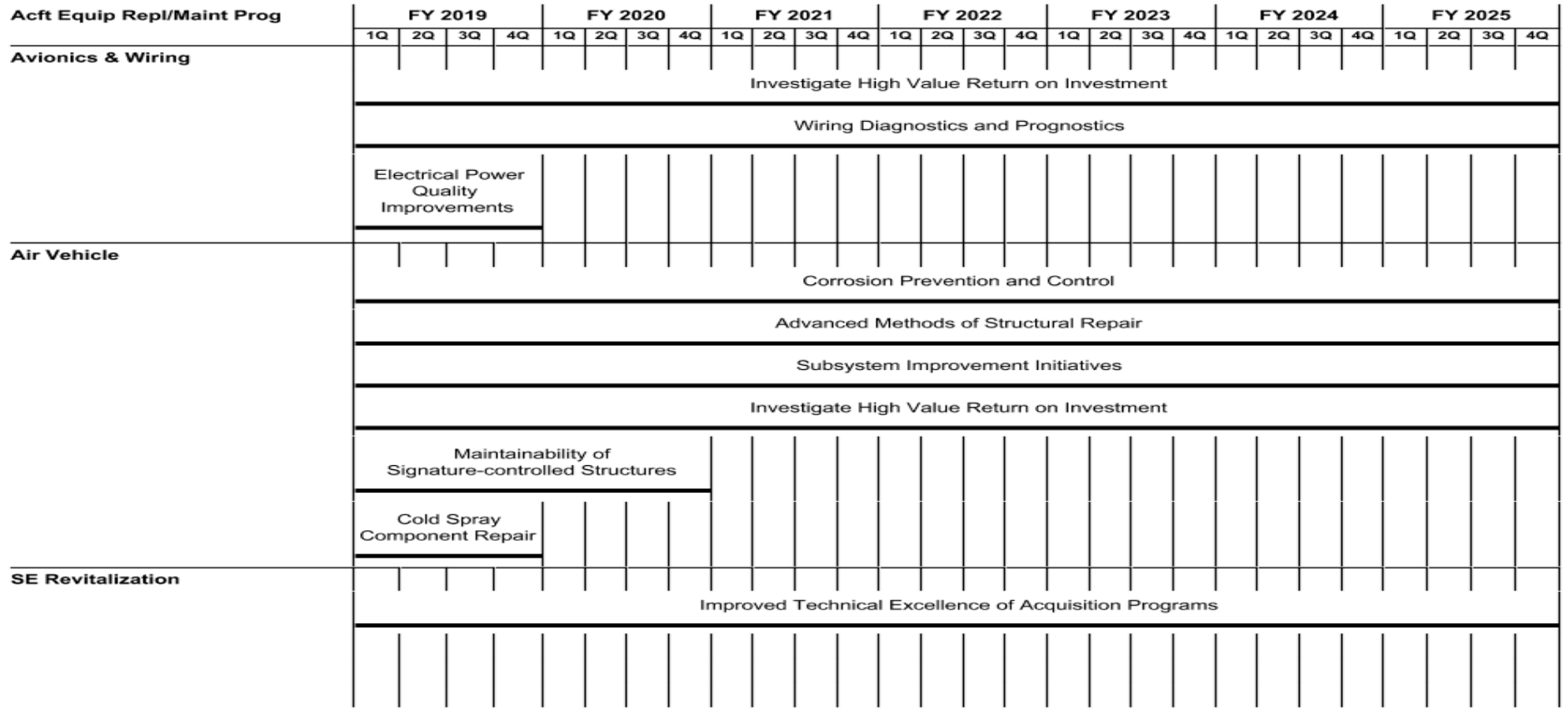
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Patuxent River, MD | 2.488 | 0.200 | Oct 2018 | 0.200 | Oct 2019 | 0.200 | Oct 2020 | - | | 0.200 | Continuing | Continuing | Continuing |
| Prior Year Mgmt cost no longer funded in the FYDP | Various | Various : Various | 1.971 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.971 | - |
| | | **Subtotal** | 4.459 | 0.200 | | 0.200 | | 0.200 | | - | | 0.200 | Continuing | Continuing | N/A |

| | Prior Years | FY 2019 | | FY 2020 | | FY 2021 Base | | FY 2021 OCO | | FY 2021 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 61.485 | 3.281 | | 3.452 | | 3.250 | | - | | 3.250 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)* |




*2021PB - 0205633N - 1041*

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Acft Equip Repl/Maint Prog*** | | | | |
| Avionics & Wiring: Investigate High Value Return on Avionics & Wiring Investment | 1 | 2019 | 4 | 2025 |
| Avionics & Wiring: Wiring Diagnostics and Prognostics | 1 | 2019 | 4 | 2025 |
| Avionics & Wiring: Electrical Power Quality Improvements | 1 | 2019 | 4 | 2019 |
| Air Vehicle: Corrosion Prevention and Control | 1 | 2019 | 4 | 2025 |
| Air Vehicle: Advanced Methods of Structural Repair | 1 | 2019 | 4 | 2025 |
| Air Vehicle: Subsystem Improvement Initiatives | 1 | 2019 | 4 | 2025 |
| Air Vehicle: Investigate High Value Return on Air Vehicle Investment | 1 | 2019 | 4 | 2025 |
| Air Vehicle: Maintainability of Signature-controlled Structures | 1 | 2019 | 4 | 2020 |
| Air Vehicle: Cold Spray Component Repair | 1 | 2019 | 4 | 2019 |
| SE Revitalization: Improved Technical Excellence of Acquisition Programs | 1 | 2019 | 4 | 2025 |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>1355 / *Propulsion and Power Component Improvement Program* | |

