| 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 0303032A / *TROJAN - RH12* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | - | 5.631 | 5.721 | 3.936 | - | 3.936 | 3.454 | 3.407 | 3.812 | 3.915 | 0.000 | 29.876 |
| RH5: *TROJAN - RH12 - MIP* | - | 5.631 | 5.721 | 3.936 | - | 3.936 | 3.454 | 3.407 | 3.812 | 3.915 | 0.000 | 29.876 |

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

This project is a Military Intelligence Program (MIP). TROJAN research and development supports TROJAN Next Generation (TROJAN NexGEN), formerly TROJAN Classic XXI (TCXXI), future capabilities to fulfill the Army's need for worldwide, deployable, remotable, intelligence, surveillance and reconnaissance support that can dynamically execute operations from sanctuary-based to deployed assets in theater. In support of Army Modernization and Army Force Generation, TROJAN NexGEN will provide soldiers with a real-world, hands-on, live and near-real time Signals Intelligence (SIGINT) training environment sustaining, maintaining and enhancing their military occupational specialty proficiencies and specific target expertise. This operational readiness training will fulfill the Army's larger intelligence training requirement via a secure, collaborative architecture.

A key factor for future force success is the ability to collect, process, and use information about an adversary while preventing similar information from being disclosed. TROJAN NexGEN is a combined operational and readiness mission system which uses advanced networking technology to provide seamless rapid radio relay, secure communications to include voice, data, and electronic reconnaissance support to U.S. forces throughout the world. TROJAN NexGEN operations may be easily tailored to fit military intelligence unit training schedules and surged during specific events to involve every aspect of the tactical intelligence collection, processing, analysis and reporting systems. Engineers test and evaluate new digital intelligence collection, processing and dissemination technology using the fielded TROJAN NexGEN systems prior to the acquisition of those technologies. As part of the objective intelligence architecture, these capabilities will enable processing and dissemination of real-time intelligence data from various sources to form the intelligence needed to issue orders inside the threat decision cycle. To that end, it is imperative that TROJAN NexGEN keeps pace with digitization initiatives in order to respond aggressively to the emerging intelligence communication threat.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 5.631 | 5.721 | 4.577 | - | 4.577 |
| Current President's Budget | 5.631 | 5.721 | 3.936 | - | 3.936 |
| Total Adjustments | 0.000 | 0.000 | -0.641 | - | -0.641 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Adjustments to Budget Years | - | - | -0.641 | - | -0.641 |

| 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 0303032A / *TROJAN - RH12* |

**Change Summary Explanation**

FY 2020 decrease due to economic adjustments.

| 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 0303032A / *TROJAN - RH12* | Project (Number/Name)<br>RH5 / *TROJAN - RH12 - MIP* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RH5: *TROJAN - RH12 - MIP* | - | 5.631 | 5.721 | 3.936 | - | 3.936 | 3.454 | 3.407 | 3.812 | 3.915 | 0.000 | 29.876 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This project is a Military Intelligence Program (MIP). TROJAN research and development supports TROJAN Next Generation (TROJAN NexGEN), formerly TROJAN Classic XXI (TCXXI), future capabilities to fulfill the Army's need for worldwide, deployable, remotable, intelligence, surveillance and reconnaissance support that can dynamically execute operations from sanctuary-based to deployed assets in theater. In support of Army Modernization and Army Force Generation, TROJAN NexGEN will provide soldiers with a real-world, hands-on, live and near-real time SIGINT training environment sustaining, maintaining and enhancing their military occupational specialty proficiencies and specific target expertise. This operational readiness training will fulfill the Army's larger intelligence training requirement via a secure, collaborative architecture.

