| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army | | | | | | | | | | | Date: March 2024 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603462A *I Next Generation Combat Vehicle Advanced Technology* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2023** | **FY 2024** | **FY 2025 Base** | **FY 2025 OCO** | **FY 2025 Total** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **Cost To Complete** | **Total Cost** |
| Total Program Element | - | 467.533 | 217.394 | 175.198 | - | 175.198 | 185.579 | 198.631 | 207.126 | 206.895 | 0.000 | 1,658.356 |
| BF4: *Combat Vehicle Robotics Adv Tech* | - | 29.321 | 34.703 | 30.939 | - | 30.939 | 39.031 | 40.027 | 42.905 | 43.876 | 0.000 | 260.802 |
| BF7: *Crew Augmentation and Optimization Adv Tech* | - | 4.326 | 3.812 | 4.367 | - | 4.367 | 4.424 | 4.427 | 4.475 | 4.520 | 0.000 | 30.351 |
| BG1: *Sensors for Auto Oper and Survivability Adv Tech* | - | 12.328 | 12.726 | 9.592 | - | 9.592 | 9.591 | 12.767 | 12.905 | 13.034 | 0.000 | 82.943 |
| BG3: *Modeling and Simulation for MUMT Advanced Tech* | - | 5.816 | 6.276 | 6.456 | - | 6.456 | 6.775 | 6.729 | 7.154 | 6.703 | 0.000 | 45.909 |
| BG7: *Ground Systems Active Defense (GSAD) Advanced Tech* | - | 59.331 | 60.617 | 51.960 | - | 51.960 | 52.996 | 56.772 | 66.034 | 62.981 | 0.000 | 410.691 |
| BG9: *Obscuration Advanced Technology* | - | 2.664 | - | - | - | - | - | - | - | - | 0.000 | 2.664 |
| BH6: *Platform Electrification and Mobility Adv Tech* | - | 45.728 | 65.647 | 40.579 | - | 40.579 | 42.489 | 41.422 | 45.167 | 45.618 | 0.000 | 326.650 |
| BH8: *Enhanced VETRONICS Advanced Technology* | - | 10.776 | 10.268 | 13.867 | - | 13.867 | 18.958 | 22.447 | 20.007 | 20.227 | 0.000 | 116.550 |
| BI3: *Sensor Protection Advanced Technology* | - | 1.666 | 1.746 | 1.752 | - | 1.752 | 1.748 | 1.750 | 1.769 | 1.787 | 0.000 | 12.218 |
| BI5: *Materials Application and Integration Adv Tech* | - | 3.979 | 5.502 | - | - | - | - | - | - | - | 0.000 | 9.481 |
| BK1: *Autonomous Mobility Adv Tech* | - | 6.221 | 5.305 | 3.860 | - | 3.860 | - | - | - | - | 0.000 | 15.386 |
| BK4: *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech* | - | 2.118 | 4.328 | - | - | - | - | - | - | - | 0.000 | 6.446 |
| BK6: *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech* | - | 1.478 | 2.062 | 7.620 | - | 7.620 | 9.567 | 12.290 | 6.710 | 8.149 | 0.000 | 47.876 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army | | | | | | | | | | | Date: March 2024 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603462A *I Next Generation Combat Vehicle Advanced Technology* | | | | | | | |
| BP6: *Ground Vehicle Advanced Technology(CA)* | - | 278.450 | - | - | - | - | - | - | - | - | 0.000 | 278.450 |
| BZ9: *Smart Targeting Environment for Lower Level Assets* | - | 3.331 | 4.402 | 4.206 | - | 4.206 | - | - | - | - | 0.000 | 11.939 |

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

This Program Element (PE) executes development, maturation, and demonstration for the Army's modernization priority for the Next Generation of Combat Vehicle (NCCV). This PE matures, integrates and demonstrates combat vehicle technologies that enable the Army to have a smarter, faster, more lethal, more precise, more protected, and more adaptable force. Technology development builds upon the foundational vehicle architectures to support the NGCV, to include autonomy architecture, power architecture, vehicle electronic architecture, physical architecture, lethality architecture and vehicle protection architecture. Technologies developed, matured, and demonstrated will enable leap ahead capabilities for manned, optionally manned and unmanned vehicles that deliver decisive lethality.

Research in this PE complements PE 0602141A (Lethality Technology), PE 0602144A (Ground Technology), PE 0602145A (Next Generation Combat Vehicle Technology), PE 0602146A (Network C3I Technology), PE 0603116A (Lethality Advanced Technology), PE 0603119A (Ground Advanced Technology), PE 0603463A (Network C3I Advanced Technology), PE 0604115A (Technology Maturation Initiatives), and PE 0708045A (End Item Industrial Preparedness Activities). Research in this PE also transitions to PE 0603645A (Armored Systems Modernization Adv Dev) and PE 0604017A (Robotics Development).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center, Armament Center, Ground Vehicle Systems Center, and the Geotechnical and Structures Laboratory.

| B. Program Change Summary ($ in Millions) | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 471.434 | 217.394 | 195.971 | - | 195.971 |
| Current President's Budget | 467.533 | 217.394 | 175.198 | - | 175.198 |
| Total Adjustments | -3.901 | 0.000 | -20.773 | - | -20.773 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -1.303 | - | | | |
| • SBIR/STTR Transfer | -2.598 | - | | | |
| • Adjustments to Budget Years | - | - | -20.773 | - | -20.773 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army | Date: March 2024 |
|---|---|
| **Appropriation/Budget Activity**<br>2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)* | **R-1 Program Element (Number/Name)**<br>PE 0603462A *I Next Generation Combat Vehicle Advanced Technology* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2023 | FY 2024 |
|---|---|---|
| **Project:** BP6: *Ground Vehicle Advanced Technology(CA)* | | |
| Congressional Add: *Program Increase - Additive Manufacturing for Jointless Hull* | 20.000 | - |
| Congressional Add: *Program Increase - ATE5.2 Engine Development* | 10.000 | - |
| Congressional Add: *Program Increase - Virtual and Physical Prototyping* | 8.000 | - |
| Congressional Add: *Program Increase - HMMWV Automotive Enhancements* | 9.000 | - |
| Congressional Add: *Program Increase - Advanced Adhesives* | 5.000 | - |
| Congressional Add: *Program Increase - Autonomous Minefield Clearance* | 8.000 | - |
| Congressional Add: *Program Increase - Carbon Fiber Tires* | 5.000 | - |
| Congressional Add: *Program Increase - Machine Learning for Advanced Lightweight Combat Vehicle Structures* | 19.000 | - |
| Congressional Add: *Program Increase - Maneuverable Lightweight Electric Weight Reducer* | 7.500 | - |
| Congressional Add: *Program Increase - Off-Road Maneuver* | 5.000 | - |
| Congressional Add: *Program Increase - Predictive Maintenance System* | 2.000 | - |
| Congressional Add: *Program Increase - Unmanned Navigational Technology* | 3.000 | - |
| Congressional Add: *Program Increase - AUGMENTED REALITY FOR DENIED ENVIRONMENTS* | 7.000 | - |
| Congressional Add: *Program Increase - AUTONOMOUS SYSTEMS FOR MILITARY GROUND VEHICLES* | 3.750 | - |
| Congressional Add: *Program Increase - CYBERSECURITY FOR AUTONOMOUS GROUND VEHICLES* | 9.000 | - |
| Congressional Add: *Program Increase - CYBERSECURITY FOR AUTONOMOUS VEHICLES* | 4.200 | - |
| Congressional Add: *Program Increase - DIGITAL ENTERPRISE TECHNOLOGY FOR OMFV* | 15.000 | - |
| Congressional Add: *Program Increase - DIGITAL TWIN* | 7.000 | - |
| Congressional Add: *Program Increase - ELECTRIC DRIVE SYSTEM* | 5.500 | - |
| Congressional Add: *Program Increase - ELECTRIFIED VEHICLE INFRARED SIGNATURE MANAGEMENT* | 5.000 | - |
| Congressional Add: *Program Increase - ELECTRON BEAM ADDITIVE MANUFACTURING OF CRITICAL METAL RING COMPONENTS* | 2.000 | - |
| Congressional Add: *Program Increase - ENHANCED LETHALITY ON ARMY SMALL MULTIPURPOSE EQUIPMENT TRANSPORT* | 8.000 | - |
| Congressional Add: *Program Increase - HMMWV OCCUPANCY PROTECTION DEVELOPMENT* | 10.000 | - |
| Congressional Add: *Program Increase - HUMAN DIGITAL TWINS AND HUMAN-MACHINE INTERACTION* | 6.000 | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army | Date: March 2024 |
|---|---|
| **Appropriation/Budget Activity**<br>2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)* | **R-1 Program Element (Number/Name)**<br>PE 0603462A *I Next Generation Combat Vehicle Advanced Technology* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2023 | FY 2024 |
|---|---|---|
| Congressional Add: *Program Increase - MODELING AND SIMULATION ACTIVITIES FOR VEHICLE DEVELOPMENT* | 10.000 | - |
| Congressional Add: *Program Increase - MODULAR ELECTRIC MOTORS* | 5.500 | - |
| Congressional Add: *Program Increase - MULTI-SERVICE ELECTRO-OPTICAL SIGNATURE CODE* | 9.000 | - |
| Congressional Add: *Program Increase - NANO-LED FABRICATION FOR AUGMENTED REALITY CONTACT LENS* | 10.000 | - |
| Congressional Add: *Program Increase - NEXT GENERATION ELECTRIFIED TRANSMISSION* | 5.000 | - |
| Congressional Add: *Program Increase - NEXT GENERATION LIGHT TACTICAL VEHICLE MANEUVER AUTONOMY* | 5.000 | - |
| Congressional Add: *Program Increase - SYNTHETIC GRAPHITE BATTERY* | 10.000 | - |
| Congressional Add: *Program Increase - VEHICLE TECHNOLOGY READINESS LEVELS* | 3.000 | - |
| Congressional Add: *Program Increase - ABRAMS MODERNIZATION* | 30.000 | - |
| Congressional Add: *Program Increase - SMALL UNIT GROUND ROBOTIC CAPABILITIES* | 7.000 | - |
| Congressional Add Subtotals for Project: BP6 | 278.450 | - |
| Congressional Add Totals for all Projects | 278.450 | - |

**Change Summary Explanation**

The decrease in Fiscal Year (FY) 2025 funding from the Previous President's Budget (PB) to the Current PB is due to efforts transitioning for maturation and demonstration.