| COST ($ in Millions) | Prior Years | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1355: *Propulsion and Power Component Improvement Program* | 1,235.054 | 102.231 | 99.372 | 115.751 | - | 115.751 | 107.957 | 115.677 | 119.616 | 114.341 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Propulsion and Power (P&P) Component Improvement Program (CIP) provides the only source of critical design and development engineering support to resolve safety, reliability and maintainability deficiencies of in-service Navy and Marine Corps aircraft propulsion systems. The highest priority issues P&P CIP addresses concern safety-of-flight deficiencies, which account for approximately 80% of P&P CIP efforts. The program also corrects service-revealed deficiencies, improves Operational Readiness and Reliability and Maintainability, and reduces platform Life Cycle Cost. Budgets are allocated across platform-specific teams and multi-platform product support teams based upon long term strategies to achieve safety and affordable readiness goals; the R-3 exhibit details annual portions of those long-term strategies. P&P CIP tasks have reduced the rate of in-flight aborts, safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall cost of ownership. This is accomplished through the maintenance and validation of specification performance, testing to qualify engineering changes, verifying life limits, and improving the inherent reliability of the propulsion and power systems as an integral part of Reliability Centered Maintenance initiatives. Historically, the missions, tactics, and environmental exposure of military aircraft systems change to meet new threats or operational demands, and often result in unforeseen problems, which if not corrected, can cause critical safety/readiness degradation, such as those experienced during OPERATIONS DESERT SHIELD/DESERT STORM, ENDURING FREEDOM, and IRAQI FREEDOM due to sand erosion. In addition, new problems arise through actual fleet deployment and usage of the aircraft. System development programs, while geared to resolve as many problems as possible before deployment, cannot duplicate actual operations or account for the vast array of environmental and usage variables, particularly when aircraft missions vary from those that the aircraft was designed to perform. Therefore, it has been found that P&P CIP can provide an immediate engineering response to these flight-critical problems and accelerated engine testing can avoid potential problems. P&P CIP starts after development and Navy acceptance of the first production article and addresses usage and life problems not covered by warranties. P&P CIP addresses engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, aircraft wiring, and fuel and lubricant systems. These efforts continue over the system's life, gradually decreasing to a minimum level sufficient to maintain the reliability, and decrease the operating costs, of older inventory. P&P CIP is a highly leveraged and cooperative tri-service program with Foreign Military Sales participation.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| ***Title:*** P3, E2, C2, C130 (T56) | 10.300 | 10.200 | 11.100 | 0.000 | 11.100 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Continue joint projects with the USAF on the T56 Series III engine on the analysis, design and qualification of improvements to address Service Revealed Deficiencies and preform repair engineering development to | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| system components including bearings, seals and drives, the compressor, combustor, turbine, control system, static structures, and gearboxes. For the T56 Series IV engine perform analysis, design and qualification work related to address Service Revealed Deficiencies and safety, readiness and cost drivers on system components and execute projects on engine performance standardization, rub tolerant turbine blades, fuel nozzle anti-coke coating, step up gearbox oil leakage and updated software for the propulsion control and monitoring unit. Develop, design and test improvements to system components including the compressor, combustor, turbine, controls and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems and auxiliary power, and electrical power systems.<br>***FY 2021 Base Plans:***<br>Continue joint projects with the USAF on the T56 Series III engine on the analysis, design and qualification of improvements to address Service Revealed Deficiencies and preform repair engineering development to system components including bearings, seals and drives, the compressor, combustor, turbine, control system, static structures, and gearboxes. For the T56 Series IV engine perform analysis, design and qualification work related to address Service Revealed Deficiencies and safety, readiness and cost drivers on system components and execute projects on engine performance standardization, rub tolerant turbine blades, fuel nozzle anti-coke coating, step up gearbox oil leakage and updated software for the propulsion control and monitoring unit. Develop, design and test improvements to system components including the compressor, combustor, turbine, controls and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems and auxiliary power, and electrical power systems.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $0.900 million from FY2020 to FY2021 is due to T56 Series IV engine design modifications. | | | | | |
| ***Title:*** E2/C2/C130/P3 (Props) | 3.600 | 3.500 | 3.700 | 0.000 | 3.700 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on system components for the 54H60 and NP2000 propeller systems. Develop, design and test 54H60 and NP2000 Propeller system improvements to the control, pitch actuation and hydraulic systems, blades, pumps, housings, seals and static structure to improve safety, reliability, maintainability, affordability, durability and Readiness. Execute engineering efforts on repair and reliability engineering, | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| universal closed loop bench test system, fleet metric database development and management and perform analysis, design and testing on the NP200 modern pump housing and onboard propeller balance monitoring systems.<br>***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on system components for the 54H60 and NP2000 propeller systems. Develop, design and test 54H60 and NP2000 Propeller system improvements to the control, pitch actuation and hydraulic systems, blades, pumps, housings, seals and static structure to improve safety, reliability, maintainability, affordability, durability and Readiness. Execute engineering efforts on repair and reliability engineering, universal closed loop bench test system, fleet metric database development and management and perform analysis, design and testing on the NP2000 modern pump housing and onboard propeller balance monitoring systems.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $0.200 million from FY2020 to FY2021 will fund 54H60 and NP2000 propeller system improvement design effort. | | | | | |
| ***Title:*** SH-60B/F, HH-60H, MH-60R/S (T700) | 5.700 | 5.200 | 6.495 | 0.000 | 6.495 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T700 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems, auxiliary power and electrical power systems, and main and tail rotor drives systems. Perform analysis, design and testing on projects to improve the compression system and static structures tolerance to sand ingestion, update engine performance modeling and engine build optimization. Perform analysis, modeling design and testing on projects related to air vehicle drive system damage tolerance and reparability. Conduct lithium battery qualification testing. Perform engine and component testing to develop and qualify design improvements.<br>***FY 2021 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T700 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems, auxiliary power and electrical power systems, and main and tail rotor drives systems. Perform analysis, design and testing on projects to improve the compression system and static structures tolerance to sand ingestion, update engine performance modeling and engine build optimization. Perform analysis, modeling design and testing on projects related to air vehicle drive system damage tolerance and reparability. Conduct lithium battery qualification testing. Perform engine and component testing to develop and qualify design improvements.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $1.295 million from FY2020 to FY2021 provides funding for service related deficiencies. | | | | | |
| ***Title:*** H-1 (T400/T700) | 0.000 | 0.500 | 0.600 | 0.000 | 0.600 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety readiness and cost drivers on the T700 propulsion and power system components including the compressor, combustor, turbines, controls, diagnostics, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power, electrical power systems and main and tail rotor drives systems.<br>***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T700 propulsion and power system components including the compressor, combustor, turbines, controls, diagnostics, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power, electrical power systems and main and tail rotor drives systems.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| Increase of $0.100 million from FY2020 to FY2021 due to increased engineering and test activity to address H-1Y/Z main gearbox corrosion which is a significant readiness degrader. | | | | | |
| ***Title:*** AV-8B (F402) | 3.430 | 3.450 | 3.651 | 0.000 | 3.651 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety readiness and cost drivers on the F402 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems, auxiliary power, electrical power and FOD detection systems. Continue working on risk management plan of supplying critical parts and refinement of life limit determinations and identification of critical parts constraints to improve safety, reliability, maintainability, affordability, durability and Readiness. | | | | | |
| ***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the F402 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems, auxiliary power, electrical power and FOD detection systems. Continue working on risk management plan of supplying critical parts and refinement of life limit determinations and identification of critical parts constraints to improve safety, reliability, maintainability, affordability, durability and Readiness. | | | | | |
| ***FY 2021 OCO Plans:***<br>N/A | | | | | |
| ***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $0.201 million from FY2020 to FY2021 provides funding for service related deficiencies. | | | | | |
| ***Title:*** H-53/H-46/H-3 (T58/T64) | 3.800 | 3.800 | 4.050 | 0.000 | 4.050 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and Safety Readiness. Analyze cost drivers on the T64 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and air vehicle drive system components. Improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing to develop inspection and repair criteria, optimized depot-level engine build specification procedures, and data reduction program implementation. Update engine mission usage and hardware life management plans.<br>***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T64 propulsion and power system components the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and air vehicle drive system components to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing to develop inspection and repair criteria, optimized depot-level engine build specification procedures, and data reduction program implementation. Update engine mission usage and hardware life management plans.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $0.250 million from FY2020 to FY2021 for engineering support of the T58-GE-400B and T64-GE-416/416A/419 Engine and Propulsion System. | | | | | |
| ***Title:*** F-18 C/D/E/F (F414/F404) | 19.758 | 19.750 | 21.360 | 0.000 | 21.360 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety readiness and cost drivers on propulsion and power system components for the F414 and F404 turbofan engines including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter and exhaust systems to improve reliability, maintainability, affordability, durability. Perform engine and component test programs including rotor spin tests and accelerated simulated mission endurance testing.<br>***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on propulsion and power system components for the F414 and F404 turbofan | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| engines including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter and exhaust systems to improve reliability, maintainability, affordability, durability. Perform engine and component test programs including rotor spin tests and accelerated simulated mission endurance testing.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $1.610 million from FY2020 to FY2021 is due to additional engine test activity for F414 and F404. | | | | | |
