| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | - | 30.812 | 32.253 | 29.164 | - | 29.164 | 7.673 | 6.955 | 5.472 | 7.209 | Continuing | Continuing |
| C97: *ACFT Avionics* | - | 20.112 | 16.727 | 11.187 | - | 11.187 | 4.824 | 3.470 | 2.228 | 1.264 | Continuing | Continuing |
| EW7: *Degraded Visual Environment* | - | 7.941 | 14.724 | 17.161 | - | 17.161 | 2.012 | 2.557 | 2.210 | 4.699 | 0.000 | 51.304 |
| VU3: *Networking And Mission Planning* | - | 2.759 | 0.802 | 0.816 | - | 0.816 | 0.837 | 0.928 | 1.034 | 1.246 | 0.000 | 8.422 |

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

The Fiscal Year FY 2020 budget estimate request funds the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Program Element support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The Doppler Global Positioning System Navigation Set (DGNS) Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as an inertial sensor interface card and Instrument Flight Rules map display. It also prepares Engineering Change Proposals (ECP) to the existing DGNS Line Replaceable Units (LRU) as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for Computer Display Unit (CDU) and Signal Data Converter LRU ECP packages. The DGNS CDU upgrade replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability and optimizes pilot interface to augment existing Instrument Flight Rules capability promoting safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (A-PNT) operations in conjunction with additional system LRU upgrades, includes anti-jam antenna capabilities, and supports Department of Defense (DoD) and Army's requirement to maintain A-PNT throughout operations. This will require assessment and follow-on upgrade to the DGNS navigation system. The CDU upgrade will perform an assessment of A-PNT assurance levels to understand system performance and associated PNT capability gaps, and will evaluate candidate solutions to cover any identified gaps.

The Enhanced Aviation GATM Localizer Performance with Vertical Guidance (LPV) Embedded GPS Inertial (EGI) Navigation System (EAGLE) A-PNT integration program assesses current capabilities in identified operational PNT environment levels, tests identified upgrades to existing EGI hardware in order to accommodate A-PNT in identified operational environments, and incorporates M-Code. It supports DoD and Army's requirement to maintain A-PNT throughout operations and requires assessment and follow-on upgrade to the EGI navigation system. The EAGLE upgrade will perform an assessment of A-PNT assurance levels to understand system performance, associated PNT capability gaps, integrate anti-jam antenna capabilities, and evaluate candidate solutions to cover any identified gaps.

The Degraded Visual Environments (DVE) program portfolio includes DVE Army Directed Requirement (DR) and Environment Exploitation System (EES).

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604201A *I Aircraft Avionics* |

The DVE DR is to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities. The DVE DR system provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions. The program will complete development and test efforts in support of the DVE DR in FY 2019.

The EES program focuses on development and maturation of active and passive sensors, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies to enable current and future fleet capabilities and innovative technical solutions for the current Army aviation fleet to safely operate in DVE. EES will equip Combat Aviation Brigades with evolving modular DVE solutions creating revolutionary tactical advantages while increasing survivability.

The DVE Increment I Capability Development Document outlining the DVE requirement for the UH-60 and CH-47 to takeoff, land and perform ground taxi operations in brownout conditions was removed from Army staffing in February 2018.

The Aviation Data Exploitation Capability (ADEC) is an Army aviation automated information system program providing specific capabilities needed at the aviation unit level to implement and support improvements within aviation operations, safety, and training to increase operational effectiveness and situational awareness at all command echelons. ADEC provides a common and interoperable capability required to implement the DoD mandated Military Flight Operations Quality Assurance processes. ADEC will standardize flight scheduling/management, risk management, mission approval, and flight data analysis and visualization. ADEC provides interfaces to Centralized Aviation Flight Records System (CAFRS) to reduce data entry and the information technology footprint while enabling disconnected and split based operations.

The Improved Data Modem (IDM) is the common solution for digitizing Army Aviation and is fielded on every modernized, rotary-wing Army aircraft, including the CH-47 Chinook, AH-64 Apache and UH-60 Black Hawk. The IDM-401 provides the Army rotary-wing fleet with critical communication capabilities, performing as an internet controller and gateway to the Tactical Internet (TI) and Fire Support (FS) internet. The IDM enables connectivity to multiple radios used by rotary-wing aircraft and the Blue Force Tracker transceiver, as well as providing the means for rapid data transfer. The Multi-Core Processor (MCP)-501 modification effort will be a technology replacement for the current Army IDM-401. The MCP-501 will satisfy Army requirements for hardware, software, and firmware and be able to satisfy cybersecurity requirements. The MCP-501 will replace the current IDM-401 with a common server capability to support current and additional IDM-401 functionality that are common among multiple Army Aviation platforms and become a core component of the Digital Backbone for Army rotary wing aircraft.

The  Aviation Mission Planning System (AMPS) is a decision support and battle synchronization system for automated mission planning, risk assessment, and transfer of mission data to aviation platforms in support of Mission Command functions within an Aviation unit. This includes route generation, performance planning, communications planning, terrain analysis, data transfer, and mission rehearsal. It also provides connectivity to Army Mission Command Systems. The AMPS efforts support the advancement of Army Aviation Mission Planning from the legacy Hardware/Software solution to a mobile, Future Airborne Capability Environment/Open Architecture conformant, hardware agnostic system. These efforts will include development and testing of a new underlying architecture to support the move of Army Aviation Mission Planning from the current structure to one that supports synchronization both vertically and horizontally between Aviation and Ground forces. It will allow for a modular, multipronged approach to meet the needs of the various planning and execution environments and allow aircrews to continually plan and update route, threat and performance data throughout all phases of an Aviation mission.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604201A *I Aircraft Avionics* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 30.153 | 32.293 | 25.582 | - | 25.582 |
| Current President's Budget | 30.812 | 32.253 | 29.164 | - | 29.164 |
| Total Adjustments | 0.659 | -0.040 | 3.582 | - | 3.582 |
| • Congressional General Reductions | -0.023 | -0.040 | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 1.800 | - | | | |
| • SBIR/STTR Transfer | -1.118 | - | | | |
| • Adjustments to Budget Years | - | - | 3.582 | - | 3.582 |

**Change Summary Explanation**

FY 2020 reflects an increase to support capabilities associated with Assured - Position, Navigation, and Timing (A-PNT).