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | Project (Number/Name)<br>BF4 / *Combat Vehicle Robotics Adv Tech* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF4: *Combat Vehicle Robotics Adv Tech* | - | 29.321 | 34.703 | 30.939 | - | 30.939 | 39.031 | 40.027 | 42.905 | 43.876 | 0.000 | 260.802 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures and demonstrates innovative enabling technologies that permits scalable integration of multi-domain robotic and autonomous system capabilities teamed within Army formations supporting all combat warfighting functions (close combat, reconnaissance, targeting and acquisition, etc.). Project focus areas include Platform Electronic Control and Autonomy Safety Engineering, Unmanned Maneuver Technologies, and Soldier-Robotic Interface Integration This Project integrates these technologies with other robotic and autonomous system technologies and validates technology maturity through Engineering Evaluation Testing (EET). This Project also demonstrates robotic and autonomous system technologies in relevant environments. Once capabilities mature to a technology readiness level (TRL) of 6 they are promoted into the appropriate product (safety, autonomy, control) and made available to all partners. This project will also mature and demonstrate the mission scenarios focused on small, unmanned ground vehicles as a deployable sensor, autonomous forward surveillance and autonomous battle drills. These missions will enhance autonomy, safety and control technologies and wrap back into the core products once completed.

This project is also coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology), and transitions to PE 0604017A (Robotics Development).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy (AMS).

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Platform Electronic Control | 8.786 | 6.229 | 5.225 |
| ***Description:*** This effort optimizes the electronic, closed loop control of by-wire vehicle systems to provide stable, reliable, and predictable control in the presence of potential malicious or unintended commands for both wheeled and tracked unmanned vehicles. | | | |
| ***FY 2024 Plans:***<br>Will mature and continue to optimize an expanded closed-loop drive by wire (DBW) system for robotic ground systems. Will develop and optimize Robotic Vehicle Integration and Safety (RVIS) components for unmanned systems with emphasis on Modular Open System Approach (MOSA) principals. Will develop RVIS components to align with the Autonomous Ground Vehicle Reference Architecture (AGVRA) framework and known safety standards to increase the safety performance of unmanned ground | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BF4 / *Combat Vehicle Robotics Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| vehicle systems. Will demonstrate enhancements through Engineering Evaluation Testing (EET) to show technical maturity of developed components. Will continue to mature and validate Robotic and Autonomy Systems (RAS) safety standards for unmanned ground vehicle systems based on EET activities. Will continue to update Ground Vehicle Robotics Safety Board published guidelines to show they meet best practices for development of safety critical software for unmanned ground vehicle systems while incorporating lessons learned.<br>***FY 2025 Plans:***<br>Will mature and continue optimization of safety processes, components, and software focused on low level control (base vehicle platforms sensors, Drive By-Wire (DBW) systems, payload/subsystem management/monitoring) for uncrewed systems. Will expand integration of safety certified components onto uncrewed systems to improve safe mobility with positive control for uncrewed ground vehicles. These certified components and subsystems will increase reliability of the platform, mean time between failure, and improve operational safety for users and close operators. Maturation of safety components will expand utilization of Real Time Operating Systems (RTOS) and align to well defined systems safety standards to improve the necessary Level of Rigor for autonomous vehicle systems. Safety processes and components are aligned with the Autonomous Ground Vehicle Reference Architecture (AGVRA) framework and GCS Common Infrastructure Architecture (GCIA) to maintain seamless interfacing with ongoing improvement to the ARMY autonomy libraries, and user interfaces with additional maturation focus on standardizing interface to support industry autonomy stacks and components.<br><br>Will mature and improve Robotic and Autonomy Systems (RAS) safety standards for uncrewed ground vehicle systems. Will expand the Ground Vehicle Robotics (GVR) Safety Council which manages, reviews, and publishes guidelines to improve on best practices for development of safety critical processes, components, and software for uncrewed ground vehicle systems. The Ground Vehicle Robotics Safety Council develops, manages, and maintains the safety processes and documentation for GVR ensuring GVR programs in the organization adhere to organizational standards and are ready for verification and validation by the test community. This will improve testing with warfighters and reduce developmental of autonomous ground systems.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding for platform electronic control is decreased in FY25 due to maturing system safety processes to focus on optimization to reduce overall development, integration, and safety risks. | | | |
| ***Title:*** Unmanned Maneuver | 14.135 | 20.346 | 16.950 |
| ***Description:*** This effort matures and demonstrates the advanced mobility performance of autonomous systems within complex, combat scenarios to allow for the completion of mission goals in individual and teaming configurations at various levels of autonomy.<br>***FY 2024 Plans:*** | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BF4 / *Combat Vehicle Robotics Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Will improve and demonstrate autonomous maneuver in degraded or hostile environments, enabling autonomous maneuvers in areas where sensor performance is poor (e.g. due to weather or smoke) and communications are not reliable. Will demonstrate coordinated movements using robotic or human team members. Will improve night-time operation of autonomous vehicles by reducing vehicle signatures through the implementation of passive sensing techniques. Will continue to mature the AGVRA framework by updating based on previous versions of conceptual, logical and physical data models while connecting them to exiting instantiated architectures. Will mature the safety and cyber meta-models and libraries associated with the AGVRA in order to support these evolving viewpoints. Will mature AGVRA functional model stereotypes by building functional models to demonstrate a cohesive functional model baseline. Will develop and mature the Robot Operating System - Military (ROS-M) to support the ability to register and distribute concepts including hardware, specifications, requirements, standards, and architectures associated to Robotic and Autonomous System (RAS) models within the Robotic Technology Kernel (RTK).<br>***FY 2025 Plans:***<br>Will improve and demonstrate an autonomous maneuver capabilities, with autonomous vehicles operating at speeds comparable to manned vehicles and executing comparable movement techniques in obstructed environments. Will continue to improve and demonstrate coordinated movements including both robotic platforms and Soldiers in these environments, such as collaborate zone-based surveillance. Will continue to improve performance and demonstrate autonomous maneuver in degraded or hostile environments, enabling autonomous maneuvers in areas where sensor performance is poor (e.g., due to weather or smoke) and communications are not reliable. Will improve night-time operation of autonomous vehicles by reducing vehicle signatures through implementation of passive sensing techniques developed by Autonomous Behaviors and Perception subtask.aap Will mature the Autonomous Ground Vehicle Reference Architecture (AGVRA) framework by developing conceptual, logical and physical data models while connecting them to existing instantiated architectures and mature the safety and cyber metamodels and associated libraries to support these evolving viewpoints. Will mature AGVRA functional model elements and linemature functional models to demonstrate a cohesive functional model, and advance overall mission modeling and test planning. Will implement provide cyber hardened architecture aspects into Robotic Technology Kernel (RTK), including the development of a broad mission threat model, verification plan, and penetration testing plans. Will improve and demonstrate the Interoperability implementation to account for advances in all product lines.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decreased in FY 2025 due to maturing small platform autonomy, with funding efforts realigned to Small UGV as a Deployable Sensor task. | | | |
| ***Title:*** Soldier-Robotic Interface Integration<br>***Description:*** This effort is a focused approach to optimize control of the unmanned systems with improved performance incorporating Manned-Unmanned Teaming enabled formations and is measured against multiple phases of the combat scenario for improved operational effectiveness and overall system performance. | 4.104 | 5.657 | 5.892 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BF4 / *Combat Vehicle Robotics Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***FY 2024 Plans:***<br>Will develop an enhanced network situational awareness capability through the integration of communication and network technology into the Warfighter Machine Interface (WMI). this will create an enriched user interface development, which will allow (in a much more effective manner) the robot operator to have a greater understanding of the boto's situational awareness and its ability to maneuver. This will create a greater ability to complete the mission and successfully achieve objectives. Will focus on integration of the WMI into RVIS model. These will be visible at the EET as the SRI technologies will be linked across many of the testing events.<br>***FY 2025 Plans:***<br>Will improve and demonstrate the ability to operate three or more robotic assets from by a single operator within through the Warfighter Machine Interface (WMI). This task will develop improve the user interface minimize the by reducing the cognitive workload on a single operator and while allowing the robot operator to achieve the mission with more effective improved understanding of the robot's situational awareness, ability to maneuver and achieve the mission fully. Will integration into RVIS model. These functions will be visible validated at the Engineering Evaluation Test's (EET) as through the soldier robotic interface technologies will be linked linkage across many of the testing events.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding is increased in FY25 due to the increasing complexity of Combat Vehicle Robotics Technology Human Robotic Interaction technologies from utilizing single voice recognition to natural language processing. | | | |
| ***Title:*** Small UGV as Deployable Sensor<br>***Description:*** This effort improves the long range autonomy, mobility and sensing capabilities of small UGVs to expand reconnaissance in terrains and environments large systems cannot reach (i.e. culverts, underground, dense urban) and to serve as unmanned listening & observation posts. The small UGVs will deploy out of NGCV systems to enhance battlespace awareness and reduce the risk to the systems.<br>***FY 2024 Plans:***<br>Will integrate, optimize, and demonstrate advanced autonomy behaviors, including: Intelligence, Surveillance and Reconnaissance (ISR) sensors, and optimize small unmanned ground system platform and controls. Will implement and demonstrate greater autonomy behaviors for small UGVs by improving their unmanned systems teaming abilities through the enhancement of their RTK capabilities, allowing them to autonomously deploy from an unmanned combat vehicle, maneuver in rough terrain, and perform reconnaissance tasks & surveillance. Will integrate and demonstrate Artificial Intelligence (AI) enabled optical and audio Modular Mission Payload (MMP) sensors with small UGV autonomy, allowing them to optimize threat and target detection probability when performing reconnaissance and surveillance missions. Will develop and mature an optimized system control architecture to overcome the SWaP limitations of small platforms when enabled with the sensors required to perform | 2.296 | 2.471 | 2.872 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BF4 / *Combat Vehicle Robotics Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| complex tasks and extended mission times. Will demonstrate these enhancements through EET ensuring the autonomous technology and integrated MMPs have been fully evaluated for system safety, performance and technical maturity.<br>***FY 2025 Plans:***<br>Will continue to integrate, optimize, and demonstrate advanced autonomy behaviors, Intelligence, Surveillance, and Reconnaissance (ISR) sensors, and optimize small, unmanned ground system platform and controls (using the Warfighter Machine Interface - WMI). Will mature and demonstrate enhanced autonomy behaviors for small Unmanned Ground Vehicles by continuing to improve the RTK capabilities for small platform teaming to autonomously deploy from an unmanned combat vehicle and maneuver in rough terrain to perform tasks ISR missions. Will integrate and demonstrate Artificial Intelligence (AI) enabled electro-optical and audio Modular Mission Payload (MMP) sensors with small UGV autonomy to optimize threat and target detection probability when performing ISR missions. Will validate maturity of enhancements through Engineering Evaluation Testing (EET) of the autonomous technology and integrated MMPs in terms of performance, and technical maturity, while ensuring safe operation.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding is increased in FY25 as the efforts in PE 0602145A / Next Generation Combat Vehicle Technology, Project BF3 / Combat Vehicle Robotics Tech accelerate matured autonomy behaviors for soldier experimentation and feedback. | | | |
| **Accomplishments/Planned Programs Subtotals** | 29.321 | 34.703 | 30.939 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | Project (Number/Name)<br>BF7 / *Crew Augmentation and Optimization Adv Tech* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF7: *Crew Augmentation and Optimization Adv Tech* | - | 4.326 | 3.812 | 4.367 | - | 4.367 | 4.424 | 4.427 | 4.475 | 4.520 | 0.000 | 30.351 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures and demonstrates advanced technologies to enable crew augmentation and optimization for closed hatch operations of ground vehicle platforms in a complex multi-domain operations environment. This includes integration of intelligent technologies to improve dynamic tasking and full crew interactions, machine learning to improve decision aids, early warnings, reduce response times and shorten task durations, and machine learning to optimize tasking and function. Mature technologies are incorporated onto existing or prototype Army-owned technology demonstrators so that performance of the enabling technologies can be evaluated.