| ***Title:*** T-45 (F405) | 2.446 | 2.450 | 2.600 | 0.000 | 2.600 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety readiness and cost drivers on the F405 propulsion and power system components including fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing on projects to update rotating engine part lives and mitigation approaches to address propulsion and power system component obsolescence issues and engine performance degradation.<br>***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies, safety, readiness and cost drivers on the F405 propulsion and power system components including fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing on projects to update rotating engine part lives and mitigation approaches to address propulsion and power system component obsolescence issues and engine performance degradation.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| Increase of $0.150 million from FY2020 to FY2021 for recurring F405 engine Component Improvement Program (CIP) requirements. | | | | | |
| ***Title:*** V-22 Propulsion | 5.200 | 6.100 | 6.400 | 0.000 | 6.400 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and Readiness and cost drivers on the AE1107C propulsion and power system components the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and prop rotor drive systems to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing on projects to mitigate rapid power loss and engine surge, and improve engine durability and operability, update engine part lives and management plan with updated mission mix, execute prop rotor input quill clutch system redesign and improve power assurance check accuracy to improve mission planning. Perform engine analytical condition inspections, air vehicle drive system damage tolerance assessment and turbine rig and full scale engine testing. | | | | | |
| ***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the AE1107C propulsion and power system components the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and prop rotor drive systems to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing on projects to mitigate rapid power loss and engine surge, and improve engine durability and operability, update engine part lives and management plan with updated mission mix, execute prop rotor input quill clutch system redesign and improve power assurance check accuracy to improve mission planning. Perform engine analytical condition inspections, air vehicle drive system damage tolerance assessment and turbine rig and full scale engine testing. | | | | | |
| ***FY 2021 OCO Plans:***<br>N/A | | | | | |
| ***FY 2020 to FY 2021 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| Increase of $0.300 million from FY2020 to FY2021 is due to increased engine and drive system design changes for the V-22 propulsion. | | | | | |
| ***Title:*** Adversary (J85) (F100) | 2.200 | 2.240 | 2.350 | 0.000 | 2.350 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and Readiness and cost drivers on the J85 and F100 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter and exhaust systems to improve safety, reliability, maintainability, affordability, durability. Continue joint projects with the USAF to perform analysis, design and testing on projects to validate the life assessment of J85 critical rotating hardware, address parts obsolescence issues, evaluate hardware inspection data, and perform stress modeling to update life limits, implement upgraded engine performance monitoring system, and implement improved turbine thermocouple probe and harness redesign. | | | | | |
| ***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and Readiness and cost drivers on the J85 and F100 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter and exhaust systems to improve safety, reliability, maintainability, affordability, durability. Continue joint projects with the USAF to perform analysis, design and testing on projects to validate the life assessment of J85 critical rotating hardware, address parts obsolescence issues, evaluate hardware inspection data, and perform stress modeling to update life limits, implement upgraded engine performance monitoring system, and implement improved turbine thermocouple probe and harness redesign. | | | | | |
| ***FY 2021 OCO Plans:***<br>N/A | | | | | |
| ***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $0.110 million from FY2020 to FY2021 for J85 engine reliability, safety, maintainability, and operability. | | | | | |
| ***Title:*** Joint Strike Fighter (F135 Engine) | 30.534 | 24.524 | 33.665 | 0.000 | 33.665 |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety readiness and cost and reliability drivers on propulsion and power system components of the F135 engine and STOVL lift system in accordance with F-35 Program Instruction 1540.05 F135 CIP Management Guide for the F135 Propulsion System Component Improvement Program. Develop, design and test improvements to system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter, exhaust and STOVL Lift system to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform engine testing and STOVL propulsion system testing at government and contractor test facilities. | | | | | |
| ***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on propulsion and power system components of the F135 engine and STOVL lift system in accordance with F-35 Program Instruction 1540.05 F135 CIP Management Guide for the F135 Propulsion System Component Improvement Program. Develop, design and test improvements to system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter, exhaust and STOVL Lift system to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform engine testing and STOVL propulsion system testing at government and contractor test facilities. | | | | | |
| ***FY 2021 OCO Plans:***<br>N/A | | | | | |
| ***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>FY20-FY21 increase of $9.141 will increase amount of planned engine Accelerated Mission Testing (AMT) at the Arnold Engineering Development Center (AEDC) including a full hot-section life demonstration. | | | | | |
| ***Title:*** P-8A (CFM56 Engine) | 0.600 | 0.600 | 0.650 | 0.000 | 0.650 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety readiness and cost and reliability drivers on propulsion and power system components of the CFM56 system including the fan, compressor, combustors, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, and durability.<br>***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on propulsion and power system components of the CFM56 system including the fan, compressor, combustors, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, and durability.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $0.050 million from FY2020 to FY2021 due to increased engineering efforts to provide expanded limits for costly components that exhibit high scrap rates based on depot shop visit experience. | | | | | |
| ***Title:*** Multi-Platform Product Support Teams | 6.963 | 7.158 | 7.250 | 0.000 | 7.250 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Continue projects to provide support to multiple platforms to analyze fleet component removal driver and reliability metrics to focus CIP investments to maximize return on investment, improve performance analysis, structural integrity modeling and simulation tools, and developmental test and evaluation facilities and procedures for propulsion and power system including engines, drive systems, fuels and lubricants, auxiliary power and electrical power systems. Includes funding for Government Furnished Fuel for research and development test and evaluation programs to evaluate and qualify component design improvements to improve safety, readiness, reliability, maintainability and durability.<br>***FY 2021 Base Plans:***<br>Continue projects to provide support to multiple platforms to analyze fleet component removal driver and reliability metrics to focus CIP investments to maximize return on investment, improve performance analysis, structural integrity modeling and simulation tools, and developmental test and evaluation facilities and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| procedures for propulsion and power system including engines, drive systems, fuels and lubricants, auxiliary power and electrical power systems. Includes funding for Government Furnished Fuel for research and development test and evaluation programs to evaluate and qualify component design improvements to improve safety, readiness, reliability, maintainability and durability.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $0.092 million from FY2020 to FY2021 due to additional engineering effort to implement a comprehensive Foreign Object Damage (FOD) program through a multi-faceted approach to understand and mitigate engine rejections due to FOD and reduce engine repair costs related to FOD which is approaching $200 million annually. | | | | | |
| ***Title:*** H-53K Propulsion (T408) | 7.700 | 7.850 | 9.000 | 0.000 | 9.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address identified deficiencies and safety readiness and cost and reliability drivers on the T408 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and main and tail rotor drive systems to improve safety, reliability, maintainability, affordability, durability. Acquire an engine test vehicle to qualify design changes developed under the component improvement program and perform component level and uninstalled engine testing.<br>***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address identified deficiencies and safety readiness and cost and reliability drivers on the T408 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and main and tail rotor drive systems to improve safety, reliability, maintainability, affordability, durability. Acquire an engine test vehicle to qualify design changes developed under the component improvement program and perform component level and uninstalled engine testing.<br>***FY 2021 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $1.150 million from FY2020 to FY2021 for development, design and test improvements for the H-53K Propulsion & Power system components. | | | | | |
| ***Title:*** MQ-4C (AE3007 Engine) | 0.000 | 1.400 | 1.500 | 0.000 | 1.500 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety readiness and cost and reliability drivers on the AE3007 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, and durability. | | | | | |
| ***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on the AE3007 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, and durability. | | | | | |
| ***FY 2021 OCO Plans:***<br>N/A | | | | | |
| ***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $0.100 million from FY2020 to FY2021 due to additional engineering effort to increase engine Time on Wing (TOW) and improve engine operability and compression system surge margin. | | | | | |
| ***Title:*** UAV Programs (Various) | 0.000 | 0.650 | 1.380 | 0.000 | 1.380 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2020 Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety readiness and cost and reliability drivers on the propulsion and power systems for small and medium size Unmanned Air Vehicles (UAVs) including the RQ-21 Small Tactical Unmanned Aerial System (STUAS). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| Develop, design and test improvements to system components including the engine components, control and diagnostic systems, static structures, bearings, seals, drives, fuel and lubrication systems, ignition and electrical power systems, exhaust system and the propeller to improve safety, reliability, maintainability, affordability, and durability.<br>***FY 2021 Base Plans:***<br>Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on the propulsion and power systems for small and medium size Unmanned Air Vehicles (UAVs) including the RQ-21 Small Tactical Unmanned Aerial System (STUAS) and the MQ-8B and MQ-8C Fire Scout variants. Develop, design and test improvements to system components including the engine components, control and diagnostic systems, static structures, bearings, seals, drives, fuel and lubrication systems, ignition and electrical power systems, exhaust system and the propeller to improve safety, reliability, maintainability, affordability, and durability.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>Increase of $0.730 million from FY2020 to FY2021 due to increased funding of MQ-8B firescout drive belts. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 102.231 | 99.372 | 115.751 | 0.000 | 115.751 |