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | Project (Number/Name)<br>C97 / *ACFT Avionics* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C97: *ACFT Avionics* | - | 20.112 | 16.727 | 11.187 | - | 11.187 | 4.824 | 3.470 | 2.228 | 1.264 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

The Fiscal Year FY 2020 budget request funds the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Project support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The Doppler Global Positioning System Navigation Set (DGNS) Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as an inertial sensor interface card and Instrument Flight Rules map display. It also prepares Engineering Change Proposals (ECP) to the existing DGNS Line Replaceable Units (LRU) as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for Computer Display Unit (CDU) and Signal Data Converter LRU ECP packages. The DGNS CDU upgrade replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability and optimizes pilot interface to augment existing Instrument Flight Rules capability promoting safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (A-PNT) operations in conjunction with additional system LRU upgrades, includes anti-jam antenna capabilities, and supports Department of Defense (DoD) and Army's requirement to maintain A-PNT throughout operations. This will require assessment and follow-on upgrade to the DGNS navigation system. The CDU upgrade will perform an assessment of A-PNT assurance levels to understand system performance and associated PNT capability gaps, and will evaluate candidate solutions to cover any identified gaps.

The Enhanced Aviation GATM Localizer Performance with Vertical Guidance (LPV) Embedded Global Positioning System (GPS) Inertial (EGI) Navigation System (EAGLE) A-PNT integration program assesses current capabilities in identified operational PNT environment levels, tests identified upgrades to existing EGI hardware in order to accommodate A-PNT in identified operational environments, and incorporates M-Code. It supports DoD and Army's requirement to maintain A-PNT throughout operations and requires assessment and follow-on upgrade to the EGI navigation system. The EAGLE upgrade will perform an assessment of A-PNT assurance levels to understand system performance, associated PNT capability gaps, integrate anti-jam antenna capabilities, and evaluate candidate solutions to cover any identified gaps.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** DGNS / A-PNT Assessment | 7.068 | 1.837 | 1.360 | - | 1.360 |
| ***Description:*** The DGNS Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as inertial sensor interface card and Instrument Flight Rules (IFR) map display. It also prepares ECPs to the existing DGNS LRU as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for CDU and Signal Data Converter LRU ECP packages. The DGNS CDU Upgrade replaces the current CDU | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>C97 / *ACFT Avionics* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| faceplate with a touch screen display, provides a moving navigation map capability and optimized pilot interface to augment existing IFR capability and promote safer flight operations. It also enables CDU support for A-PNT operations in conjunction with additional system LRU upgrades, including anti-jam antenna capabilities.<br><br>***FY 2019 Plans:***<br>Complete software modifications to legacy GPS receiver cards to include RSAM and complete GPS anti-jam antenna development and integration.<br><br>***FY 2020 Base Plans:***<br>Complete Airworthiness Qualification of RSAM software modifications and complete Airworthiness Qualification of the Multiplatform Anti-jam GPS Navigation Antenna.<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decreases in FY 2020 over funding levels in FY 2019 are attributed to the completion of engineering work and materials procurement in FY 2019 and only system test, qualification, and CDRL closeout taking place in FY 2020. | | | | | |
| ***Title:*** EAGLE Navigation System A-PNT Integration<br><br>***Description:*** The EAGLE Navigation System A-PNT integration program assesses current capabilities in identified operational PNT environment levels and tests identified upgrades to existing EGI hardware to accommodate A-PNT in identified operational environments.<br><br>***FY 2019 Plans:***<br>Complete software modifications to legacy GPS receiver cards, continue M-Code integration into the EAGLE, and complete the development and integration of a GPS anti-jam antenna.<br><br>***FY 2020 Base Plans:***<br>Complete M-Code integration into the EAGLE system, begin final EAGLE-M airworthiness qualification testing, and begin final RSAM integration onto legacy GPS receivers.<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increases in FY 2020 over funding levels in FY 2019 are attributed to the initiation of final RSAM integration onto legacy EGI GPS receivers. | 13.044 | 14.277 | 9.827 | - | 9.827 |
| ***Title:*** FY2019 SBIR STTR Transfer<br><br>***Description:*** FY 2019 SBIR STTR Transfer | - | 0.613 | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>C97 / *ACFT Avionics* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>FY 2019 SBIR STTR Transfer<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 SBIR STTR Transfer | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 20.112 | 16.727 | 11.187 | - | 11.187 |

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

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • AA0723: *Comms, Nav Surveillance* | 162.639 | 156.969 | 164.315 | - | 164.315 | 138.817 | 94.588 | 149.306 | 116.084 | Continuing | Continuing |
| • AA0704: *GATM - Rotary Wing Aircraft* | 37.403 | 26.848 | 30.966 | - | 30.966 | 30.008 | 19.864 | 17.675 | 14.998 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