Work in this Project is also coordinated with work in Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) and PE 0602143 (Soldier Lethality Technology)

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Crew Augmentation and Optimization Advanced Technology | 4.326 | 3.812 | 4.367 |
| ***Description:*** This effort focuses on optimizing crew station technologies while reducing crew sizes that will provide the same overall performance by exploiting human-machine interaction technologies, automation, machine intelligence and customization to permit soldiers to achieve performance beyond today's constrained ground vehicle environment. This effort focuses on the down-selection, integration, optimization, and demonstration of crew interaction technologies. It enables universal crew interfaces across multiple platforms that enhance crew interactions while reducing crew size. | | | |
| ***FY 2024 Plans:***<br>Will integrate, optimize, and demonstrate an initial capability for embedded training tools that facilitate soldier comprehension and utilization of autonomous systems; integrate, mature, and demonstrate technologies that automate re-allocation of tasks of vehicle crew members to reduce overall soldier cognitive load; mature and demonstrate technology aids to process and share information | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BF7 / *Crew Augmentation and Optimization Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| between crew and autonomous agents to improve vehicle and overall platoon-level situational awareness; validate platoon-level maneuver effectiveness in an operationally-relevant field demonstration.<br>***FY 2025 Plans:***<br>Will mature and demonstrate technologies that augment overall NGCV crew task load. Will demonstrate use of augmentation technology aids and virtual control to facilitate battlespace awareness of events taking place outside the vehicle in simulation of closed hatched operations, improving protection for Soldiers operating NGCVs. Will optimize NGCV crew and/or formation notifications and cuing of mid-mission events. Will integrate, optimize and demonstrate advanced crew-to-section embedded training capability for NGCV platforms. Will validate effectiveness in an operationally-relevant, field demonstration.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding change reflects planned lifecycle of this effort. | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.326 | 3.812 | 4.367 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | Project (Number/Name)<br>BG1 / *Sensors for Auto Oper and Survivability Adv Tech* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BG1: *Sensors for Auto Oper and Survivability Adv Tech* | - | 12.328 | 12.726 | 9.592 | - | 9.592 | 9.591 | 12.767 | 12.905 | 13.034 | 0.000 | 82.943 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures, optimizes, and demonstrates automated, advanced multi-function sensors and integrates threat cueing capabilities for operations in full spectrum, complex environments, for next generation manned, optionally manned, and robotic platform applications. This Project will deliver sensor payloads which provide greatly increased situational awareness (e.g., pre-shot and hostile fire detection, threat classification) in all environments for manned and unmanned ground vehicle systems.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Army Science and Technology modernization priorities.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Advanced Sensors with Embedded Processing | 8.695 | 8.989 | 5.827 |
| ***Description:*** Matures and demonstrates advanced, multi-spectral and multi-function sensors, and image processing capabilities with improved performance in all environments and against all threats to include low-contrast targets in camouflage or in degraded conditions. Matures and demonstrates rapid detection of concealed enemy optical threat systems (visible, midwave infrared, longwave infrared) and real-time hostile fire detection (HFD) for anti-armor threats while on the move, exploiting multi-functional imaging components and embedded processing. Enables enhanced situational awareness and targeting capabilities in complex environments via manned, optionally manned, and robotic platform applications. | | | |
| ***FY 2024 Plans:***<br>Will integrate advanced high speed, high sensitivity sensor components with novel uncooled infrared sensors to enable a modular uncooled infrared sensor system with low power processing and reduced size, weight, and power (SWAP); integrate optimized, far target location capability into advanced targeting system for increased performance while on-the-move; demonstrate targeting and threat detection sensors with embedded processing for detection of threats at increased range in complex environments; improve sensor-to-shooter timelines through automation of low level sensor tasking. | | | |
| ***FY 2025 Plans:***<br>Will develop advanced sensor components to inform future maturation of a common, modular multispectral sensor system with low power processing and reduced SWaP; mature and demonstrate precision far target location for on-the-move performance | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BG1 / *Sensors for Auto Oper and Survivability Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| and reduced crew workload for legacy and next generation targeting and surveillance systems; exploit targeting and threat detection sensors with embedded processing in a laboratory environment to validate reduced user interactions and improved crew performance; optimize sensor-to-shooter timelines through automation of low-level sensor tasking and smart fusion of sensor data outputs.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease reflects elimination of efforts to mature sensor components for a common, modular multispectral sensor system with low power processing and reduced SWAP. | | | |
| ***Title:*** Multi-Mission Payload<br>***Description:*** Matures and demonstrates sensor payloads for ground vehicle based unmanned aerial systems to detect line of sight, and beyond line of sight threats and complex obstacles such as personnel and vehicles in all environments.<br>***FY 2024 Plans:***<br>Will demonstrate polarization sensors co-located with existing electro-optic/infrared (EO/IR) sensors and advanced lasers on a rotary wing small unmanned aerial system (sUAS) to enhance detection of a wider range of threats and to improve target location capabilities in complex terrain and temperate environments; demonstrate real-time feature extraction and target detection capabilities on-board the sUAS to detect near peer threats while suppressing clutter to reduce false alarms<br>***FY 2025 Plans:***<br>FY 2025 Plans: Will optimize polarized sensors and demonstrate with embedded detection algorithms and a ground penetrating radar sensor with synthetic aperture radar processing to accurately identify locations of near peer threats from small UAS systems. Will provide threat data and their precise locations onto the tactical network from the sUAS in real time to support maneuver decisions for improved survivability of US combat vehicles.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding increase is an economic adjustment. | 3.633 | 3.737 | 3.765 |
| **Accomplishments/Planned Programs Subtotals** | 12.328 | 12.726 | 9.592 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | Project (Number/Name)<br>BG3 / *Modeling and Simulation for MUMT Advanced Tech* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BG3: *Modeling and Simulation for MUMT Advanced Tech* | - | 5.816 | 6.276 | 6.456 | - | 6.456 | 6.775 | 6.729 | 7.154 | 6.703 | 0.000 | 45.909 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures and demonstrates modeling and simulation (M&S) tools/technologies to assess and improve freedom of movement for ground forces and supports vehicle developers by addressing challenges for robotic and ground vehicles. This Project matures and demonstrates obstacle detection capabilities for autonomous systems operating in complex environments. This Project also matures and demonstrates real-time mobility decision support tools, vehicle-terrain interaction models for autonomous convoy operations, simulation tools for vehicle mobility in highly altered terrain, and M&S tools for predicting the performance of autonomous vehicles. These M&S technologies can be integrated across Army vehicle platforms as required.

Work in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) / Project BG2 (Modeling and Simulation for MUMT Technology).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Simulation Tools for Combat Vehicle Robotics (CoVeR) Demonstrations<br>***Description:*** This effort matures and demonstrates M&S tools to support the development of autonomous ground vehicle platforms and components for successful maneuver in unstructured and mission relevant environments. This effort demonstrates M&S capabilities to evaluate hardware and software technologies enabling battlefield autonomy in complex and challenging environments. | 5.816 | - | - |
| ***Title:*** Autonomous Vehicle/Terrain Interactions Demonstration<br>***Description:*** This effort matures and demonstrates the Virtual Autonomous Navigation Environment (VANE) to robustly simulate multiple vehicles/teaming behaviors operating in complex formations and complex, unstructured environments. This effort provides the capabilities to computationally assess manned/unmanned vehicle maneuvering through cross-country environments ensuring battlefield overmatch.<br>***FY 2024 Plans:*** | - | 6.276 | 6.456 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BG3 / *Modeling and Simulation for MUMT Advanced Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Will integrate robust, high-fidelity, physics-based sensor models into the Virtual Autonomous Navigation Environment (VANE) M&S tool. Will demonstrate high-fidelity M&S tools integrated with Software-in-the-Loop capabilities to simulate and predict simple, coordinated manned-unmanned teaming movements. Will demonstrate the rapid generation of relevant geospacial world scenes.<br>***FY 2025 Plans:***<br>Will integrate and demonstrate high-fidelity M&S tools coupled with software-in-the-loop capabilities simulating and predicting human/machine interactions of collaborative MUM-T movements. Will demonstrate advanced vehicle terrain interface and soft-soil terramechanics for ground vehicle systems operating and highly altered terrain/environments. Will integrate and demonstrate real-time, physics-based thermal sensor modeling capabilities in operational environments.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding increase reflects planned increase of workflows for this effort as technologies are transitioned for maturation and demonstration. | | | |
| **Accomplishments/Planned Programs Subtotals** | 5.816 | 6.276 | 6.456 |

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

N/A

**Remarks**

N/A

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | Project (Number/Name)<br>BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BG7: *Ground Systems Active Defense (GSAD) Advanced Tech* | - | 59.331 | 60.617 | 51.960 | - | 51.960 | 52.996 | 56.772 | 66.034 | 62.981 | 0.000 | 410.691 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures and demonstrates protection and survivability technologies to increase the survivability of ground vehicles and the protection of the Soldiers who depend on them. The tasks will focus on component maturation and demonstration and transfer products for demonstration as holistic (vehicle level) solutions. The Project will mature and demonstrate technologies to defeat threats throughout the timeline of a threat engagement; from obscuring a target, to actively defeat a threat and through mitigating its effects after engagement. These technologies include the active employment of smoke, physical and electronic active protection, advanced and adaptive armors, advanced and active blast mitigation systems and adaptive interior protection.