**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.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sys Eng T56 Engine Program | WR | NAWCAD : Patuxent River, MD | 47.120 | 4.100 | Oct 2018 | 4.100 | Oct 2019 | 4.500 | Oct 2020 | - | | 4.500 | Continuing | Continuing | Continuing |
| Sys Eng T56 Engine Program | SS/CPFF | Rolls Royce : Indianapolis, IN | 62.341 | 5.500 | Jan 2019 | 5.400 | Jan 2020 | 5.700 | Jan 2021 | - | | 5.700 | 0.000 | 78.941 | 78.941 |
| Sys Eng T56 Engine Program | WR | FRC-E : Cherry Point, NC | 3.435 | 0.500 | Oct 2018 | 0.500 | Oct 2019 | 0.600 | Oct 2020 | - | | 0.600 | Continuing | Continuing | Continuing |
| Sys Eng T56 Engine Program | WR | FRC-SE : Jacksonville, FL | 0.896 | 0.100 | Oct 2018 | 0.100 | Oct 2019 | 0.150 | Oct 2020 | - | | 0.150 | Continuing | Continuing | Continuing |
| Sys Eng T56 Engine Program | WR | FRC-SW : North Island, CA | 0.178 | 0.100 | Oct 2018 | 0.100 | Oct 2019 | 0.150 | Oct 2020 | - | | 0.150 | Continuing | Continuing | Continuing |
| Sys Eng Props Program | SS/CPFF | Hamilton Sundstrand : Windsor Locks, CT | 29.933 | 3.600 | Jan 2019 | 3.500 | Jan 2020 | 3.700 | Jan 2021 | - | | 3.700 | 0.000 | 40.733 | 40.733 |
| Sys Eng T700 Engine Program | WR | NAWCAD : Patuxent River, MD | 19.927 | 2.500 | Oct 2018 | 2.500 | Oct 2019 | 3.600 | Oct 2020 | - | | 3.600 | Continuing | Continuing | Continuing |
| Sys Eng T700 Engine Program | SS/CPFF | General Electric : Lynn, MA | 37.521 | 3.200 | Jan 2019 | 3.200 | Jan 2020 | 3.500 | Jan 2021 | - | | 3.500 | 0.000 | 47.421 | 47.421 |
| Sys Eng F402 Engine Program | WR | NAWCAD : Patuxent River, MD | 22.807 | 1.700 | Oct 2018 | 1.700 | Oct 2019 | 1.800 | Oct 2020 | - | | 1.800 | Continuing | Continuing | Continuing |
| Sys Eng F402 Engine Program | WR | FRC-E : Cherry Point, NC | 1.107 | 0.130 | Oct 2018 | 0.150 | Oct 2019 | 0.151 | Oct 2020 | - | | 0.151 | Continuing | Continuing | Continuing |
| Sys Eng F402 Engine Program | SS/CPFF | Rolls Royce : Bristol, England, UK | 79.360 | 1.600 | Jan 2019 | 1.600 | Jan 2020 | 1.700 | Jan 2021 | - | | 1.700 | 0.000 | 84.260 | 84.260 |
| Sys Eng T58/T64 Engine Program | WR | NAWCAD : Patuxent River, MD | 39.480 | 2.100 | Oct 2018 | 2.100 | Oct 2019 | 2.200 | Oct 2020 | - | | 2.200 | Continuing | Continuing | Continuing |
| Sys Eng T58/T64 Engine Program | SS/CPFF | General Electric : Lynn, MA | 89.800 | 1.700 | Jan 2019 | 1.700 | Jan 2020 | 1.850 | Jan 2021 | - | | 1.850 | 0.000 | 95.050 | 95.050 |
| Sys Eng F414/F404 Engine Program | WR | NAWCAD : Patuxent River, MD | 53.684 | 4.000 | Oct 2018 | 4.000 | Oct 2019 | 4.110 | Oct 2020 | - | | 4.110 | Continuing | Continuing | Continuing |
| Sys Eng F414/F404 Engine Program | SS/CPFF | General Electric : Lynn, MA | 177.116 | 15.508 | Jan 2019 | 15.500 | Jan 2020 | 17.000 | Jan 2021 | - | | 17.000 | 0.000 | 225.124 | 225.124 |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sys Eng F414/F404 Engine Program | WR | FRC-SE : Jacksonville, FL | 1.223 | 0.250 | Nov 2018 | 0.250 | Nov 2019 | 0.250 | Nov 2020 | - | | 0.250 | Continuing | Continuing | Continuing |
| Sys Eng F405 Engine Program | WR | NAWCAD : Patuxent River, MD | 13.435 | 1.400 | Oct 2018 | 1.400 | Oct 2019 | 1.500 | Oct 2020 | - | | 1.500 | Continuing | Continuing | Continuing |
| Sys Eng F405 Engine Program | SS/CPFF | Rolls Royce : Bristol, England, UK | 38.933 | 1.046 | Jan 2019 | 1.050 | Jan 2020 | 1.100 | Jan 2021 | - | | 1.100 | 0.000 | 42.129 | 42.129 |
| Sys Eng V-22 Propulsion Program | WR | NAWCAD : Patuxent River, MD | 2.638 | 1.100 | Oct 2018 | 2.000 | Oct 2019 | 2.100 | Oct 2020 | - | | 2.100 | Continuing | Continuing | Continuing |
| Sys Eng V-22 Propulsion Program | SS/FFP | Bell- Boeing : Ft. Worth, TX | 9.044 | 2.100 | Jan 2019 | 2.100 | Jan 2020 | 2.100 | Jan 2021 | - | | 2.100 | 0.000 | 15.344 | 15.344 |
| Sys Eng V-22 Propulsion Program | SS/CPFF | Rolls Royce : Indianapolis, IN | 5.085 | 2.000 | Jan 2019 | 2.000 | Jan 2020 | 2.200 | Jan 2021 | - | | 2.200 | 0.000 | 11.285 | 11.285 |
| Sys Eng Adversary J85 Engine Program | WR | FRC-SE : Jacksonville, FL | 0.083 | 0.100 | Nov 2018 | 0.100 | Nov 2019 | 0.100 | Nov 2020 | - | | 0.100 | Continuing | Continuing | Continuing |
| Sys Eng Adversary J85 Engine Program | WR | NAWCAD : Patuxent River, MD | 5.060 | 1.500 | Oct 2018 | 1.500 | Oct 2019 | 1.600 | Oct 2020 | - | | 1.600 | Continuing | Continuing | Continuing |
| Sys Eng Adversary J85 Engine Program | SS/CPFF | General Electric : Lynn, MA | 3.656 | 0.600 | Jan 2019 | 0.640 | Jan 2020 | 0.650 | Jan 2021 | - | | 0.650 | 0.000 | 5.546 | 5.546 |
| Sys Eng JSF Engine Program | WR | NAWCAD : Patuxent River, MD | 7.977 | 1.283 | Oct 2018 | 1.300 | Oct 2019 | 1.400 | Oct 2020 | - | | 1.400 | Continuing | Continuing | Continuing |
| Sys Eng JSF Engine Program | SS/FFP | UTC Pratt & Whitney : East Hartford, CT | 77.666 | 29.251 | Jan 2019 | 23.224 | Jan 2020 | 32.265 | Jan 2021 | - | | 32.265 | 0.000 | 162.406 | 162.641 |
| Sys Eng P-8A Engine Program | WR | NAWCAD : Patuxent River, MD | 2.300 | 0.600 | Oct 2018 | 0.600 | Oct 2019 | 0.650 | Oct 2020 | - | | 0.650 | Continuing | Continuing | Continuing |
| Sys Eng Lab Fld Activity-1.0 or more | WR | NAWCAD : Patuxent River, MD | 221.259 | 4.689 | Oct 2018 | 4.748 | Oct 2019 | 5.000 | Oct 2020 | - | | 5.000 | Continuing | Continuing | Continuing |
| Sys Eng Other In-House Spt | Various | Various : Various | 20.827 | 0.220 | Nov 2018 | 0.250 | Nov 2019 | 0.550 | Nov 2020 | - | | 0.550 | Continuing | Continuing | Continuing |
| GFE* | Reqn | DES/DLA : Various | 13.894 | 1.500 | Jan 2019 | 1.600 | Jan 2020 | 1.700 | Jan 2021 | - | | 1.700 | Continuing | Continuing | Continuing |
| Sys Eng H-53K Propulsion | WR | NAWCAD : Patuxent River, MD | 0.000 | 1.700 | Oct 2018 | 1.850 | Oct 2019 | 2.000 | Oct 2020 | - | | 2.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sys Eng H-53K Propulsion | SS/CPFF | General Electric : Lynn, MA | 0.000 | 6.000 | Jan 2019 | 6.000 | Jan 2020 | 7.000 | Jan 2021 | - | | 7.000 | 0.000 | 19.000 | 19.000 |
| MQ-4C | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.400 | Oct 2019 | 0.500 | Oct 2020 | - | | 0.500 | Continuing | Continuing | Continuing |
| MQ-4C | SS/CPFF | Rolls Royce : Indianapolis, IN | 0.000 | 0.000 | | 1.000 | Mar 2020 | 1.000 | Mar 2021 | - | | 1.000 | 0.000 | 2.000 | 2.000 |
| Sys Eng UAV Engine Program | SS/FFP | Bell-Boeing : Bingen, WA | 0.000 | 0.000 | | 0.400 | Mar 2020 | 0.500 | Mar 2021 | - | | 0.500 | 0.000 | 0.900 | 0.900 |
| Sys Eng UAV Engine Program | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.250 | Oct 2019 | 0.300 | Oct 2020 | - | | 0.300 | Continuing | Continuing | Continuing |
| Prior Year Prod Dev costs no longer funded in the FYDP | Various | Various : Various | 131.162 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 131.162 | - |
| | | **Subtotal** | 1,218.947 | 101.677 | | 98.812 | | 115.176 | | - | | 115.176 | Continuing | Continuing | N/A |