This project is comprised of multiple systems supporting aircraft avionics. While the detailed acquisition strategy varies from program to program, the general strategy is for each individual program to complete the development and testing efforts in coordination with the aircraft platforms on integration issues, use the various contracts of the aircraft platforms original equipment manufacturers on integration efforts, and utilize the Aviation & Missile Research, Development, and Engineering Center for software development. This requires the use of various contract methods and types to accomplish the aircraft avionics development efforts. All required acquisition program documentation is prepared.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | Project (Number/Name)<br>C97 / *ACFT Avionics* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM Services (DGNS Upgrade/ DGNS A-PNT) | Various | PM AME/AMRDEC SED : Redstone Arsenal, AL | 0.626 | 0.272 | Oct 2017 | 0.212 | Oct 2018 | 0.047 | Oct 2019 | - | | 0.047 | 0.000 | 1.157 | - |
| PM Services (EAGLE) | Various | PM AME/AMRDEC SED : Redstone Arsenal, AL | 0.014 | 0.273 | Oct 2017 | 0.212 | Oct 2018 | 0.047 | Oct 2019 | - | | 0.047 | 0.000 | 0.546 | - |
| FY2019 SBIR STTR Transfer | TBD | HQDA : Washington D.C. | - | - | | 0.613 | Oct 2018 | - | | - | | - | 0.000 | 0.613 | - |
| | | **Subtotal** | 0.640 | 0.545 | | 1.037 | | 0.094 | | - | | 0.094 | 0.000 | 2.316 | N/A |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DGNS A-PNT Assessment and Upgrade | SS/CPFF | BAE Systems : Wayne, NJ | - | 6.621 | May 2018 | 1.100 | Jul 2019 | 1.183 | Mar 2020 | - | | 1.183 | 0.000 | 8.904 | - |
| DGNS Anti-Jam Antenna Development | SS/CPFF | Mayflower Communications, Inc. : Bedford, MA | 0.981 | 0.175 | Oct 2017 | 0.275 | Nov 2018 | - | | - | | - | 0.000 | 1.431 | - |
| EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration | SS/CPFF | Honeywell : Clearwater, FL | - | 5.649 | Sep 2018 | 10.587 | Mar 2019 | 7.042 | Oct 2019 | - | | 7.042 | 0.804 | 24.082 | - |
| EGI Anti-Jam Antenna Development | SS/CPFF | Mayflower Communications, Inc. : Bedford, MA | 0.392 | 7.122 | Oct 2017 | 3.171 | Nov 2018 | - | | - | | - | 0.000 | 10.685 | - |
| EGI/EAGLE RSAM Development | SS/CPIF | Honeywell International : Clearwater, FL | - | - | | - | | 2.388 | Dec 2019 | - | | 2.388 | Continuing | Continuing | - |
| | | **Subtotal** | 1.373 | 19.567 | | 15.133 | | 10.613 | | - | | 10.613 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | Project (Number/Name)<br>C97 / *ACFT Avionics* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DGNS RSAM Flight Test Support | Various | AMRDEC Aviation Engineering Directorate : Redstone Arsenal, AL | - | - | | 0.125 | Jun 2019 | 0.055 | Jun 2020 | - | | 0.055 | 0.000 | 0.180 | - |
| EAGLE M-Code / EGI RSAM Flight Test Support | Various | AMRDEC Aviation Engineering Directorate : Redstone Arsenal, AL | - | - | | 0.173 | Jun 2019 | 0.125 | Jun 2020 | - | | 0.125 | Continuing | Continuing | - |
| | | **Subtotal** | - | - | | 0.298 | | 0.180 | | - | | 0.180 | Continuing | Continuing | N/A |