This Project will be coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) and transitions to PE 0604852A (Suite of Vehicle Protection Systems - EMD).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle System Center (GVSC) and Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Advanced Radar and Soft-Kill (A-RASK) Suite | 6.567 | 6.836 | 6.620 |
| ***Description:*** This effort matures and demonstrates next generation vehicle radar technologies and holistic electronic warning and soft-kill countermeasure techniques to support a layered modular active protection suite and ensure the survivability of ground combat platforms in all-weather day or night conditions with 360 degree situational awareness and threat Anti-Tank Guided Missile (ATGM) defeat. | | | |
| ***FY 2024 Plans:***<br>Will continue development of universal threat detection sensor hardware and algorithms to detect priority ATGM threats; complete models of the system and subsystem components and analyze performance of the technology against emerging threat performance parameters; evaluate models to identify methods for optimizing the system and subsystem components; develop additional soft-kill countermeasure techniques for emerging classes of ATGM threats. | | | |
| ***FY 2025 Plans:*** | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Will mature soft-kill countermeasure techniques to defeat laser-guided ATGM threats; Will determine optimized sensor configuration for detection of unknown/unexploited threats; Will improve threat detection algorithms to include additional emerging threat classes and increase accuracy of threat tracking; Will demonstrate representative hardware with enhanced algorithms for detection of unknown/unexploited threats in in relevant environment.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding change reflects planned lifecycle of this effort. | | | |
| ***Title:*** Soft-Kill System Development<br>***Description:*** This effort matures and demonstrates soft-kill system technologies to protect combat vehicles from current and emerging ATGM threats at increased stand-off distances with an unlimited magazine and low collateral hazard. This capability will also improve situational awareness to vehicle occupants by detecting and alerting when threats have been fired. Technologies will be optimized and integrated on combat vehicles using the Modular Active Protection System (MAPS) Framework and Controller. They will be demonstrated in a relevant environment.<br>***FY 2024 Plans:***<br>Will integrate the soft-kill system onto a ground combat vehicle; validate the soft-kill system performance through hardware-in-the-loop (HWIL) lab evaluation and physical live-fire demonstration, including demonstrating 360 degree field of regard and on-the-move capabilities; demonstrate the ability to defeat multiple ATGM classes.<br>***FY 2025 Plans:***<br>Will begin development and maturation of next increment of soft-kill subsystems to address additional threats. Will environmentally harden the system, begin upgrading to the latest revision of the Modular Active Protection System Framework. Improve optimization of subsystems for space, weight, and power (SWAP) and begin virtual and lab demonstrations to assess subsystem performance and robustness in preparation for system integration.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>The funding decrease reflects a shift in focus from testing efforts of previous increment capability to maturation design updates for the next increment capabilities. | 15.046 | 16.867 | 12.833 |
| ***Title:*** Survivability Capability Characterization and Demonstration<br>***Description:*** This effort evaluates, validates, and demonstrates emerging protection technologies to characterize and assess their performance and maturity and potential for transition to Product Manager (PdM) Vehicle Protection System (VPS).<br>***FY 2024 Plans:*** | 2.354 | 2.389 | 2.456 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Will evaluate selected survivability subsystem for performance and platform integration feasibility; coordinate desired technical knowledge and provide to transition partner, informing our acquisition stakeholders so they can determine the viability of technology insertion on selected platform(s); continue to identify available survivability subsystems for uniqueness and applicability to current ground vehicle platforms requirements.<br>***FY 2025 Plans:***<br>Will complete Survivability subsystem/system demonstration, provide documentation and reports for selected survivability subsystems, and transition relevant information to stakeholders.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding change reflects planned lifecycle of this effort. | | | |
| ***Title:*** Sensors for Adaptive Armor<br>***Description:*** This effort matures and demonstrates sensor technology to enable an adaptive armor system using the MAPS Framework and Controller on a combat vehicle platform. This effort matures real-time processing software, continuously refines the threat trajectory prediction algorithm and integrates sensors with an adaptive countermeasure for threat defeat to the MAPS Framework and Controller to ensure the activation of adaptive armor to protect against incoming threats. | 1.476 | - | - |
| ***Title:*** APS Residuals Protection Maturation and Complex Threat Attack Protection (CTAP)<br>***Description:*** This effort contributes to the Army's ground vehicle survivability by maturing, integrating, and demonstrating advanced technologies which physically defeat incoming threats. These technologies involve passive and reactive mechanisms that work seamlessly with active protection systems in order to increase the overall efficiency of the system. This effort will mature and demonstrate armor components that defeat residual blast and fragmentation from hard-kill active protection systems engagements with kinetic threats in order to protect vehicle occupants and critical subsystems. This effort also matures and demonstrates armor and occupant protection components that provide threat defeat for advanced and emerging threats with complex defeat mechanisms.<br>***FY 2024 Plans:***<br>Will mature and demonstrate component technologies developed under PE 0602145A, Project BG 6, Advanced Concepts for Active Defense for vehicle and occupant protection against advanced and emerging threats with complex defeat mechanisms; mature and package these component designs for vehicle integration including durability; demonstrate hardened component's threat defeat performance through exposure to environmental conditions (e.g. MIL-STD-810); validate that the packaged component's physical parameters such as size and weight are able to meet vehicle system-level design constraints.<br>***FY 2025 Plans:*** | 7.313 | 9.471 | 6.735 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Will build upon prior year's work, at the system level for demonstration, to integrate packaged component designs for protection against advanced and emerging threats which employ complex defeat mechanisms. Will mature and optimize designs through integrated system-level environmental and automotive durability testing, followed by ballistic testing, to validate performance against system-level requirements. Will validate compliance with the Modular Active Framework. Will provide capstone demonstrations of capabilities against pacing threat defeat in a relevant environment.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease reflects reduced test and demonstration activities planned in FY25. | | | |
| ***Title:*** Controls and Architecture<br>***Description:*** This effort provides the basis for holistic (vehicle level) active defense by ensuring compatibility of active defense subsystems and systems. This effort matures and demonstrates the effectiveness and efficiency of the controls and architecture for active defense systems. The focus will be to enable the integration of multiple emerging survivability technologies into safe and secure configurations. This effort will optimize size, weight, and power - cooling (SWaP-C) performance for the system components.<br>***FY 2024 Plans:***<br>Will perform system-level demonstration of the initial base kit hardware and software products in a lab environment; continue to optimize software against established layered survivability technologies and ensure minimal impact to fielded technology; report and define requirements for collaborative active defense.<br>***FY 2025 Plans:***<br>Will complete laboratory demonstration and transition deliverables to program office. Will document designs for advancements of next phase of active defense technologies.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>The funding decrease is in accordance with the project plan to transition layered survivability technologies. | 5.520 | 5.560 | 2.565 |
| ***Title:*** Hard Kill Active Protection System (HK APS) Development, Integration, and Demonstration<br>***Description:*** This effort matures, integrates, and demonstrates a HK APS capable of defeating Rocket Propelled Grenades (RPGs), Anti-Tank Guided Missiles, and Recoilless Rifles ensuring the platform's ability to shoot, move and communicate after an engagement. The system will be compliant to the Modular APS Framework (MAF). This effort will optimize an HK APS that includes the following subsystems; counter-measure, launcher, and sensors (active/passive). Will demonstrate HK APS capabilities in a virtual and live fire demonstration in a relevant operational environment. | 21.055 | 19.494 | 19.809 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Counter-measure (CM): Matures and demonstrates CM designs that includes the following aspects: blast size, time of flight, velocity, engagement distance, accuracy, and SWaP-C. Analysis will be conducted for each counter-measure component as well as at the sub-system level. Demonstrations will be performed in the following environments: virtual, hardware in the loop, and live fire.<br><br>Launcher: Matures and demonstrates launcher designs that considers the following aspects: SWaP-C, engagement speed and accuracy, number of launchers, material composition and reliability. The most mature and suitable launcher for the project will be demonstrated in the following environments: virtual, hardware in the loop, and live fire.<br><br>Sensors: Matures and demonstrates overall sensor suite design (active/passive) that considers the following aspects; radar frequency, power, weight, volume, algorithms, accuracy, search range, tracking and identification time, and passive cueing integration and optimization. The most mature and suitable sensor suite (active/passive) for the project will be demonstrated in the following environments: virtual, hardware in the loop, and live fire.<br><br>Integration: Demonstrate the matured HK APS sub-systems on a platform in the following environments: virtual, hardware in the loop, and live fire. This will also analyze subsystem and system performance characteristics against Integrated Product Team (IPT) stakeholder requirements. Develop a performance baseline for future hard kill system evaluations.<br><br>***FY 2024 Plans:***<br>Will execute a system-level Preliminary Design Review including the Countermeasure (CM), Launcher and Sensor sub-systems - all of which draw from the baselines established in the sub-system Preliminary Design Reviews; progress to conducting individual Critical Design Reviews for the CM, Launcher, and Sensor sub-systems with industry and government experts; improve and optimize an HK APS simulation to represent the system in a relevant environment and conduct overall system performance analysis; conduct demonstrations of CM and Sensor sub-system capabilities in a System Integration Laboratory setting; improve integration plan for the sub-systems into a unified HK APS onto the demonstration platform.<br><br>***FY 2025 Plans:***<br>Will provide Interface Control Documents at the sub-system level, including those for the Countermeasure, Launcher, Fire Control Solution, and Radar. Will update the system-level Interface Control Document based on sub-system finalization completing the Final Design Review package in order to baseline the system architecture. Will develop radar subsystem components for integration and testing. Will conduct testing-validation and demonstration of Countermeasure sub-system capabilities.<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding increase is an economic adjustment. | | | |
| ***Title:*** Integrated Signature Management | - | - | 0.942 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Description:*** This effort provides the capability for ground vehicle systems to achieve increased standoff from threat system detection and targeting, enabling freedom of maneuver and the option to strike first, through the use of novel technology. This effort matures and demonstrates signature management technology that is integrated into the vehicle system, as opposed to ad hoc appliques that do not consider all other vehicle requirements. This effort will optimize a system level solution that considers size, weight, power consumption, and cost impacts to the platform. This effort will provide a demonstration of the improvement in signature management capability in an operationally-relevant environment.<br><br>***FY 2025 Plans:***<br>Will build upon FY2024 effort under 6221450A/BG6. Will mature selected component integrated signature management technologies transitioned from PE 0602145A/BG6 Advanced Concepts for Active Defense, by validating individual component performance and integrating the technologies into a physical system for preliminary design review. Will optimize system design through system-level modeling and simulation.<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>This effort is new for FY25 with funding realigned from Project Element (PE) 0602145A / BG6 Advanced Concepts for Active Defense Technology to focus on maturing the signature management technology. | | | |
| **Accomplishments/Planned Programs Subtotals** | 59.331 | 60.617 | 51.960 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | Project (Number/Name)<br>BG9 / *Obscuration Advanced Technology* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BG9: *Obscuration Advanced Technology* | - | 2.664 | - | - | - | - | - | - | - | - | 0.000 | 2.664 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

The Project matures and demonstrates obscurant technologies with potential to enhance personnel and platform survivability by degrading threat force surveillance sensors and defeating the enemy's target acquisition devices, missile guidance, and directed energy weapons. Dissemination systems for new and improved obscurants are developed with the goal of providing efficient and safe screening of deployed forces. Synthetic Biology Manufacturing technologies in this project will provide Department of Defense (DoD) with the ability to manufacture products such as explosive alternatives and defense-only critical chemicals & materials.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is related to and fully coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology).