A key factor for future force success is the ability to collect, process, and use information about an adversary while preventing similar information from being disclosed. TROJAN NexGEN is a combined operational and readiness mission system which uses advanced networking technology to provide seamless rapid radio relay, secure communications to include voice, data, and electronic reconnaissance support to U.S. forces throughout the world. TROJAN NexGEN operations may be easily tailored to fit military intelligence unit training schedules and surged during specific events to involve every aspect of the tactical intelligence collection, processing, analysis and reporting systems. Engineers test and evaluate new digital intelligence collection, processing and dissemination technology using the fielded TROJAN NexGEN systems prior to the acquisition of those technologies. As part of the objective intelligence architecture, these capabilities will enable processing and dissemination of real-time intelligence data from various sources to form the intelligence needed to issue orders inside the threat decision cycle. To that end, it is imperative that TROJAN NexGEN keeps pace with digitization initiatives in order to respond aggressively to the emerging intelligence communication threat.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Integrate Direction Finding and geo-location | 1.077 | 1.113 | 0.765 | - | 0.765 |
| ***Description:*** Integrate Direction Finding (DF) and geolocation (GL) technologies into TROJAN Remote Receiving Groups. | | | | | |
| ***FY 2019 Plans:***<br>Continue efforts to integrate Direction Finding (DF) and geolocation technologies into TROJAN Remote Receiving Groups in accordance with Joint Interface Control Document (JICD) 4.2. Utilize field based risk reduction exercises to test and evaluate integrated technologies of the overall TROJAN Intelligence, Surveillance, and Reconnaissance (ISR) Enterprise. Research and test for the integration of Electronics Intelligence (ELINT) capabilities. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| 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 0303032A / *TROJAN - RH12* | **Project (Number/Name)**<br>RH5 / *TROJAN - RH12 - MIP* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Will continuously adapt/improve the latest Direction Finding (DF) and geolocation technologies for integration into TROJAN NexGEN systems in accordance with Joint Interface Control Document (JICD) 4.2. Will utilize field based risk reduction exercises to test and evaluate integrated technologies of the overall TROJAN Intelligence, Surveillance, and Reconnaissance (ISR) Enterprise. Continue to research and test for the integration of Electronics Intelligence (ELINT) capabilities.<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding change due to economic adjustment. | | | | | |
| ***Title:*** Enable assured communications for the TROJAN Network architecture (formerly Improve security of the TROJAN Network architecture).<br>***Description:*** Acquire and apply multi-bandwidth compression algorithm technology to maximize TROJAN intelligence network throughput.<br>***FY 2019 Plans:***<br>Continue efforts to utilize Government off the shelf (GOTS) / Commercial of the shelf (COTS) solutions to secure data-at-rest / data-in-transit to extend the TROJAN intelligence network architecture to the edge.<br>***FY 2020 Base Plans:***<br>Will continue efforts that will enable communication in an anti-access/area denial environment; will continue testing with anti-jam technologies for satellite communications.<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding change due to economic adjustment. | 1.376 | 1.504 | 1.035 | - | 1.035 |
| ***Title:*** Integrate and test specialized hardware/software<br>***Description:*** Integrate and test specialized hardware/software for classified pre-processing of new signals of interest utilizing enhanced signal processing algorithms. Resource development of GLAIVE software (SW). Integrated several new National Security Agency (NSA) SW packages.<br>***FY 2019 Plans:***<br>Continue integration and testing of specialized hardware/software for classified pre-processing of new signals of interest utilizing enhanced signal processing algorithms. Continue resource development of GLAIVE software. Will continue efforts to develop TROJAN Intelligence Surveillance Reconnaissance enterprise. Will continue | 1.750 | 1.805 | 1.001 | - | 1.001 |

| 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 0303032A / *TROJAN - RH12* | Project (Number/Name)<br>RH5 / *TROJAN - RH12 - MIP* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| efforts to integrate JICD 4.2 across all platforms. Begin efforts to integrate C4ISR Modular Open Suite of Standards (CMOSS).<br>***FY 2020 Base Plans:***<br>Will continue integration and testing of specialized hardware/software for classified pre-processing of new signals of interest utilizing enhanced signal processing algorithms. Will continue resource development of GLAIVE software. Will continue efforts to develop TROJAN Intelligence Surveillance Reconnaissance enterprise. Will continue efforts to integrate JICD 4.2 and the C4ISR Modular Open Suite of Standards (CMOSS).<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding change due to economic adjustment. | | | | | |
| ***Title:*** Research and testing of receivers<br>***Description:*** Research and testing of receiver packages for fixed and transportable TROJAN systems to acquire non-standard modulations using Digital System Processing (DSP) and Software Defined Radio (SDR) technologies.<br>***FY 2019 Plans:***<br>Continue research and testing of receiver packages for fixed and transportable TROJAN systems to acquire non-standard modulations using DSP and SDRs. Integration of receiver packages to enable additional frequency ranges for GOTS Software Defined Radios.<br>***FY 2020 Base Plans:***<br>Will continue research and testing of receiver packages for fixed and transportable TROJAN systems to acquire non-standard modulations using DSP and SDRs.<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding change due to economic adjustment. | 0.255 | 0.524 | 0.360 | - | 0.360 |
| ***Title:*** Labor cost software (SW) engineers<br>***Description:*** Labor for two software (SW) engineers in support of GLAIVE and other above applicable efforts. Labor for one Material Developer (MAT DEV) technologist, one MAT DEV software and one MAT DEV Hardware (HW) engineer.<br>***FY 2019 Plans:*** | 0.775 | 0.775 | 0.775 | - | 0.775 |