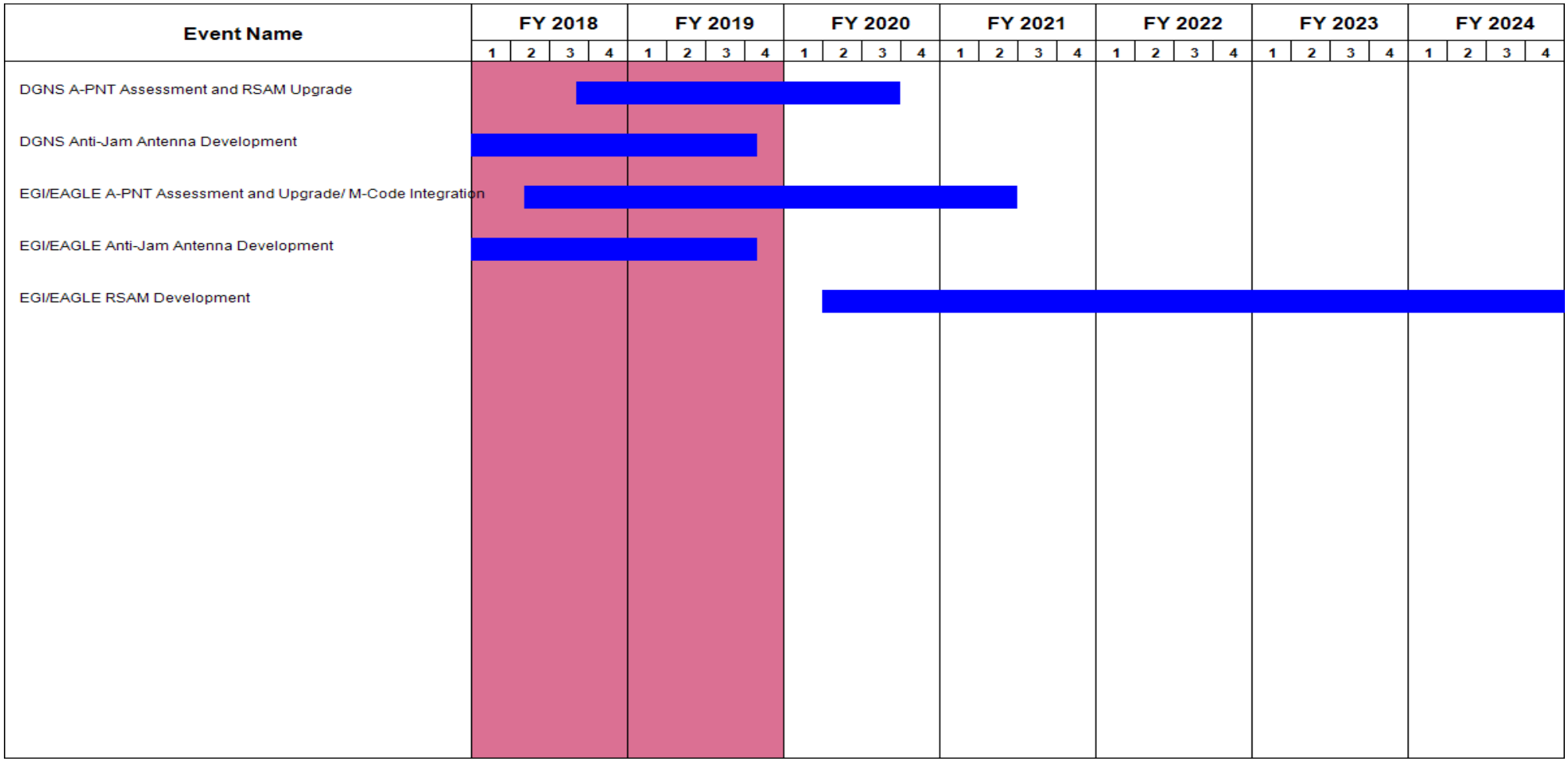
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DGNS RSAM Airworthiness Qualification Testing | RO | Redstone Test Center : Redstone Arsenal, AL | - | - | | 0.125 | Jun 2019 | 0.075 | Jun 2020 | - | | 0.075 | 0.000 | 0.200 | - |
| EAGLE M-Code / EGI RSAM Airworthiness Qualification Testing | RO | Redstone Test Center : Redstone Arsenal, AL | - | - | | 0.134 | Jun 2019 | 0.225 | Jun 2020 | - | | 0.225 | Continuing | Continuing | - |
| | | **Subtotal** | - | - | | 0.259 | | 0.300 | | - | | 0.300 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 2.013 | 20.112 | | 16.727 | | 11.187 | | - | | 11.187 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>C97 / *ACFT Avionics* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>C97 / *ACFT Avionics* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events** | **Quarter** | **Year** | **Quarter** | **Year** |
| DGNS A-PNT Assessment and RSAM Upgrade | 3 | 2018 | 3 | 2020 |
| DGNS Anti-Jam Antenna Development | 4 | 2016 | 4 | 2019 |
| EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration | 2 | 2018 | 2 | 2021 |
| EGI/EAGLE Anti-Jam Antenna Development | 4 | 2016 | 4 | 2019 |
| EGI/EAGLE RSAM Development | 2 | 2020 | 2 | 2025 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | Project (Number/Name)<br>EW7 / *Degraded Visual Environment* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EW7: *Degraded Visual Environment* | - | 7.941 | 14.724 | 17.161 | - | 17.161 | 2.012 | 2.557 | 2.210 | 4.699 | 0.000 | 51.304 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

The Fiscal Year (FY) 2020 budget request funds the development and integration of the Environment Exploitation System (EES) on Army aviation platforms to achieve a tactical advantage and increase aircrew situational awareness and survivability during adverse flight conditions.

The Degraded Visual Environments (DVE) program portfolio includes DVE Army Directed Requirement (DR) and EES.

The DVE DR is to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities. The DVE DR system provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions. The program will complete development and test efforts in support of the DVE DR in FY 2019.

The EES program focuses on development and maturation of active and passive sensors, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies to enable current and future capabilities and innovative technical solutions for the current Army aviation fleet to safely operate in DVE. EES will equip Combat Aviation Brigades with evolving modular DVE solutions creating revolutionary tactical advantages while increasing survivability.

The DVE Increment I Capability Development Document outlining the DVE requirement for the UH-60 and CH-47 to takeoff, land and perform ground taxi operations in brownout conditions was removed from Army staffing in February 2018.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Degraded Visual Environment (DVE) | 7.941 | 14.185 | 17.161 | - | 17.161 |
| ***Description:*** The Degraded Visual Environments (DVE) program portfolio includes DVE Army Directed Requirement (DR) and Environment Exploitation System (EES).<br><br>The DVE DR is to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities. The DVE DR system provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions. The program will complete development and test efforts in support of the DVE DR in FY 2019. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>EW7 / *Degraded Visual Environment* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The EES program focuses on development and maturation of active and passive sensors, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies to enable current and future capabilities and innovative technical solutions for the current Army aviation fleet to safely operate in DVE. EES will equip Combat Aviation Brigades with evolving modular DVE solutions creating revolutionary tactical advantages while increasing survivability.<br><br>The DVE Increment I Capability Development Document outlining the DVE requirement for the UH-60 and CH-47 to takeoff, land and perform ground taxi operations in brownout conditions was removed from Army staffing in February 2018.<br><br>***FY 2019 Plans:***<br>DVE DR developmental test began in June of FY 2018 and will continue through May of FY 2019.<br><br>***FY 2020 Base Plans:***<br>Develop and mature active and passive sensors, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies for aviation capabilities and innovate technical solutions for the current Army aviation fleet to safely operate in DVE. Continue system architecture development, modeling and simulation, multi-use sensor integration and demonstrations. Initiate DVE application development for aviation multicore common server, sensor characterization, and platform integration and conduct technology demonstrations.<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in funding as DVE DR development effort transitions to EES development efforts. | | | | | |
| ***Title:*** FY2019 SBIR STTR Transfer<br><br>***Description:*** FY2019 SBIR STTR Transfer<br><br>***FY 2019 Plans:***<br>FY2019 SBIR STTR Transfer<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY2019 SBIR STTR Transfer | - | 0.539 | - | - | - |
| **Accomplishments/Planned Programs Subtotals** | 7.941 | 14.724 | 17.161 | - | 17.161 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>EW7 / *Degraded Visual Environment* |