Work in this Project performed by the Chemical and Biological Center (CBC).

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Advanced Obscuration<br>***Description:*** This effort matures and demonstrates the dissemination of new and advanced obscurants. | 2.664 | - | - |
| **Accomplishments/Planned Programs Subtotals** | 2.664 | - | - |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | | | | | | | | | | Date: March 2024 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | | | | | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | | | | Project (Number/Name)<br>BH6 / *Platform Electrification and Mobility Adv Tech* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2023** | **FY 2024** | **FY 2025 Base** | **FY 2025 OCO** | **FY 2025 Total** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **Cost To Complete** | **Total Cost** |
| BH6: *Platform Electrification and Mobility Adv Tech* | - | 45.728 | 65.647 | 40.579 | - | 40.579 | 42.489 | 41.422 | 45.167 | 45.618 | 0.000 | 326.650 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures, integrates and demonstrates technologies to electrify both manned and unmanned Next Generation Combat Vehicle (NGCV) platforms. Electrification of these platforms will enable advanced onboard electrified payloads such as directed energy weapons, reduce battlefield fuel consumption, and provide new capabilities such as burst acceleration, extended silent mobility and silent watch. This Project will also mature, integrate and demonstrate technologies to increase electric power such as a high voltage/temperature generator and high power/ temperature power electronics as well as technologies to reduce power demands including composite rubber band track and adaptive hydro-strut suspension.

This Project matures, integrates and demonstrates energy storage and charging technologies and addresses associated domestic supply chain challenges. This Project also continues work between the Department of Energy and the Department of the Army with a focus on energy storage for electrification, providing an emphasis on developing advanced technologies that enable military ground vehicles to become significantly more energy efficient. The combined efforts in this project will have a positive impact toward reducing Army impact on climate change.

Work in this Project complements Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) / Project BH5 (Platform Electrification and Mobility Tech)