| 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 0303032A / *TROJAN - RH12* | **Project (Number/Name)**<br>RH5 / *TROJAN - RH12 - MIP* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue to resource labor for one MAT DEV technologist, two MAT DEV software engineers and two MAT DEV HW engineers.<br>***FY 2020 Base Plans:***<br>Will continue to resource labor for one MAT DEV technologist, two MAT DEV software engineers and two MAT DEV HW engineers. | | | | | |
| ***Title:*** Development of Satellite Communication (SATCOM) dishes and transceivers<br>***Description:*** Development of smaller more mobile Satellite Communication (SATCOM) dishes and transceivers. Development of more efficient use of bandwidth, communications on the move and man-packable intelligence collection systems. | 0.375 | - | - | - | - |
| ***Title:*** Develop specialized software enhancements to the TROJAN streaming subsystems<br>***Description:*** Develop specialized software enhancements to the TROJAN audio streaming subsystems to improve system redundancy and throughput capacity and system management capabilities; Investigate compression/processing technologies to reduce communications bandwidth requirements for remoted TROJAN systems, including streaming audio technologies. | 0.023 | - | - | - | - |
| **Accomplishments/Planned Programs Subtotals** | 5.631 | 5.721 | 3.936 | - | 3.936 |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • BA0326: *TROJAN (MIP)* | 40.062 | 27.549 | 17.368 | 1.337 | 18.705 | 18.949 | 18.144 | 15.909 | 16.068 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The Acquisition Strategy for the TROJAN NexGEN Systems supported by TROJAN RDT&E is to adapt and leverage from Commercial Off the Shelf (COTS) and Government Off the Shelf (GOTS) products. Additionally, the Acquisition Strategy leverages off of development by DoD and other Government agencies to the greatest extent possible. TROJAN RDT&E is used to fund the development of enhancing these technologies to meet specific user requirements.

**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 0303032A / *TROJAN - RH12* | Project (Number/Name)<br>RH5 / *TROJAN - RH12 - MIP* | |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Labor Costs MAT DEV HW/SW Engineers | Various | CERDEC I2WD, APG, MD : MD | 4.337 | 0.775 | Oct 2017 | 0.775 | Oct 2018 | 0.775 | Oct 2019 | - | | 0.775 | 0.000 | 6.662 | - |
| | | **Subtotal** | 4.337 | 0.775 | | 0.775 | | 0.775 | | - | | 0.775 | 0.000 | 6.662 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrate Direction Finding and geo-location | Various | APG : MD | 4.018 | 1.077 | | 1.112 | Oct 2018 | 0.765 | Oct 2019 | - | | 0.765 | Continuing | Continuing | - |
| Improve security of the TROJAN Network architecture | Various | APG : MD | 3.275 | 1.376 | | 1.505 | Oct 2018 | 1.035 | Oct 2019 | - | | 1.035 | Continuing | Continuing | - |
| Research and testing of Receivers | Various | APG : MD | 1.641 | 0.255 | | 0.524 | Oct 2018 | 0.360 | Oct 2019 | - | | 0.360 | Continuing | Continuing | - |
| Develop Satellite Communications (SATCOM) Dishes and transceivers | Various | APG : MD | 3.269 | 0.375 | | - | | - | | - | | - | 0.000 | 3.644 | - |
| Specialized Software Enhancements | Various | APG : MD | 0.975 | 0.023 | | - | | - | | - | | - | 0.000 | 0.998 | - |
| Develop Hardware/ Software Interface | Various | APG : MD | 0.445 | - | | - | | - | | - | | - | 0.000 | 0.445 | - |
| | | **Subtotal** | 13.623 | 3.106 | | 3.141 | | 2.160 | | - | | 2.160 | Continuing | Continuing | N/A |