**Remarks**

GFE includes expected cost of fuel necessary to support engine development and qualification testing.
Total may be off due to rounding.
All prior year lines have been consolidated.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | Various | Various : Various | 8.300 | 0.100 | Oct 2018 | 0.100 | Oct 2019 | 0.100 | Oct 2020 | - | | 0.100 | Continuing | Continuing | Continuing |
| Development Support | WR | NSWC : Crane, IN | 0.260 | 0.200 | Oct 2018 | 0.200 | Oct 2019 | 0.100 | Oct 2020 | - | | 0.100 | Continuing | Continuing | Continuing |
| Prior Year Development Supt cost no longer | Various | Various : Various | 1.278 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.278 | - |
| | | **Subtotal** | 9.838 | 0.300 | | 0.300 | | 0.200 | | - | | 0.200 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | Various | Various : Various | 3.442 | 0.100 | Oct 2018 | 0.100 | Oct 2019 | 0.200 | Oct 2020 | - | | 0.200 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | WR | NSWC : Crane, IN | 0.548 | 0.100 | Oct 2018 | 0.100 | Oct 2019 | 0.100 | Oct 2020 | - | | 0.100 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.990 | 0.200 | | 0.200 | | 0.300 | | - | | 0.300 | Continuing | Continuing | N/A |

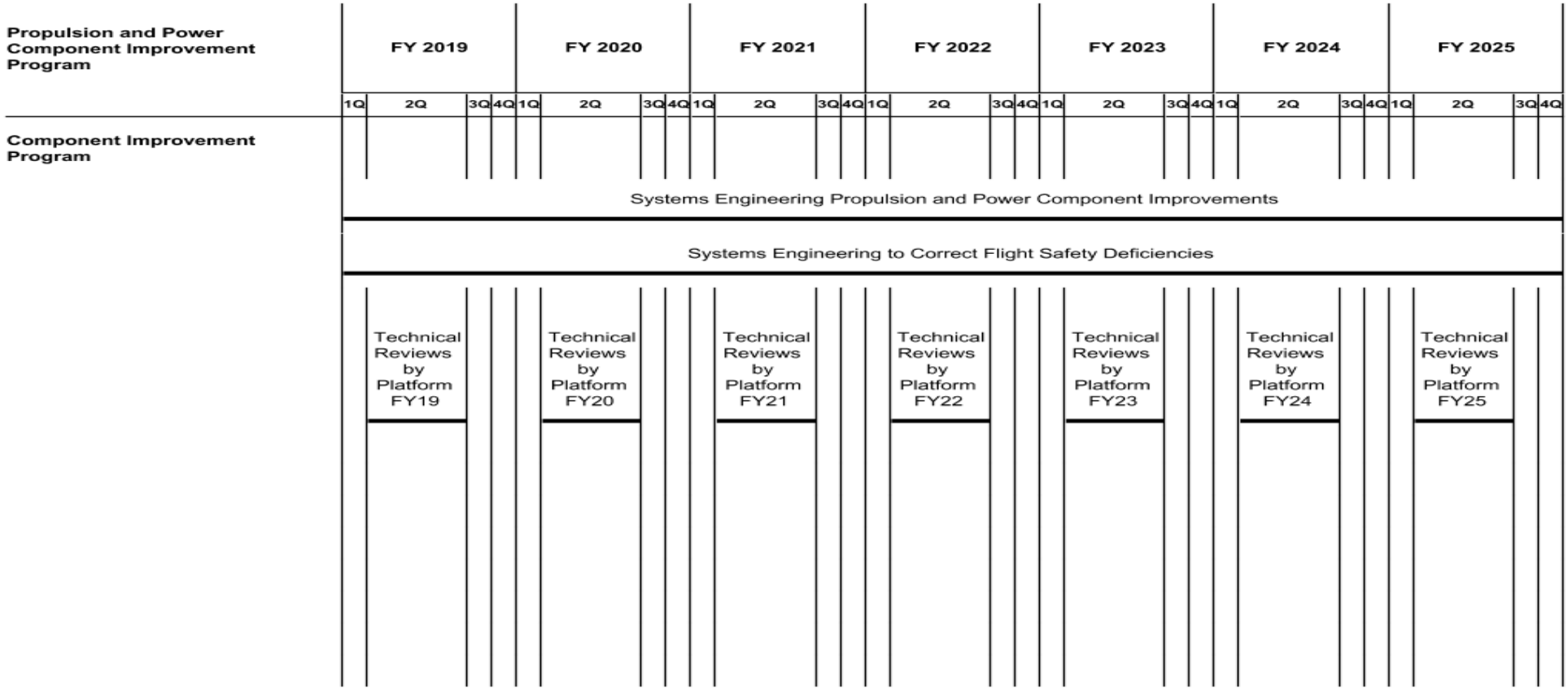
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Various | NAVAIR : Patuxent River, MD | 0.832 | 0.054 | Oct 2018 | 0.060 | Oct 2019 | 0.075 | Oct 2020 | - | | 0.075 | Continuing | Continuing | Continuing |
| Prior Year Mgmt cost no longer funded in the FYDP | Various | Various : Various | 1.447 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.447 | - |
| | | **Subtotal** | 2.279 | 0.054 | | 0.060 | | 0.075 | | - | | 0.075 | Continuing | Continuing | N/A |

| | Prior Years | FY 2019 | | FY 2020 | | FY 2021 Base | | FY 2021 OCO | | FY 2021 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,235.054 | 102.231 | | 99.372 | | 115.751 | | - | | 115.751 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |