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Platform Electrification Technologies | 11.652 | 13.636 | 4.283 |
| ***Description:*** This effort matures and integrates components and sub-systems in order to demonstrate a modular electrification architecture that scales across light to heavy weight classes of combat vehicles. | | | |
| ***FY 2024 Plans:***<br>Will integrate components for electric drive cooling system, including fluid pumps, heat exchangers, fans, and interconnecting components. Will optimize platform electrification system performance in the system integration laboratory. Will validate performance under full range of military conditions. Will improve electrification architecture robustness during faults and degraded | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BH6 / *Platform Electrification and Mobility Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| modes possible from battlefield damage. Will improve recharge rate of a modular high voltage energy storage system. Will integrate technology from non-traditional vendors to improve performance of composite track system technology with longer lasting compounds at higher weight carrying capacities to increase mobility<br>***FY 2025 Plans:***<br>Will demonstrate traction motor system for heavy combat vehicle weight class.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease reflects the planned lifecycle of this effort with only traction motor work continuing in FY25. | | | |
| ***Title:*** Advanced Mobility Technologies<br>***Description:*** This effort matures and demonstrates a reduced weight composite running gear system for medium combat vehicle applications which increases operational effectiveness and reduces fuel consumption.<br>***FY 2024 Plans:***<br>Will validate segmented composite running gear and track systems to prove out component performance and supportability improvements.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease reflects planned conclusion of this effort. | 5.949 | 1.699 | - |
| ***Title:*** Advanced Vehicle Power Technology Alliance - Electrification Technology<br>***Description:*** This effort matures and develops advanced energy storage technologies to improve power and energy performance and safety for vehicles. Higher energy stored with less space and weight increases vehicle efficiency and range. Ensures electrified ground vehicles have enough power for mobility, silent watch, and enables capabilities such as advanced protection, lethality and network capabilities. This effort is a partnership with the Department of Energy.<br>***FY 2024 Plans:***<br>Will demonstrate commercial based advanced energy storage system on a combat vehicle to enable all-electric capability.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>The decrease in funding reflects completion of this effort. | 2.166 | 2.406 | - |
| ***Title:*** System/Vehicle Integration and Test<br>***Description:*** This effort integrates advanced mobility, platform electrification components and electrification architecture technologies into surrogate platforms and demonstrates the performance, scalability and modularity of the system approach which | 3.910 | 8.950 | 2.148 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BH6 / *Platform Electrification and Mobility Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| will provide the capabilities of silent mobility, improved mobility performance, improved operational duration without re-supply, and provides power to enable integration of advanced protection, lethality and network capabilities.<br><br>***FY 2024 Plans:***<br>Will complete system-level integration and laboratory testing over the full range of military operating conditions; mature control system software to enable in-vehicle testing. Will integrate components into surrogate vehicle demonstrator.<br><br>***FY 2025 Plans:***<br>Will demonstrate silent operation extension technology in the system level integration lab.<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease is due to completion of demonstration with component level maturation for follow-on effort realigned to enhanced combat hybrid capability. | | | |
| ***Title:*** Scalable Electrification & Control Architecture Technology<br><br>***Description:*** This effort validates component-level performance and integrates the power distribution and control components to implement a common, scalable, electrified vehicle power architecture to enable analyze layered survivability technologies, high voltage batteries, fast vehicle charging from the grid, and silent mobility on combat platforms from 15 to 50 tons.<br><br>***FY 2024 Plans:***<br>Will improve subsystem performance incorporating the new hardware (high voltage power distribution and high voltage power converter); optimize subsystem software to fully take advantage of the new capabilities and use-cases they enable.<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease reflects planned conclusion of this effort. | 3.471 | 4.224 | - |
| ***Title:*** Robotic Combat Vehicle Silent Watch and Mobility Range Extension Advanced Technology<br><br>***Description:*** This effort matures and demonstrates JP8 reformer components and sub-systems that provide extended silent watch and mobility as part of a modular electrification architecture supporting robotic combat vehicles. The Army's robotic combat vehicles are expected to have increased silent watch and silent mobility requirements that are not met by current technologies.<br><br>***FY 2024 Plans:***<br>Will demonstrate JP8 reformer and metal supported solid oxide fuel cell system in a medium robotic combat vehicle for increased silent watch and mobility; conduct system level design of power dense range extender.<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:*** | 1.984 | 3.545 | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BH6 / *Platform Electrification and Mobility Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| In Fiscal Year (2024), this effort is completed. | | | |
| ***Title:*** Parallel Hybrid Electric Combat System<br>***Description:*** This effort is focused on developing and demonstrating a parallel hybrid electric capability for tracked combat veicles that will enable silent mobility and improved fuel efficiency. | 1.767 | - | - |
| ***Title:*** Tactical and Wheeled Vehicles Hybrid Electric System<br>***Description:*** This effort is part of the climate change initiative to reduce vehicle platform carbon emissions through development of hybrid electric, anti-idle and multi-vehicle power networking capabilities for tactical and wheeled platforms.<br>***FY 2024 Plans:***<br>Will validate subsystems for the electrically controlled clutch and multi-vehicle networking node. Will validate integration software and supervisory control system in a systems integration laboratory. Will integrate components into a tactical vehicle system evaluation.<br>***FY 2025 Plans:***<br>Will optimize hybrid-electric system and light combat and tactical vehicle performance in the system integration laboratory and on vehicle; . Will validate performance under full range of military conditions; . Will improve electrification architecture robustness during faults and degraded modes possible resulting from battlefield damage; . Will demonstrate capability of the light combat and tacticalvehicle in a tactical microgrid technology demonstration.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease reflects planned completion of this effort. | 6.282 | 5.767 | 1.726 |
| ***Title:*** Battery Technologies for Supply Chain Security<br>***Description:*** This effort researches technologies that mitigate battery supply chain security issues as it relates to common military form factors that are critical to military ground vehicle electrification and other Army battery applications. This effort is part of a coordinated effort to conduct assessments of technologies across the Defense Advanced Battery Supply Chain along with DoD battery technology projects in PEs 0603342D8Z, 0605798D8Z, 0603680D8Z, 0607210D8Z, 0605805Z, 0603724N, and 0901212N. This effort matures and demonstrates an import/export power capability that will allow combat vehicles to interface with the existing electrical grid in a compact, highly efficient package that is installed and carried in the vehicle.? It will also support interfacing to microgrid hardware for dispersed operations and flexible power on the battlefield.? This investment would reduce fuel consumption and increase operational range, furthering the enhancement of reducing the logistic burden of fuel and towed power generation. | 8.547 | 16.656 | 8.517 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BH6 / *Platform Electrification and Mobility Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***FY 2024 Plans:***<br>Will provide an advanced high voltage battery testing capability that can be leveraged to exploit commercial automotive energy storage technologies for military applications. Enhanced capability will be used to validate commercial automotive battery technologies in military specific environmental conditions to develop a gap analysis of how the commercial battery will survive in a military unique environment. This gap analysis will allow for design optimization of commercial technologies to facilitate improved system performance in military vehicle applications. Will exploit testing capability to validate and demonstrate scale-able battery technologies for various DOD vehicle applications. Will optimize and mature 6T common form factor Li-ion (Lithium ion) battery technology and packaging to demonstrate alternative uses for the standardized battery to accelerate the electrification of other Army and DOD platforms. Will validate system level safety testing to provide an accelerated pathway for Li-ion 6T implementation. Will leverage industrial base assessment to design and develop Li-ion 6T battery technologies with higher percentages of domestically sourced cells and materials.<br>***FY 2025 Plans:***<br>Will continue to exploit the Li-ion 6T, Small Tactical Universal Battery (STUB), Conformal Wearable Battery (CWB), and BB2590 form factor to cultivate new applications for this technology to increase standardization and volume to and reduce costs. Will optimize the vehicle import/export power system for power density and further compatibility with the grid and microgrid systems.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease is due to significant reduction in testing and more focused supply chain investment. | | | |
| ***Title:*** Combat Vehicle Hybrid Electric Capability Demonstration<br>***Description:*** This effort is part of the climate change initiative to reduce vehicle platform carbon emissions through development and demonstration of hybrid electric and battery dominant vehicles. This effort matures technology to perform rapid recharging of electric vehicles in battlefield environments. This effort demonstrates capabilities applicable to both wheeled tactical vehicles and tracked combat vehicles.<br>***FY 2024 Plans:***<br>Will validate parallel hybrid design architectures for medium combat tracked vehicle platforms. Will perform concepting studies and analysis of potential technology solutions to improve vehicle performance, offer silent mobility, and improve fuel efficiency. Will conduct soldier operated demonstrations and gather feedback to refine hybrid system operations. Will evaluate a mobile system to include power generation and distribution to combat/tactical electrified vehicles.<br>***FY 2025 Plans:*** | - | 8.764 | 6.973 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BH6 / *Platform Electrification and Mobility Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Will improve performance of the parallel hybrid design architecture for medium combat tracked vehicle platforms; integrate hardware for implementation of the parallel hybrid architecture; optimize the system controls during component validation to improve efficiency and mobility for future parallel hybrid tracked vehicles.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding change reflects planned lifecycle of this effort after early demonstrations of commercial technologies. | | | |
| ***Title:*** Next Generation Power Conversion and Distribution Electronics<br>***Description:*** This effort increases performance, reduces the cost, and simplifies the design of next generation power conversion and power distribution electronics. By utilizing materials and techniques such as 4th generation (Gen 4) Silicon Carbide (SiC) in power electronics, this effort will explore the capabilities of this next generation semiconductor in areas such as higher voltage architectures, solving thermal management challenges, and increasing power conversion efficiency while reducing the Size, Weight, and Power (SWaP). This will significantly improve the transition potential of vehicle electrification components and will enable further vehicle electrification/hybridization of military ground vehicles.<br>***FY 2025 Plans:***<br>Will use digital engineering to initiate the maturation of power conversion and power distribution components using Gen 4 SiC; utilize modeling, simulation, and analysis to quantify improvements of Gen 4 SiC for both power electronics and power architectures.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Increase to support new research efforts for next generation power conversations and distribution electronics. | - | - | 3.150 |
| ***Title:*** Extreme Energy Density Energy Storage Technology<br>***Description:*** Mature, integrate and validate battery performance of multiple-cell battery modules to enable an Extreme Density Energy Storage Systems for hybrid electric drive combat platforms. Also includes efforts with Department of Energy (DoE) to consider army vehicle applications in their development efforts.<br>***FY 2025 Plans:***<br>Will mature and evaluate battery module performance for high energy battery systems for battery dominate electrified combat platforms.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Increase to support new research efforts in extreme energy density energy storage technology. | - | - | 2.952 |
| ***Title:*** Advanced Running Gear and Suspension System Technology | - | - | 1.072 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BH6 / *Platform Electrification and Mobility Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Description:*** This effort matures, integrates, and demonstrates an advanced track and suspension system for heavy combat vehicle applications which offers significantly reduced system weight, maintenance, noise and vibration over conventional systems as well as increased operational effectiveness on- and off-road and lower platform fuel consumption.<br><br>***FY 2025 Plans:***<br>Will improve and mature performance of composite track system technology with longer lasting compounds at higher weight carrying capacities; optimize and mature external suspension system design to increase mobility performance at higher weight carrying capacities.<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Increase to support new research efforts in advanced running gear and suspension system technology. | | | |
| ***Title:*** Electric Propulsion System Technology<br><br>***Description:*** This effort matures, integrates, and demonstrates the propulsion system and sub-systems required to power heavy combat vehicles with hybrid-electric propulsion systems. It also develops the support hardware and auxiliary systems to allow integration and thermal management of electrified components and energy storage for heavy combat vehicles.<br><br>***FY 2025 Plans:***<br>Will begin develop component- level improvement and integration to ensure system level requirements can be met; Will mature and integrate a hub drive system to support an Advanced Electric Drive system. Will mature supporting auxiliary and cooling subsystems to allow operation of electrified components and energy storage.<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Increase supports new research efforts in electric propulsion system technology. | - | - | 9.081 |
| ***Title:*** Extreme Energy Density Storage Technology<br><br>***Description:*** This effort matures and develops advanced energy storage technologies to improve power and energy performance and safety for vehicles. Higher energy stored with less space and weight increases vehicle efficiency and range. Ensures electrified ground vehicles have enough power for mobility, silent watch, and enables capabilities such as advanced protection, lethality and network capabilities. This effort is a partnership with the Department of Energy.<br><br>***FY 2025 Plans:***<br>Will evaluate and mature beyond Li-ion battery technologies with increased energy and improved safety.<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:*** | - | - | 0.677 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BH6 / *Platform Electrification and Mobility Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Increase supports new research efforts in extreme energy density storage technology. | | | |
| **Accomplishments/Planned Programs Subtotals** | 45.728 | 65.647 | 40.579 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | | | | | | | | | Date: March 2024 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | | | | | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | | | | Project (Number/Name)<br>BH8 / *Enhanced VETRONICS Advanced Technology* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2023** | **FY 2024** | **FY 2025 Base** | **FY 2025 OCO** | **FY 2025 Total** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **Cost To Complete** | **Total Cost** |
| BH8: *Enhanced VETRONICS Advanced Technology* | - | 10.776 | 10.268 | 13.867 | - | 13.867 | 18.958 | 22.447 | 20.007 | 20.227 | 0.000 | 116.550 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures, integrates, and demonstrates vehicle electronics hardware such as computers, sensors, communications systems, displays, and vehicle command/control/driving mechanisms as well as vehicle software to enhance crew performance, increase vehicle fuel efficiency, reduce Size, Weight, and Power (SWaP) burdens and reduce vehicle maintenance costs. This Project also advances open system architectures (power and data) for military ground vehicles to enable common interfaces, standards and hardware implementations. This will align Program Executive Office Ground Combat Systems (PEO-GCS's) Common Infrastructure Architecture (GCIA) with current combat platform modernization efforts and inform future GCIA iterations. The overall vehicle system architecture approach provides an open architecture such as the Vehicle Integration for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance / Electronic Warfare (C4ISR/EW) Interoperability (VICTORY), to allow platforms to accept future technologies without the need for significant re-design as new technologies are developed and integrated. Additionally, this project matures infrastructure that enables the ease of integration of autonomous subsystem technologies into future and existing tactical and combat vehicle architectures. Technical challenges include software and algorithm development for increased levels of automation for both manned and unmanned systems, secure vehicle data networks, interoperability of intra-vehicle and inter-vehicle systems, and implementation of advanced user interfaces. Overcoming these technical challenges enables improved and increased span of collaborative vehicle operations, efficient workload management, commander's decision aids, embedded simulation for battlefield visualization and fully integrated virtual test/evaluation.

Research in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle Systems Center (GVSC)

| **B. Accomplishments/Planned Programs ($ in Millions)** | **FY 2023** | **FY 2024** | **FY 2025** |
|---|---|---|---|
| ***Title:*** Enhanced - Vehicle Electronics (E-Vetronics) | 10.776 | 10.268 | 13.867 |
| ***Description:*** This effort addressed technical and integration challenges in the areas of vehicle architecture and systems integration. Specifically, this effort focused on maturing and demonstrating a common ground vehicle open architecture with distributed display processing architecture, computing hardware capable of being re-configured to adapt to changes in Input / Output (I/O) needs, advanced network video distribution, advancements in slip ring technology, tactical situational awareness (SA), cooperative engagement and mission package integration through open architecture components and software. These efforts enabled future vehicle capabilities, reduced dependencies on proprietary solutions, and supported increased market | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BH8 / *Enhanced VETRONICS Advanced Technology* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| competition through open architecture components and software. This effort created the electronics architecture for future ground combat vehicles to enable software and hardware commonality and reduce system integration timing and cost.<br><br>***FY 2024 Plans:***<br>Will mature the ground vehicle common architecture, tactical situational awareness, and advanced digital visual network lines of efforts; optimize mission package integration for key network functions within the common network architecture and validate components; mature and demonstrate open system architecture products to include objective hardware available to conduct bench level demonstration; optimize the electronics architecture for future ground combat vehicles to enable software and hardware commonality and reduce system integration timing and cost.<br><br>***FY 2025 Plans:***<br>Will mature and demonstrate key network functions within the common on-vehicle network architecture; demonstrate an integrated Ground Combat Systems (GCS) Common Infrastructure Architecture (GCIA) instantiation to validate an implementation of GCIA hardware and software; optimize the ground vehicle common architecture to Technology Readiness Level (TRL) 6 for incremental transition to PEO GCS for refinement of the GCIA architecture; initiate the maturation of the architecture to address further capabilities such as cyber, on-board high-performance computing for artificial intelligence (AI), and thermally efficient electronics.<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding increase reflects planned acceleration of capabilities for GCIA and an increase in the number of capabilities in alignment with current combat platform modernization efforts. | | | |
| **Accomplishments/Planned Programs Subtotals** | 10.776 | 10.268 | 13.867 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | | | | | | | | | Date: March 2024 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | | | | | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | | | | Project (Number/Name)<br>BI3 / *Sensor Protection Advanced Technology* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2023** | **FY 2024** | **FY 2025 Base** | **FY 2025 OCO** | **FY 2025 Total** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **Cost To Complete** | **Total Cost** |
| BI3: *Sensor Protection Advanced Technology* | - | 1.666 | 1.746 | 1.752 | - | 1.752 | 1.748 | 1.750 | 1.769 | 1.787 | 0.000 | 12.218 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures and demonstrates novel sensor protection capabilities which dramatically reduce the susceptibility of our thermal electro-optic/infrared (EO/IR) sensors to ever increasing threats on the battlefield. This Project enables continuation of the mission despite potential threat laser engagements. Low-cost modular solutions will be demonstrated that can be applied across current and planned EO/IR targeting, surveillance, and situational awareness sensor systems against existing and emerging threats in support of combined arms maneuver.