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

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • A00713: *Degraded Visual Environment* | - | 30.000 | 0.000 | 49.450 | 49.450 | 49.450 | - | - | - | 0.000 | 128.900 |

**Remarks**

**D. Acquisition Strategy**

The DVE DR acquisition strategy is to leverage an existing contract competitively awarded by the Technology Applications Program Office. Another Government Agency will perform the installation of the DVE DR system into the designated aircraft. A disposition analysis of the DVE DR will inform future DVE requirements for both current and future Army aviation platforms.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | Project (Number/Name)<br>EW7 / *Degraded Visual Environment* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM Support for DR | Various | Various : Various | - | 1.606 | Oct 2017 | 3.862 | Oct 2018 | - | | - | | - | 0.000 | 5.468 | Continuing |
| PM Support for EES | Various | Various : Various | - | - | | - | | 0.860 | Oct 2019 | - | | 0.860 | Continuing | Continuing | - |
| FY2019 SBIR STTR Transfer | TBD | HQDA : Washington D.C. | - | - | | 0.539 | Oct 2018 | - | | - | | - | 0.000 | 0.539 | - |
| | | **Subtotal** | - | 1.606 | | 4.401 | | 0.860 | | - | | 0.860 | Continuing | Continuing | N/A |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Develop and qualify the A-Kit software and hardware for DR | MIPR | Aviation Development Directorate-Eustis : Ft. Eustis, Virginia | - | 2.819 | Jul 2018 | 1.800 | Dec 2018 | - | | - | | - | 0.000 | 4.619 | Continuing |
| Develop and qualify software and hardware for DR | Various | Various : Various | - | - | | 1.774 | Mar 2019 | - | | - | | - | 0.000 | 1.774 | - |
| Develop and qualify the software and hardware for EES | TBD | TBD : TBD | - | - | | - | | 7.000 | Jan 2020 | - | | 7.000 | Continuing | Continuing | - |
| | | **Subtotal** | - | 2.819 | | 3.574 | | 7.000 | | - | | 7.000 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Engineering, Logistics and Technical Support for DR | Various | Various : Various | - | 1.411 | Mar 2019 | 2.649 | May 2019 | - | | - | | - | Continuing | Continuing | Continuing |
| System Engineering, Logistics and Technical Support for EES | TBD | TBD : TBD | - | - | | - | | 1.791 | Mar 2020 | - | | 1.791 | 0.000 | 1.791 | - |
| | | **Subtotal** | - | 1.411 | | 2.649 | | 1.791 | | - | | 1.791 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | Project (Number/Name)<br>EW7 / *Degraded Visual Environment* | |