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

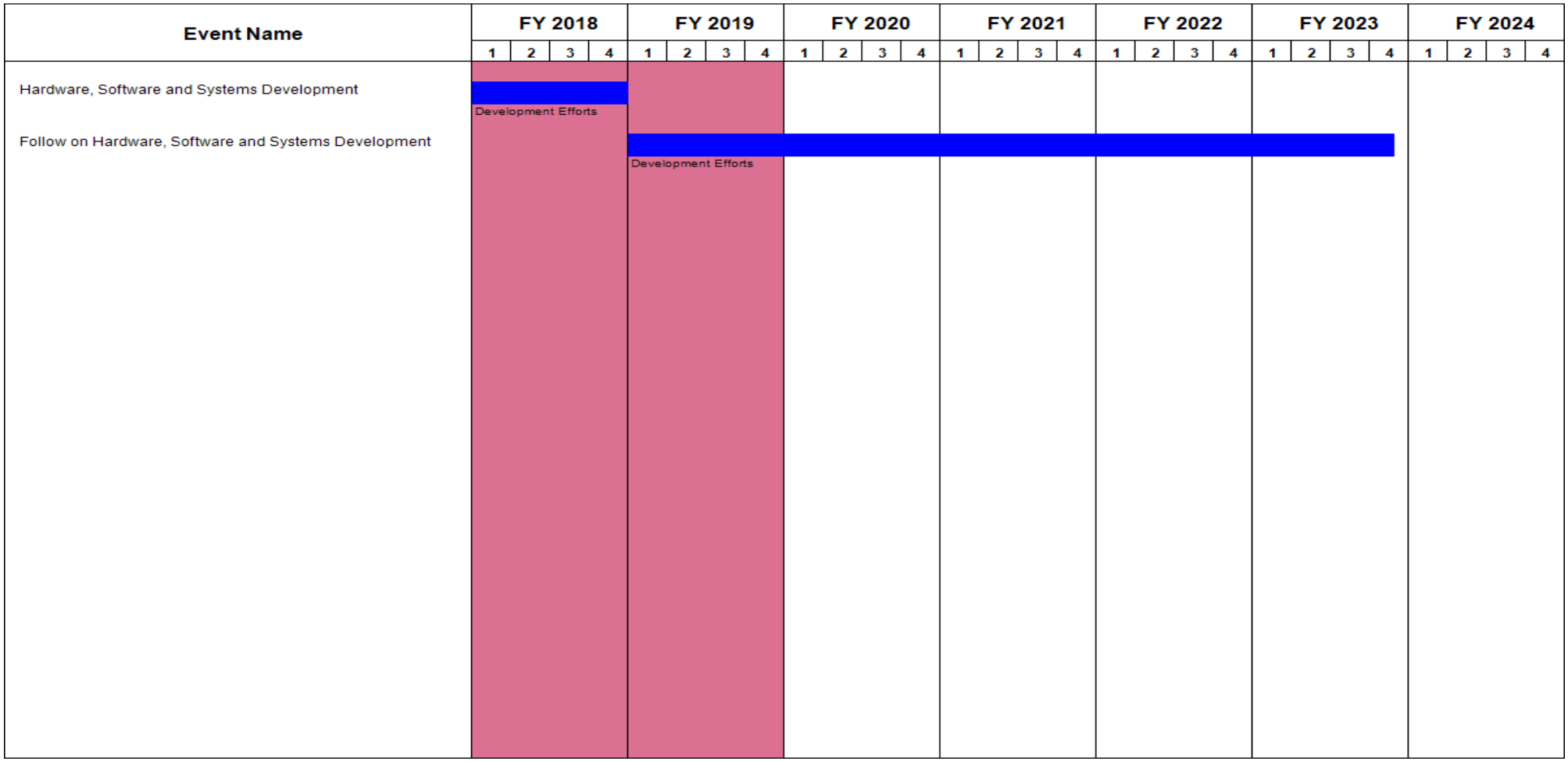
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integration and Testing of Hardware/Software | Various | APG : MD | 3.587 | 1.750 | | 1.805 | Oct 2018 | 1.001 | Oct 2019 | - | | 1.001 | 0.000 | 8.143 | Continuing |
| | | **Subtotal** | 3.587 | 1.750 | | 1.805 | | 1.001 | | - | | 1.001 | 0.000 | 8.143 | 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 0303032A / *TROJAN - RH12* | Project (Number/Name)<br>RH5 / *TROJAN - RH12 - MIP* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 21.547 | 5.631 | | 5.721 | | 3.936 | | - | | 3.936 | 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 0303032A / *TROJAN - RH12* | **Project (Number/Name)**<br>RH5 / *TROJAN - RH12 - MIP* |



| 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 0303032A / *TROJAN - RH12* | **Project (Number/Name)**<br>RH5 / *TROJAN - RH12 - MIP* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events** | **Quarter** | **Year** | **Quarter** | **Year** |
| Hardware, Software and Systems Development | 1 | 2014 | 4 | 2018 |
| Follow on Hardware, Software and Systems Development | 1 | 2019 | 4 | 2023 |