*2021PB - 0205633N - 1355*

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>1355 / *Propulsion and Power Component Improvement Program* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Propulsion and Power Component Improvement Program*** | | | | |
| Component Improvement Program: Engine Improvements | 1 | 2019 | 4 | 2025 |
| Component Improvement Program: Power & Propulsion | 1 | 2019 | 4 | 2025 |
| Component Improvement Program: Technical Reviews by Platform FY19 | 2 | 2019 | 2 | 2019 |
| Component Improvement Program: Technical Reviews by Platform FY20 | 2 | 2020 | 2 | 2020 |
| Component Improvement Program: Technical Reviews by Platform FY21 | 2 | 2021 | 2 | 2021 |
| Component Improvement Program: Technical Reviews by Platform FY22 | 2 | 2022 | 2 | 2022 |
| Component Improvement Program: Technical Reviews by Platform FY23 | 2 | 2023 | 2 | 2023 |
| Component Improvement Program: Technical Reviews by Platform FY24 | 2 | 2024 | 2 | 2024 |
| Component Improvement Program: Technical Reviews by Platform FY25 | 2 | 2025 | 2 | 2025 |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>2269 / *Expeditionary Airfield Improvements* | |

| COST ($ in Millions) | Prior Years | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2269: *Expeditionary Airfield Improvements* | 68.719 | 1.605 | 2.068 | 0.357 | - | 0.357 | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 73.249 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

The Expeditionary Airfields (EAF) program designs, develops and tests a Sustainment Lighting System (SLS); specifically the LED CAT I Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Light System and a Night Vision Device (NVD) Compatible Runway Light System, to replace the obsolete legacy EAF lighting system. This system will support EAF Marine Aircraft Wing Support Squadrons with the required EAF Approach Light System equipment to install Forward Operating Bases and Forward Arming and Refueling Points. With the deployment of this equipment, the Marine Aircraft Wing Support Squadrons can support all United States Marine Corps (USMC) aircraft allowing the Combatant Commanders the flexibility to deploy Aircraft Combat Elements to meet anticipated threats.

Design maturity with the Lead System Integrator (LSI) for the Sustainment Lighting System (SLS) program was re-scoped in FY19 and out to focus on the development of a new Light Emitting Diode (LED) CAT I Visual Flight Rules (VFR) Approach Light System and a Night Vision Device (NVD) Compatible Runway Light System. The schedule has been updated to remove the previous SLS schedule and to add two new schedules for the LED CAT I VFR and the NVD Compatibility Runway Light System.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| ***Title:*** Expeditionary Airfield Improvements | 1.605 | 2.068 | 0.357 | 0.000 | 0.357 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The EAF program designs, develops and tests a Sustainment Lighting System (SLS); specifically the LED CAT I Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Light System and a Night Vision Device (NVD) Compatible Runway Light System, to replace the obsolete legacy EAF lighting system. This system This system will provide EAF Marine Aircraft Wing Support Squadrons with the required EAF equipment to install Forward Operating Bases and Forward Arming and Refueling Points. With the deployment of this equipment the Marine Aircraft Wing Support Squadron can support all USMC aircraft allowing the Combatant Commanders the flexibility to deploy Aircraft Combat Elements to meet anticipated threats. This system will provide EAF Marine Aircraft Wing support Squadrons. | | | | | |
| ***FY 2020 Plans:***<br>Continue systems engineering efforts in support of the Sustainment Lighting System (SLS). Complete Integration/Operational Testing, conduct a Production Readiness Review (PRR), and complete Milestone C for the SLS - LED CAT I Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Light System. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>2269 / *Expeditionary Airfield Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total |
|---|---|---|---|---|---|
| Conduct a Critical Design Review (CDR) and Test Readiness Review (TRR) and begin Developmental Testing (DT) for the Night Vision Device (NVD) Compatible Runway Light System.<br>***FY 2021 Base Plans:***<br>Complete systems engineering efforts in support of the Sustainment Lighting System (SLS). Complete Developmental Testing (DT) and Integration/Operation Testing and conduct a Production Readiness Review (PRR) for the Night Vision Device (NVD) Compatible Runway Light System.<br>***FY 2021 OCO Plans:***<br>N/A<br>***FY 2020 to FY 2021 Increase/Decrease Statement:***<br>The decrease from FY 2020 to FY 2021 is to complete the development of the Sustainment Lighting System (SLS); specifically the LED CAT I Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Light System and Night Vision Device (NVD) Compatible Runway Light System. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.605 | 2.068 | 0.357 | 0.000 | 0.357 |

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

| Line Item | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4213: *ASE-Expeditionary Airfields* | 105.693 | 187.926 | 187.758 | 60.217 | 247.975 | 214.070 | 334.429 | 184.828 | 145.928 | Continuing | Continuing |

**Remarks**

EAF is a portion of the 4213 budget.

**D. Acquisition Strategy**

Expeditionary Airfields (EAF) Sustainment Lighting System was initially an ACAT III program. As a result of the re-scope it has been re-designated as an ACAT IV M program in January 2018. The program is focused on a combination of a required capability to conduct operations in an expeditionary environment and the industrial base for airfield lighting.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>2269 / *Expeditionary Airfield Improvements* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWCAD : Lakehurst, NJ | 33.541 | 0.497 | Jan 2019 | 1.372 | Nov 2019 | 0.209 | Nov 2020 | - | | 0.209 | 0.375 | 35.994 | - |
| Prior year Prod Dev no longer funded in the FYDP | Various | Various : Various | 22.016 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 22.016 | - |
| | | **Subtotal** | 55.557 | 0.497 | | 1.372 | | 0.209 | | - | | 0.209 | 0.375 | 58.010 | N/A |

**Remarks**

The decrease from FY2020 to FY2021 is to complete the Systems Engineering that supports the Sustainment Lighting System (SLS) efforts.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics | WR | NAWCAD : Lakehurst, NJ | 3.215 | 0.297 | Jan 2019 | 0.447 | Nov 2019 | 0.052 | Nov 2020 | - | | 0.052 | 0.040 | 4.051 | - |
| Prior Year Support no longer funded in the FYDP | Various | Various : Various | 3.637 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.637 | - |
| | | **Subtotal** | 6.852 | 0.297 | | 0.447 | | 0.052 | | - | | 0.052 | 0.040 | 7.688 | N/A |

**Remarks**

The decrease from FY2020 to FY2021 is to complete the Logistics efforts that support the Sustainment Lighting System (SLS) efforts.

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | NAWCAD : Lakehurst, NJ | 4.476 | 0.562 | Jan 2019 | 0.161 | Nov 2019 | 0.085 | Nov 2020 | - | | 0.085 | 0.085 | 5.369 | - |
| Opeval Test Support | WR | COMOPTEVFOR : Norfolk, VA | 0.239 | 0.166 | Apr 2019 | 0.046 | Nov 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.451 | - |
| | | **Subtotal** | 4.715 | 0.728 | | 0.207 | | 0.085 | | - | | 0.085 | 0.085 | 5.820 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>2269 / *Expeditionary Airfield Improvements* | |

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

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

The decrease from FY2020 to FY2021 is to complete the test and evaluation that supports the Sustainment Lighting System (SLS).