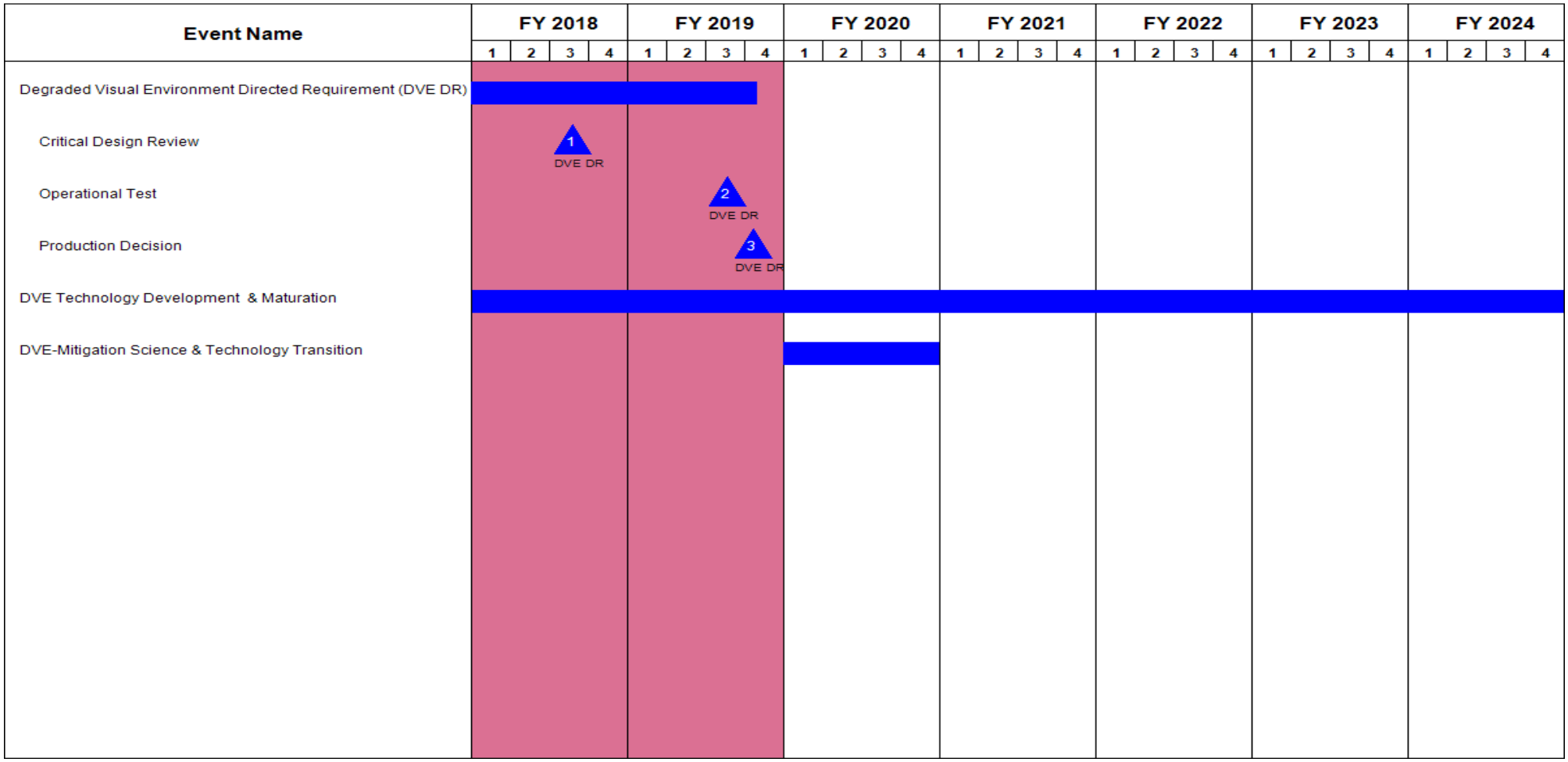
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Airworthiness and Qualification Testing for DR | MIPR | Redstone Test Center, Aviation Applied Technology Directorate : Redstone Arsenal, AL | - | 2.105 | Aug 2018 | 3.100 | Mar 2019 | - | | - | | - | 0.000 | 5.205 | - |
| DVEPS System Characterization for DR | MIPR | Yuma Testing Center : Yuma Proving Ground, AZ | - | - | | 1.000 | Jun 2019 | - | | - | | - | 0.000 | 1.000 | - |
| Airworthiness and Qualification Testing for EES | TBD | TBD : TBD | - | - | | - | | 7.510 | May 2020 | - | | 7.510 | Continuing | Continuing | Continuing |
| | | **Subtotal** | - | 2.105 | | 4.100 | | 7.510 | | - | | 7.510 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | - | 7.941 | | 14.724 | | 17.161 | | - | | 17.161 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>EW7 / *Degraded Visual Environment* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>EW7 / *Degraded Visual Environment* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events** | **Quarter** | **Year** | **Quarter** | **Year** |
| Degraded Visual Environment Directed Requirement (DVE DR) | 3 | 2017 | 4 | 2019 |
| Critical Design Review | 3 | 2018 | 3 | 2018 |
| Operational Test | 3 | 2019 | 3 | 2019 |
| Production Decision | 4 | 2019 | 4 | 2019 |
| DVE Technology Development & Maturation | 1 | 2018 | 4 | 2024 |
| DVE-Mitigation Science & Technology Transition | 1 | 2020 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | | | | Project (Number/Name)<br>VU3 / *Networking And Mission Planning* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| VU3: *Networking And Mission Planning* | - | 2.759 | 0.802 | 0.816 | - | 0.816 | 0.837 | 0.928 | 1.034 | 1.246 | 0.000 | 8.422 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

The Fiscal Year (FY) 2020 budget estimate submission request funds the development of Networking and Mission Planning systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Project support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The Aviation Data Exploitation Capability (ADEC) is an Army aviation automated information system program providing specific capabilities needed at the aviation unit level to implement and support improvements within aviation operations, safety, and training to increase operational effectiveness and situational awareness at all command echelons. ADEC provides a common and interoperable capability required to implement the DoD mandated Military Flight Operations Quality Assurance processes. ADEC will standardize flight scheduling/management, risk management, mission approval, and flight data analysis and visualization. ADEC provides interfaces to Centralized Aviation Flight Records System (CAFRS) to reduce data entry and the information technology footprint while enabling disconnected and split based operations.

The Improved Data Modem (IDM) is the common solution for digitizing Army Aviation and is fielded on every modernized, rotary-wing Army aircraft, including the CH-47 Chinook, AH-64 Apache and UH-60 Black Hawk. The IDM-401 provides the Army rotary-wing fleet with critical communication capabilities, performing as an internet controller and gateway to the Tactical Internet (TI) and Fire Support (FS) internet. The IDM enables connectivity to multiple radios used by rotary-wing aircraft and the Blue Force Tracker transceiver, as well as providing the means for rapid data transfer. The Multi-Core Processor (MCP)-501 modification effort will be a technology replacement for the current Army IDM-401. The MCP-501 will satisfy Army requirements for hardware, software, and firmware and be able to satisfy cybersecurity requirements. The MCP-501 will replace the current IDM-401 with a common server capability to support current and additional IDM-401 functionality that are common among multiple Army Aviation platforms and become a core component of the Digital Backbone for Army rotary wing aircraft.