Research in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology), 0602143A (Soldier Lethality Technology), 0603465A (Future Vertical Lift Advanced Technology) and 0603118A (Soldier Lethality Advanced Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Army Modernization Priorities.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center

| **B. Accomplishments/Planned Programs ($ in Millions)** | **FY 2023** | **FY 2024** | **FY 2025** |
|---|---|---|---|
| ***Title:*** Sensor Protection Advanced Technology | 1.666 | 1.746 | 1.752 |
| ***Description:*** This effort will mature and demonstrate sensor protection and signature reduction capabilities which better ensure sensors are difficult to detect, dazzle, and damage by current and future laser threats. | | | |
| ***FY 2024 Plans:***<br>Will optimize optical coating processes and materials for high performance cooled infrared systems to reduce reflections and improve signature management; mature and demonstrate a laser ID algorithm that detects an adversarial laser incident in a high performance IR sensor's imagery and reports the associated adversary laser band that is detected. | | | |
| ***FY 2025 Plans:***<br>Will mature, demonstrate, and deliver high transmission in-dewar optics with advanced coatings for improved performance and signature management. Will optimize laser ID algorithm to detect a laser incident and automatically select or tune a filter to provide protection. | | | |
| ***FY 2024 to FY 2025 Increase/Decrease Statement:*** | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BI3 / *Sensor Protection Advanced Technology* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Funding increase is an economic adjustment. | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.666 | 1.746 | 1.752 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | Project (Number/Name)<br>BI5 / *Materials Application and Integration Adv Tech* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BI5: *Materials Application and Integration Adv Tech* | - | 3.979 | 5.502 | - | - | - | - | - | - | - | 0.000 | 9.481 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures, integrates, and demonstrates lightweight novel materials, integrated computational materials engineering methods, and new manufacturing processes and methodologies. These materials and technologies enable the Army to address critical areas of survivability, mobility, and transportability within the Next Generation Combat Vehicle (NGCV).

This Project also continues the efforts originally started under Advanced Vehicle Power Technology Alliance (AVPTA) between the Department of Energy and the Department of the Army with a focus on developing advanced materials technologies that enable military ground vehicles to become significantly more energy efficient. The AVPTA, though no longer chartered, has developed a relationship between DoE and DA that continues to accelerate the conceptualization and transition to deployment of inventive and creative energy-saving concepts that the Nation needs to achieve energy security. In support of lighter military vehicles which are more fuel-efficient and capable in expeditionary scenarios, this project will mature and integrate lightweight materials and joining technologies to provide superior mobility and protection of both vehicles and occupants.

Research in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** System Design Optimization for Lightweighting | 3.212 | 4.757 | - |
| ***Description:*** This effort improves technologies, tools, and advanced manufacturing techniques in support of the Army's mission to increase mobility, protection, and transportability while reducing weight. This effort focuses on maturing and demonstrating technologies to decrease ground vehicle weight while optimizing performances and enabling the Army trade space for enhanced capabilities. The technologies being demonstrated are in the fields of material maturation, design optimization, operational metrics, joining technologies, and additive manufacturing. | | | |
| ***FY 2024 Plans:*** | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BI5 / *Materials Application and Integration Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Will mature rapid screening methods for novel, high-entropy alloys and evaluation of the process to predict the likelihood of their successful maturation; complete initial stage of integrated computational materials engineering (ICME) development resulting in the use of new technical capabilities and toolsets to understand and optimize at a component level (rather than at a fundamental or finite element level); validate ICME efforts by evaluating materials to develop robust material properties, further improving modeling and simulation for virtual prototyping; mature advanced testing methods at sub-scale, which will lead to faster results than conventional testing, thus accelerating novel material screening and maturation cycles; manufacture two alloy weld wires that can be used in wire additive processes to produce high strength components with the potential to replace high strength steel castings; complete Directed Energy Deposition (DED) design guidelines to evaluate candidate parts for advanced manufacturing processes, process parameters for the operation of the equipment as well as mechanical and materials performance metrics for part qualification and justification.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Decrease is due to effort completion in FY24. | | | |
| ***Title:*** Advanced Vehicle Power Technology Alliance - Materials<br>***Description:*** This effort matures and demonstrates lightweight materials and joining technologies in support of lighter military vehicles which are more fuel-efficient and expeditionary with superior mobility and protection of both vehicles and occupants. Lighter materials/constructions and advances in joining technologies such as multi-material and dissimilar material joining will lead to lightweight military vehicle structures.<br>***FY 2024 Plans:***<br>Will evaluate materials for integration into battery containment, powertrain weight and/or space claim reduction, and multifunctional structural energy storage to enable increased vehicle electrification of ground vehicles.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Decrease is due to effort completion in FY24. | 0.767 | 0.745 | - |
| **Accomplishments/Planned Programs Subtotals** | 3.979 | 5.502 | - |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | Project (Number/Name)<br>BK1 / *Autonomous Mobility Adv Tech* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BK1: *Autonomous Mobility Adv Tech* | - | 6.221 | 5.305 | 3.860 | - | 3.860 | - | - | - | - | 0.000 | 15.386 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures and demonstrates data-based Artificial Intelligence and Machine Learning (AI/ML) technologies to increase autonomy and mobility and perform teamed operations with manned and unmanned air and ground vehicles in a military relevant environment through data collection on relevant platforms. Data collection will involve both simulation and live collection. Simulation will provide a baseline to correctly collect, clean, and analyze data that meets the need for improving algorithms for both formation control and unmanned aerial vehicle map input for unmanned ground vehicle mobility, while reducing costs. Live data will start with Surrogate platforms in local areas. The Project will use AI/ML techniques to mature and demonstrate intelligent formation control to be used in complex, off-road terrain without the need for a global positioning system (GPS). Data will be collected from mounted platforms utilizing sensors to improve algorithms for relative and absolute positioning, undistributed formation control, and increased speeds of unmanned platforms. The utility of the military-relevant data will be demonstrated through a datahub which is designed specifically for robotic data types, formats and sizes. The datahub infrastructure is a unique solution to handle such ground vehicle data needs and will be able to optimize the outcome of the collected data. Also, the Project will use AI/ML techniques to optimize intelligent autonomous ground platform planning team with Unmanned Aerial Systems (UAS). Data collected from air vehicles will be converted to maneuverable information for unmanned ground platforms with the identification of obstacles, go/no-go areas, terrain classification, and optimal suggested paths.

Research in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) / Projects BF3 (Combat Vehicle Robotics Tech) and BF4 (Combat Vehicle Robotics Adv Tech)

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Machine Learning Data Collection | 1.726 | 1.558 | 1.907 |
| ***Description:*** This effort matures and demonstrates techniques and technologies for mass unmanned ground vehicle data collection to be used towards Army research in autonomy and mobility with machine learning efforts. | | | |
| ***FY 2024 Plans:*** | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BK1 / *Autonomous Mobility Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Will optimize and demonstrate the datahub (project data environment) infrastructure to properly interface with ML and AI development environments to leverage the unique, military-relevant collected and hosted data in the project for the development of new robotic and autonomous ground vehicle capabilities for improved mobility and maneuver.<br>***FY 2025 Plans:***<br>Will create and document detailed final report with results, conclusions, and recommendations in addition to data packages supporting potential ATP to transition partners. Will further collect and ingest maneuver data and customize datahub for hosting maneuver-relevant data.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding increase reflects efforts to complete final year deliverables on this task. | | | |
| ***Title:*** UAS Mapping<br>***Description:*** This effort matures and demonstrates the use of combined UAS and ground system (UGV) data with ML techniques to develop intelligent unmanned ground system path planning. Data collected from UAS will be converted to maneuverable information for unmanned ground platform to help with the identification of enemy positions, go/no-go areas, terrain classification, and optimal suggested paths. | 1.581 | - | - |
| ***Title:*** Formation Control<br>***Description:*** This effort uses ML techniques to develop intelligent formation control for manned and unmanned ground vehicles to be used on maintained roads and in contested environments under electronic warfare (EW) and GPS-denied conditions. Data will be collected from mounted platforms utilizing special internal and external sensors to develop and demonstrate algorithms for exact positioning, undistributed formation control, and increased speed.<br>***FY 2024 Plans:***<br>Will optimize the performance of the ML models for multi-vehicle maneuver to approach manned-vehicle formation control performance in relative and absolute positioning and under specific mission goals and context.<br>***FY 2025 Plans:***<br>Will prepare and document results and conclusions including specifics for data collection and modeling for maneuver and formation control applications.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding change reflects planned lifecycle of this effort which concludes in FY25. | 2.914 | 3.747 | 1.953 |
| **Accomplishments/Planned Programs Subtotals** | 6.221 | 5.305 | 3.860 |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BK1 / *Autonomous Mobility Adv Tech* |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | | | | | | | | | | Date: March 2024 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | | | | | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | | | | Project (Number/Name)<br>BK4 / *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2023** | **FY 2024** | **FY 2025 Base** | **FY 2025 OCO** | **FY 2025 Total** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **Cost To Complete** | **Total Cost** |
| BK4: *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech* | - | 2.118 | 4.328 | - | - | - | - | - | - | - | 0.000 | 6.446 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project will mature and demonstrate armament specific hardware, algorithms and architectures to support the Next Generation Combat Vehicle with the necessary fire control on future manned and unmanned platforms.