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Support Services | C/CPFF | Various : Various | 1.595 | 0.083 | Dec 2018 | 0.042 | Dec 2019 | 0.011 | Nov 2020 | - | | 0.011 | 0.000 | 1.731 | 1.737 |
| | | **Subtotal** | 1.595 | 0.083 | | 0.042 | | 0.011 | | - | | 0.011 | 0.000 | 1.731 | N/A |

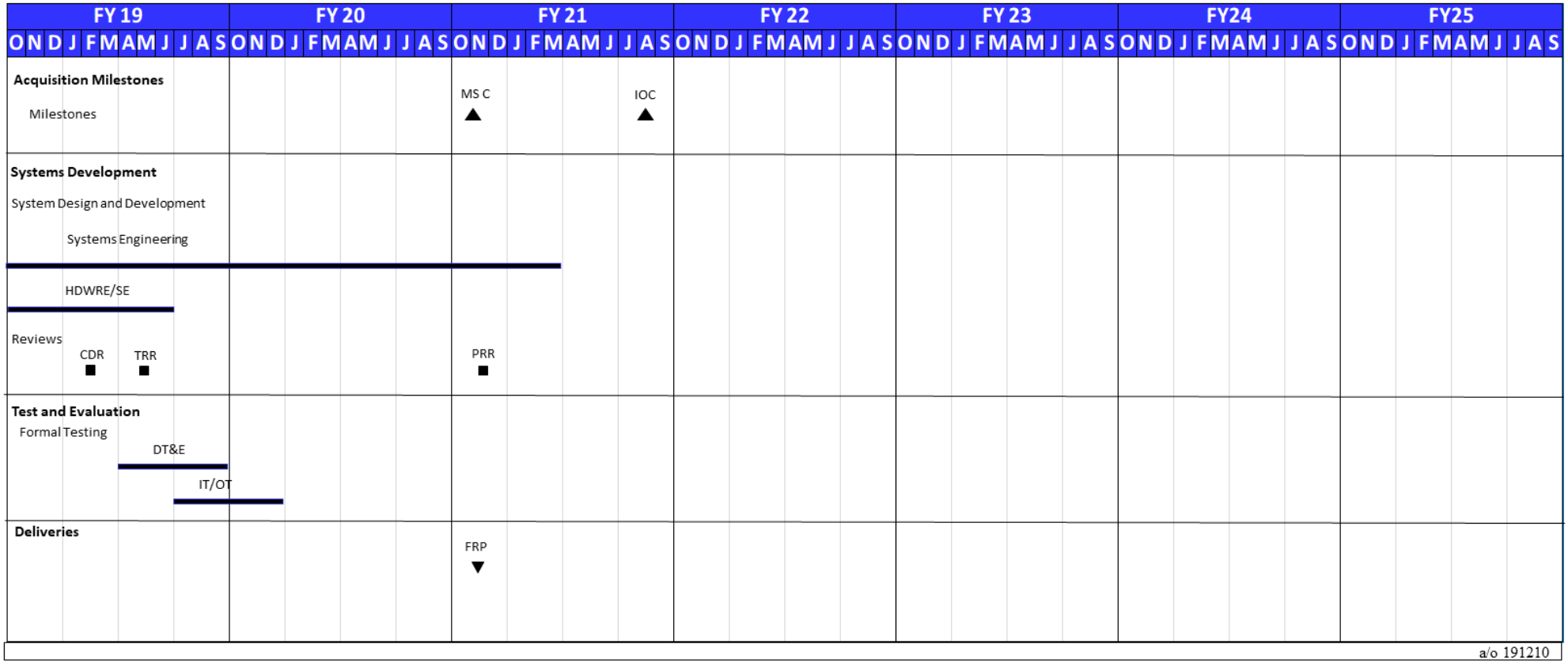
| | Prior Years | FY 2019 | | FY 2020 | | FY 2021 Base | | FY 2021 OCO | | FY 2021 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 68.719 | 1.605 | | 2.068 | | 0.357 | | - | | 0.357 | 0.500 | 73.249 | N/A |

**Remarks**

Prior Year includes $4.9 million of Congressional Add funding.

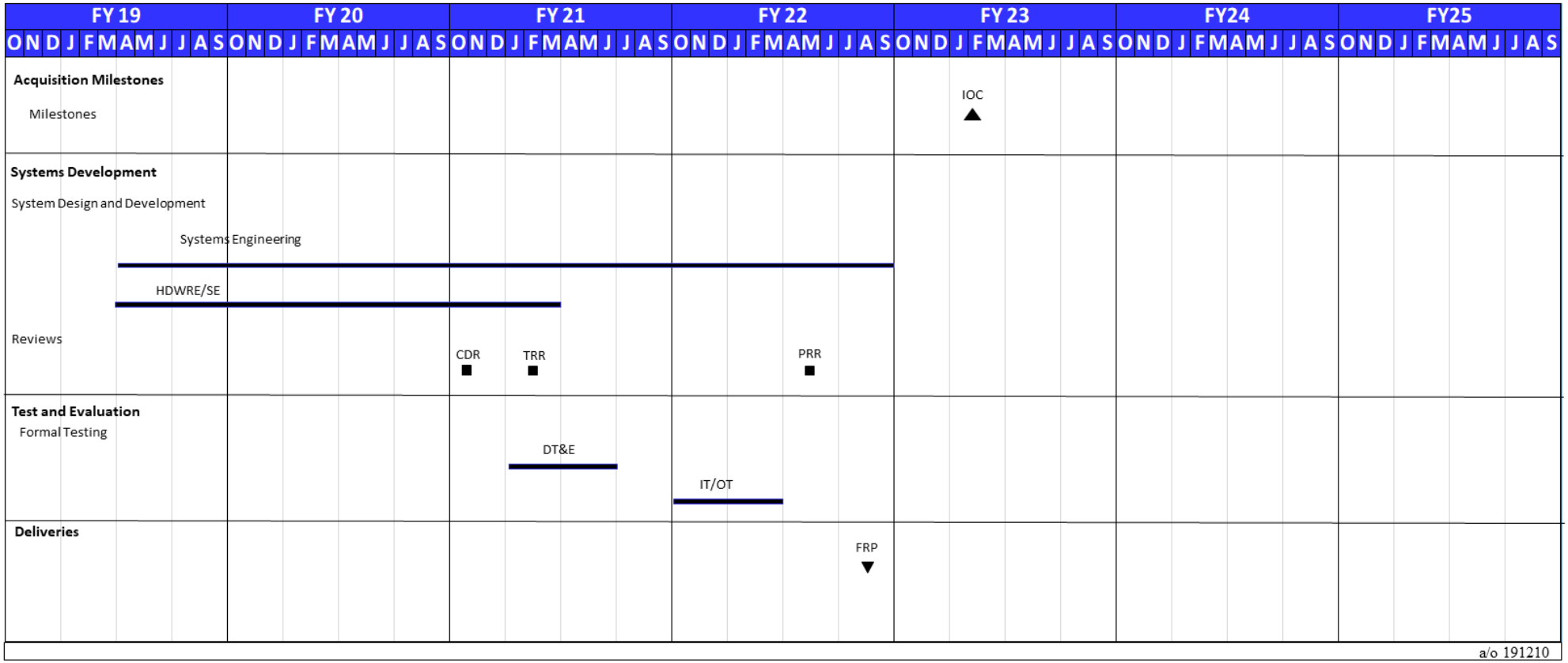
| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>2269 / *Expeditionary Airfield Improvements* |

# LED CAT I Instrumented Flight Rules (IFR)/ Visual Flight Rules (VFR) Approach Light System



| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>2269 / *Expeditionary Airfield Improvements* |