The Aviation Mission Planning System (AMPS) is a decision support and battle synchronization system for automated mission planning, risk assessment, and transfer of mission data to aviation platforms in support of Mission Command functions within an Aviation unit. This includes route generation, performance planning, communications planning, terrain analysis, data transfer, and mission rehearsal. It also provides connectivity to Army Mission Command Systems. The AMPS efforts support the advancement of Army Aviation Mission Planning from the legacy Hardware/Software solution to a mobile, Future Airborne Capability Environment/Open Architecture conformant, hardware agnostic system. These efforts will include development and testing of a new underlying architecture to support the move of Army Aviation Mission Planning from the current structure to one that supports synchronization both vertically and horizontally between Aviation and Ground forces. It will allow for a modular, multipronged approach to meet the needs of the various planning and execution environments and allow aircrews to continually plan and update route, threat and performance data throughout all phases of an Aviation mission. Development of a mobile aircraft performance planning/weight & balance calculator is currently underway and will be the first migration of AMPS capabilities to a mobile hardware agnostic environment.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>VU3 / *Networking And Mission Planning* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Improved Data Modem (IDM)<br>***Description:*** The IDM provides digital connectivity among airborne and ground platforms and transmission of air-to-air target data between IDM equipped aircraft using existing radio and crypto equipment.<br>***FY 2019 Plans:***<br>Conduct market research, prepare requests for information (RFI), perform requirements determination and Size, Weight, and Power research on Army helicopter platforms, and develop Airworthiness Qualification Plan in support of Multi-Core Processor (MCP)-501 hardware which will be an upgrade, and eventual replacement for the current IDM-401.<br>***FY 2020 Base Plans:***<br>Finalize specifications for MCP-501 hardware, prepare request for proposals (RFP) from industry, and publish solicitation for eventual award of developmental contract.<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>IDM's increase in RDTE from FY 2019 to FY 2020 can be attributed to transition from cybersecurity efforts to the modification of IDM-401 hardware to enable its evolvement to the MCP-501. | 0.800 | 0.802 | 0.816 | - | 0.816 |
| ***Title:*** Aviation Data Exploitation Capability (ADEC)<br>***Description:*** The ADEC is an Army aviation automated information system program providing specific capabilities needed at the aviation unit level to implement and support improvements within aviation operations, safety, and training to increase operational effectiveness and situational awareness at all command echelons. ADEC provides a common and interoperable capability required to implement the DoD mandated Military Flight Operations Quality Assurance processes. ADEC will standardize flight scheduling/management, risk management, mission approval, and flight data analysis and visualization. ADEC provides interfaces to CAFRS to reduce data entry and the information technology footprint while enabling disconnected and split based operations. | 0.018 | - | - | - | - |
| ***Title:*** Aviation Mission Planning System (AMPS)<br>***Description:*** The AMPS is a decision support and battle synchronization system for automated mission planning, risk assessment, and transfer of mission data to aviation platforms in support of Mission Command functions within an Aviation unit. This includes route generation, performance planning, communications planning, terrain analysis, data transfer, and mission rehearsal. It also provides connectivity to Army Mission Command Systems. The AMPS efforts support the advancement of Army Aviation Mission Planning from the | 1.941 | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>VU3 / *Networking And Mission Planning* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| legacy Hardware/Software solution to a mobile, Future Airborne Capability Environment/Open Architecture conformant, hardware agnostic system. These efforts will include development and testing of a new underlying architecture to support the move of Army Aviation Mission Planning from the current structure to one that supports synchronization both vertically and horizontally between Aviation and Ground forces. It will allow for a modular, multipronged approach to meet the needs of the various planning and execution environments and allow aircrews to continually plan and update route, threat and performance data throughout all phases of an Aviation mission. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.759 | 0.802 | 0.816 | - | 0.816 |

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

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • AA0712: *Network And Mission Plan* | 132.402 | 118.614 | 105.442 | 0.010 | 105.452 | 77.687 | 42.617 | 50.718 | 43.510 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

This project is comprised of multiple systems supporting aircraft avionics. While the detailed acquisition strategy varies from program to program, the general strategy is for each individual program to complete the development and testing efforts in coordination with the aircraft platforms on integration issues, use the various contracts of the aircraft platforms original equipment manufacturers on integration efforts, and utilize the Aviation & Missile Research, Development, and Engineering Center for software development. The Product Directorate Office continues to look for other competitive options to decrease cost and schedule.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | Project (Number/Name)<br>VU3 / *Networking And Mission Planning* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM Support (IDM) | MIPR | PM ANMP : Redstone Arsenal, AL | - | 0.050 | Jul 2018 | 0.015 | Dec 2018 | 0.041 | Mar 2019 | - | | 0.041 | Continuing | Continuing | Continuing |
| | | **Subtotal** | - | 0.050 | | 0.015 | | 0.041 | | - | | 0.041 | Continuing | Continuing | N/A |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Qualify ADEC software and hardware | MIPR | Aviation Missile Research Development Engineering Center (AMRDEC) : Redstone Arsenal, AL | 17.388 | 0.018 | Feb 2018 | - | | - | | - | | - | 0.000 | 17.406 | - |
| Develop software for IDM | C/Various | Aviation Missile Research Development Engineering Center (AMRDEC) : Redstone Arsenal, AL | - | 0.578 | Aug 2018 | 0.787 | Apr 2019 | 0.775 | Mar 2019 | - | | 0.775 | Continuing | Continuing | Continuing |
| Develop AMPS Software | TBD | Aviation Missile Research Development Engineering Center (AMRDEC) : Redstone Arsenal, AL | - | 1.590 | Sep 2018 | - | | - | | - | | - | 0.000 | 1.590 | - |
| | | **Subtotal** | 17.388 | 2.186 | | 0.787 | | 0.775 | | - | | 0.775 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | Project (Number/Name)<br>VU3 / *Networking And Mission Planning* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Engineering, Logistics, and Technical Support (ADEC) | Various | Army Test & Evaluation (ATEC), Aberdeen, MD; AMRDEC : Redstone Arsenal, AL | 1.193 | - | | - | | - | | - | | - | 0.000 | 1.193 | - |
| System Engineering, Logistics, and Technical Support (IDM) | MIPR | Aviation Missile Research Development Engineering Center (AMRDEC) : Redstone Arsenal, AL | - | 0.172 | Dec 2018 | - | | - | | - | | - | 0.000 | 0.172 | - |
| System Engineering, Logistics, and Technical Support (AMPS) | MIPR | Aviation Missile Research Development Engineering Center (AMRDEC) : Redstone Arsenal, AL | - | 0.351 | Sep 2018 | - | | - | | - | | - | 0.000 | 0.351 | - |
| | | **Subtotal** | 1.193 | 0.523 | | - | | - | | - | | - | 0.000 | 1.716 | N/A |