# Night Vision Device (NVD) Compatible Runway Light System



| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>2269 / *Expeditionary Airfield Improvements* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***LED CAT I Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Light System*** | | | | |
| Acquisition Milestones: Milestones: Milestone C | 1 | 2021 | 1 | 2021 |
| Acquisition Milestones: Milestones: IOC | 4 | 2021 | 4 | 2021 |
| Systems Development: System Design and Development: Systems Engineering | 1 | 2019 | 2 | 2021 |
| Systems Development: System Design and Development: Hardware/Software Development | 1 | 2019 | 3 | 2019 |
| Systems Development: Reviews: Critical Design Review | 2 | 2019 | 2 | 2019 |
| Systems Development: Reviews: Test Readiness Review | 3 | 2019 | 3 | 2019 |
| Systems Development: Reviews: Production Readiness Review | 1 | 2021 | 1 | 2021 |
| Test and Evaluation: Formal Testing: Tech Eval/Dev T&E | 3 | 2019 | 4 | 2019 |
| Test and Evaluation: Formal Testing: IntegrationTesting/Operational Testing | 4 | 2019 | 1 | 2020 |
| Deliveries: Delivery: Lot 1 | 1 | 2021 | 1 | 2021 |
| ***Night Vision Device (NVD) Compatible Runway Light System*** | | | | |
| Acquisition Milestones: Milestones: IOC | 2 | 2023 | 2 | 2023 |
| Systems Development: System Design and Development: Systems Engineering | 3 | 2019 | 4 | 2022 |
| Systems Development: System Design and Development: Hardware/Software Development | 3 | 2019 | 2 | 2021 |
| Reviews: Critical Design Review | 1 | 2021 | 1 | 2021 |
| Reviews: Test Readiness Review | 2 | 2021 | 2 | 2021 |
| Reviews: Production Readiness Review | 3 | 2022 | 3 | 2022 |
| Test and Evaluation: Formal Testing: Tech Eval/Dev T&E | 2 | 2021 | 3 | 2021 |
| Test and Evaluation: Formal Testing: IntegrationTesting/Operational Testing | 1 | 2022 | 2 | 2022 |
| Deliveries: Delivery: Lot 1 | 4 | 2022 | 4 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 4.828 | 14.480 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 19.308 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

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

Funding will support F/A-18 E/F and E/A-18G Engine Enhancements, Technology Maturation and Risk Reduction planning and analysis.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2019 | FY 2020 |
|---|---|---|
| ***Congressional Add:*** F/A-18 E/F and E/A-18G Engine Enhancements | 14.480 | 0.000 |
| ***FY 2019 Accomplishments:*** Funding will support F/A-18 E/F and E/A-18G Engine Enhancements, Technology Maturation and Risk Reduction planning and analysis. | | |
| ***FY 2020 Plans:*** N/A | | |
| **Congressional Adds Subtotals** | 14.480 | 0.000 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Not required for congressional adds

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy | | | Date: February 2020 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 7 | R-1 Program Element (Number/Name)<br>PE 0205633N / *Aviation Improvements* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | C/CPFF | General Electric : Various | 0.000 | 11.725 | Feb 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.725 | 11.725 |
| | | **Subtotal** | 0.000 | 11.725 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.725 | N/A |

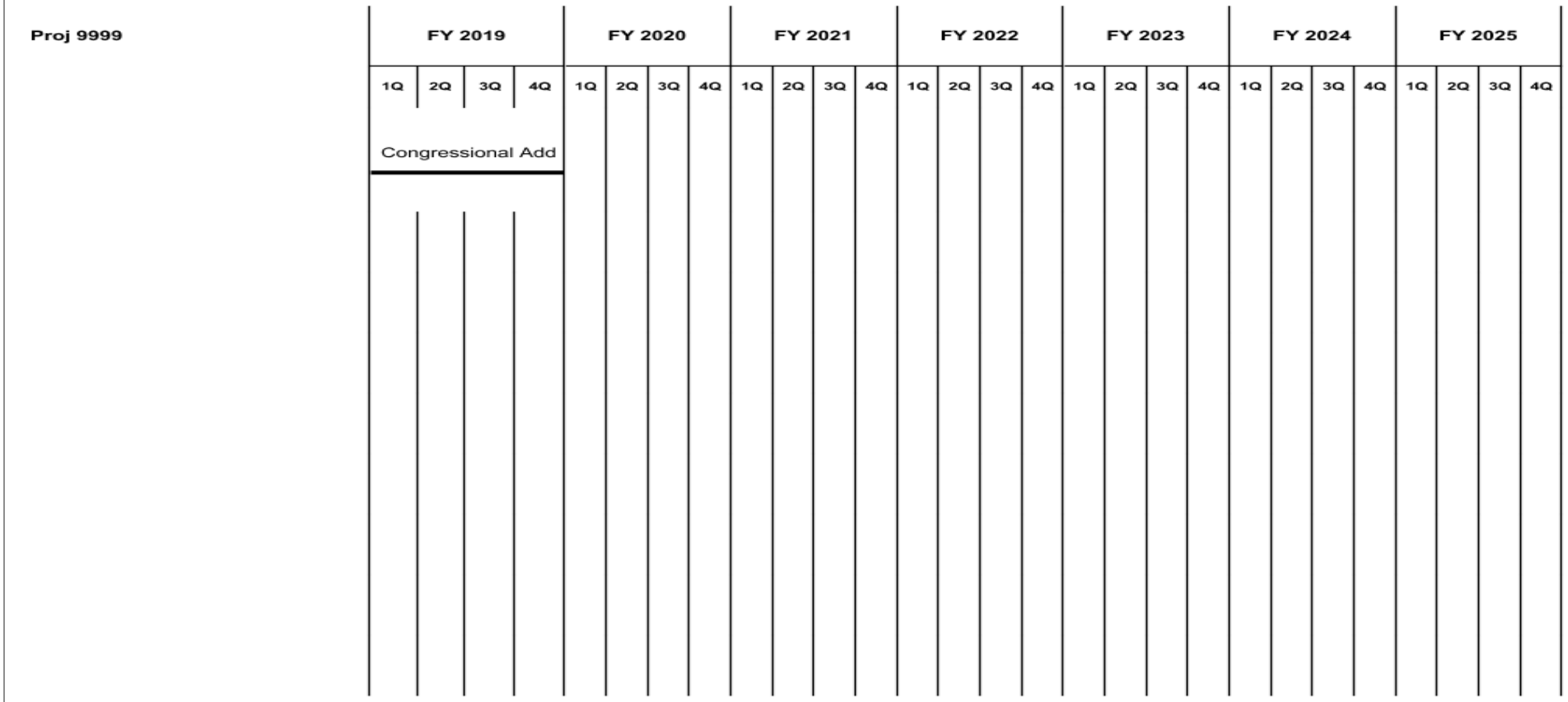
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2019 Cost | FY 2019 Award Date | FY 2020 Cost | FY 2020 Award Date | FY 2021 Base Cost | FY 2021 Base Award Date | FY 2021 OCO Cost | FY 2021 OCO Award Date | FY 2021 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support | WR | NAWCAD : Patuxent River, MD | 4.828 | 2.755 | Dec 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.583 | - |
| | | **Subtotal** | 4.828 | 2.755 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.583 | N/A |

| | Prior Years | FY 2019 | | FY 2020 | | FY 2021 Base | | FY 2021 OCO | | FY 2021 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 4.828 | 14.480 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 19.308 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2021PB - 0205633N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy | | Date: February 2020 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 7 | **R-1 Program Element (Number/Name)**<br>PE 0205633N / *Aviation Improvements* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Congressional Add | 1 | 2019 | 4 | 2019 |