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

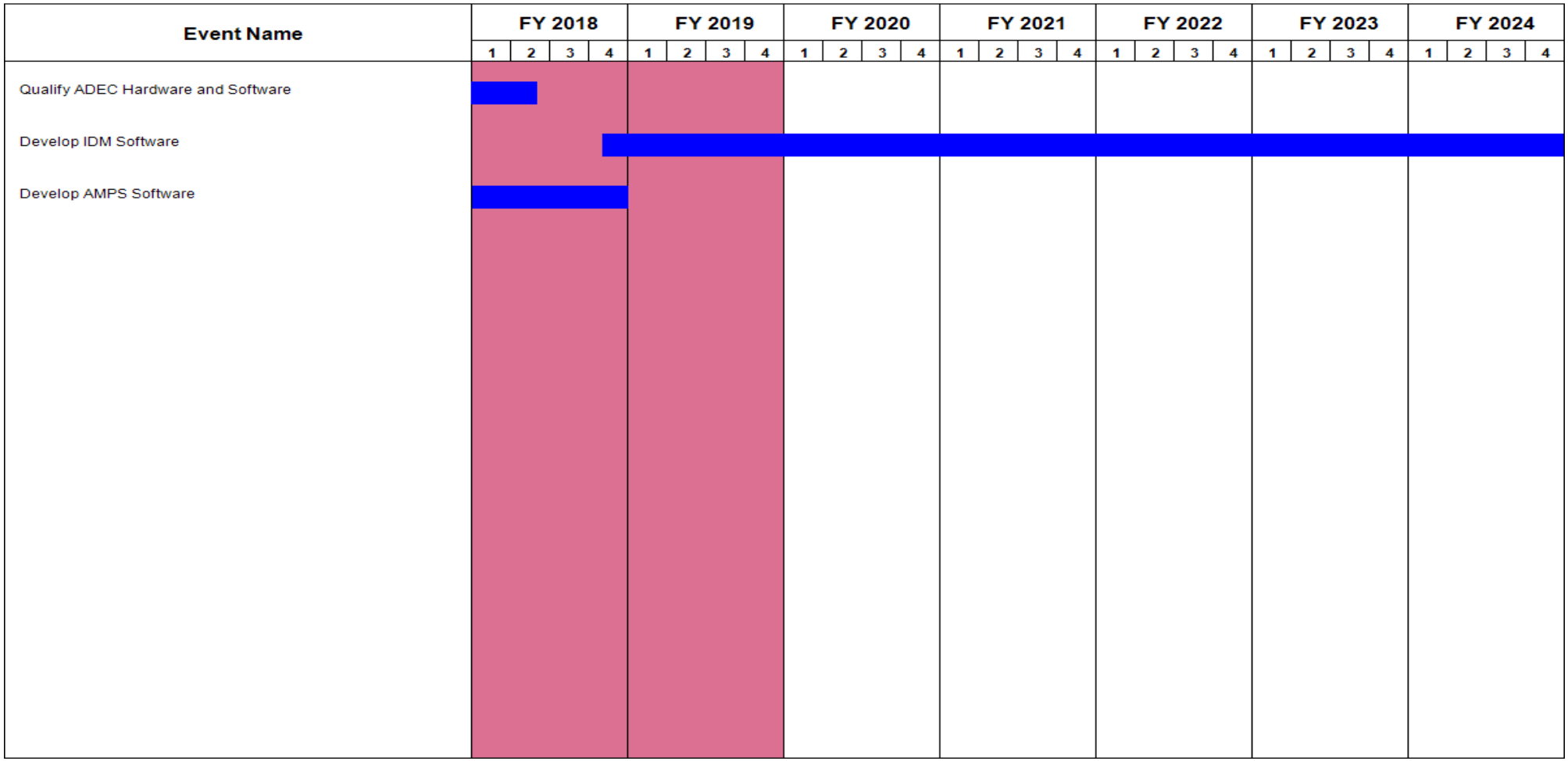
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADEC | Various | Army Test & Evaluation Command (ATEC), Aberdeen MD; AMRDEC : Redstone Arsenal, AL | 4.589 | - | | - | | - | | - | | - | 0.000 | 4.589 | - |
| | | **Subtotal** | 4.589 | - | | - | | - | | - | | - | 0.000 | 4.589 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 5 | R-1 Program Element (Number/Name)<br>PE 0604201A / *Aircraft Avionics* | Project (Number/Name)<br>VU3 / *Networking And Mission Planning* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 23.170 | 2.759 | | 0.802 | | 0.816 | | - | | 0.816 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>VU3 / *Networking And Mission Planning* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604201A / *Aircraft Avionics* | **Project (Number/Name)**<br>VU3 / *Networking And Mission Planning* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events** | **Quarter** | **Year** | **Quarter** | **Year** |
| Qualify ADEC Hardware and Software | 2 | 2011 | 2 | 2018 |
| Develop hardware and software (ACN) | 1 | 2012 | 4 | 2016 |
| Develop IDM Software | 4 | 2018 | 4 | 2024 |
| Develop AMPS Software | 1 | 2018 | 4 | 2018 |