Research in this Project is related to and fully integrated with the efforts funded in Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

Research in this Project is performed by the Armaments Center (AC)

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Next Generation Intelligent Fire Control<br>***Description:*** This effort will deliver armament specific hardware, algorithms and architectures to support the Next Generation Combat Vehicle with the necessary fire control on future manned and unmanned platforms.<br>***FY 2024 Plans:***<br>Will optimize, mature and demonstrate fire control hardware and software to address current and future turreted systems' performance requirements. Will demonstrate improvement to operator's decision-making time by using advanced algorithms to optimize engagement priority in a target rich environment. Will optimize model characteristics by assessing performance against specified targets and scenarios.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease reflects planned completion of workflows in FY2024 | 2.118 | 2.328 | - |
| ***Title:*** Integration Compliant Fire Control Lethality Architecture<br>***Description:*** This effort will deliver armament fire control hardware and software that will be compliant to integrate with Next Generation Combat Vehicle architecture for direct fire platforms. | - | 2.000 | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BK4 / *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***FY 2024 Plans:***<br>Will mature and?demonstrate armament specific hardware and software algorithms, and open architectures for future manned and unmanned direct fire platforms. Will integrate fire-control software into open architecture Armament Mission Computer fire control hardware.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding decrease reflects planned completion of workflows in FY2024 | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.118 | 4.328 | - |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | | | | | | | | | | Date: March 2024 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | | | | | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | | | | Project (Number/Name)<br>BK6 / *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2023** | **FY 2024** | **FY 2025 Base** | **FY 2025 OCO** | **FY 2025 Total** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **Cost To Complete** | **Total Cost** |
| BK6: *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech* | - | 1.478 | 2.062 | 7.620 | - | 7.620 | 9.567 | 12.290 | 6.710 | 8.149 | 0.000 | 47.876 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures and demonstrates technologies for large caliber direct fire light-weight armament systems that will exceed the current capability of 120 millimeter (mm) direct fire cannons and be optimized for future operational environment with cross-domain engagement capability. Specifically, this Project integrates and demonstrates technologies for rapid fire on-the-move at all elevations (direct & indirect), compact ammunition design with advanced ignition, advanced recoil mitigation to reduce impulse and allow integration onto lighter platforms, automated ammunition handling and reloading. This Project also supports open architecture to enable supervised autonomy and remote operation and integrates intelligent fire control to address multi-domain targets from manned and unmanned platforms.

Work in this Project is related to and fully integrated with the efforts funded in Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) and PE 0604115A (Technology Maturation Initiatives).

Work in this Project complements Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) / Project BK5 (Adv Direct In-Direct Armament Sys (ADIDAS) Tech) and Program Element (PE) 0603464A (Long Range Precision Fires Advanced Technology) / Project CE9 (Armaments Advanced Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

Work in this Project is performed by the Armaments Center (AC)

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** Large Caliber Armament System (LCAS) | 1.478 | 2.062 | - |
| ***Description:*** This effort matures and demonstrates a next generation, automated, lightweight 120-mm armament system design for Next Generation Combat Vehicle, providing tank-like lethality for light to medium-weight optionally manned platforms. | | | |
| ***FY 2024 Plans:***<br>Will optimize technologies for improving lethal performance of direct fire projectiles against emerging threats. Will mature direct fire projectile component technologies and methodologies to increase munition effectiveness against emerging threats. | | | |
| ***FY 2024 to FY 2025 Increase/Decrease Statement:*** | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BK6 / *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Funding decrease reflects planned completion of workflow in FY2024 | | | |
| ***Title:*** Advanced Lethality Armament System for Large Caliber Advanced Tech<br>***Description:*** This effort demonstrates increased lethality solutions for current and future large caliber direct fire armament systems focused on exceeding performance of current 120mm direct fire weapons.<br>***FY 2025 Plans:***<br>Will demonstrate large caliber direct fire cannon component level technologies that increase: lethality against armored targets, probability of hit, and rate of fire. Will demonstrate compatibility with advanced ignition systems and automated ammunition handling. Will provide improved logistics and platform supportability via improved automation technologies.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>This effort initiates in FY 2025. | - | - | 7.620 |
| **Accomplishments/Planned Programs Subtotals** | 1.478 | 2.062 | 7.620 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | Project (Number/Name)<br>BP6 / *Ground Vehicle Advanced Technology(CA)* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BP6: *Ground Vehicle Advanced Technology(CA)* | - | 278.450 | - | - | - | - | - | - | - | - | 0.000 | 278.450 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**Note**

Congressional Interest Item funding provided for Ground Vehicle Advanced Technology.

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

Congressional Interest Item funding provided for Ground Vehicle Advanced Technology.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 |
|---|---|---|
| ***Congressional Add:*** Program Increase - Additive Manufacturing for Jointless Hull<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Additive Manufacturing for Jointless Hull | 20.000 | - |
| ***Congressional Add:*** Program Increase - ATE5.2 Engine Development<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ATE5.2 Engine Development | 10.000 | - |
| ***Congressional Add:*** Program Increase - Virtual and Physical Prototyping<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Virtual and Physical Prototyping | 8.000 | - |
| ***Congressional Add:*** Program Increase - HMMWV Automotive Enhancements<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for HMMWV Automotive Enhancements | 9.000 | - |
| ***Congressional Add:*** Program Increase - Advanced Adhesives<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Advanced Adhesives | 5.000 | - |
| ***Congressional Add:*** Program Increase - Autonomous Minefield Clearance<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Autonomous Minefield Clearance | 8.000 | - |
| ***Congressional Add:*** Program Increase - Carbon Fiber Tires | 5.000 | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BP6 / *Ground Vehicle Advanced Technology(CA)* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 |
|---|---|---|
| ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Carbon Fiber TIres | | |
| ***Congressional Add:*** Program Increase - Machine Learning for Advanced Lightweight Combat Vehicle Structures<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Machine Learning for Advanced Lightweight Combat Vehicle Structures | 19.000 | - |
| ***Congressional Add:*** Program Increase - Maneuverable Lightweight Electric Weight Reducer<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Maneuverable Lightweight Electric Weight Reducer | 7.500 | - |
| ***Congressional Add:*** Program Increase - Off-Road Maneuver<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Off-Road Maneuver | 5.000 | - |
| ***Congressional Add:*** Program Increase - Predictive Maintenance System<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Predictive Maintenance System | 2.000 | - |
| ***Congressional Add:*** Program Increase - Unmanned Navigational Technology<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Unmanned Navigational Technology | 3.000 | - |
| ***Congressional Add:*** Program Increase - AUGMENTED REALITY FOR DENIED ENVIRONMENTS<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Augmented Reality for Denied Environments | 7.000 | - |
| ***Congressional Add:*** Program Increase - AUTONOMOUS SYSTEMS FOR MILITARY GROUND VEHICLES<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for AUTONOMOUS SYSTEMS FOR MILITARY GROUND VEHICLES | 3.750 | - |
| ***Congressional Add:*** Program Increase - CYBERSECURITY FOR AUTONOMOUS GROUND VEHICLES<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for CYBERSECURITY FOR AUTONOMOUS GROUND VEHICLES | 9.000 | - |
| ***Congressional Add:*** Program Increase - CYBERSECURITY FOR AUTONOMOUS VEHICLES | 4.200 | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BP6 / *Ground Vehicle Advanced Technology(CA)* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 |
|---|---|---|
| ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for CYBERSECURITY FOR AUTONOMOUS VEHICLES | | |
| ***Congressional Add:*** Program Increase - DIGITAL ENTERPRISE TECHNOLOGY FOR OMFV<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for DIGITAL ENTERPRISE TECHNOLOGY FOR OMFV | 15.000 | - |
| ***Congressional Add:*** Program Increase - DIGITAL TWIN<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Digital Twin | 7.000 | - |
| ***Congressional Add:*** Program Increase - ELECTRIC DRIVE SYSTEM<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Electric Drive System | 5.500 | - |
| ***Congressional Add:*** Program Increase - ELECTRIFIED VEHICLE INFRARED SIGNATURE MANAGEMENT<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ELECTRIFIED VEHICLE INFRARED SIGNATURE MANAGEMENT | 5.000 | - |
| ***Congressional Add:*** Program Increase - ELECTRON BEAM ADDITIVE MANUFACTURING OF CRITICAL METAL RING COMPONENTS<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ELECTRON BEAM ADDITIVE MANUFACTURING OF CRITICAL METAL RING COMPONENTS | 2.000 | - |
| ***Congressional Add:*** Program Increase - ENHANCED LETHALITY ON ARMY SMALL MULTIPURPOSE EQUIPMENT TRANSPORT<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ENHANCED LETHALITY ON ARMY SMALL MULTIPURPOSE EQUIPMENT TRANSPORT | 8.000 | - |
| ***Congressional Add:*** Program Increase - HMMWV OCCUPANCY PROTECTION DEVELOPMENT<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for HMMWV OCCUPANCY PROTECTION DEVELOPMENT | 10.000 | - |
| ***Congressional Add:*** Program Increase - HUMAN DIGITAL TWINS AND HUMAN-MACHINE INTERACTION | 6.000 | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BP6 / *Ground Vehicle Advanced Technology(CA)* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 |
|---|---|---|
| ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for HUMAN DIGITAL TWINS AND HUMAN-MACHINE INTERACTION | | |
| ***Congressional Add:*** Program Increase - MODELING AND SIMULATION ACTIVITIES FOR VEHICLE DEVELOPMENT<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for MODELING AND SIMULATION ACTIVITIES FOR VEHICLE DEVELOPMENT | 10.000 | - |
| ***Congressional Add:*** Program Increase - MODULAR ELECTRIC MOTORS<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Modular Electric Motors | 5.500 | - |
| ***Congressional Add:*** Program Increase - MULTI-SERVICE ELECTRO-OPTICAL SIGNATURE CODE<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for MULTI-SERVICE ELECTRO-OPTICAL SIGNATURE CODE | 9.000 | - |
| ***Congressional Add:*** Program Increase - NANO-LED FABRICATION FOR AUGMENTED REALITY CONTACT LENS<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for NANO-LED FABRICATION FOR AUGMENTED REALITY CONTACT LENS | 10.000 | - |
| ***Congressional Add:*** Program Increase - NEXT GENERATION ELECTRIFIED TRANSMISSION<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for NEXT GENERATION ELECTRIFIED TRANSMISSION | 5.000 | - |
| ***Congressional Add:*** Program Increase - NEXT GENERATION LIGHT TACTICAL VEHICLE MANEUVER AUTONOMY<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for NEXT GENERATION LIGHT TACTICAL VEHICLE MANEUVER AUTONOMY | 5.000 | - |
| ***Congressional Add:*** Program Increase - SYNTHETIC GRAPHITE BATTERY<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Synthetic Graphite Battery | 10.000 | - |
| ***Congressional Add:*** Program Increase - VEHICLE TECHNOLOGY READINESS LEVELS | 3.000 | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BP6 / *Ground Vehicle Advanced Technology(CA)* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 |
|---|---|---|
| ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for VEHICLE TECHNOLOGY READINESS LEVELS | | |
| ***Congressional Add:*** Program Increase - ABRAMS MODERNIZATION<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ABRAMS Modernization | 30.000 | - |
| ***Congressional Add:*** Program Increase - SMALL UNIT GROUND ROBOTIC CAPABILITIES<br>***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Small Unit Ground Robotic Capabilities | 7.000 | - |
| **Congressional Adds Subtotals** | 278.450 | - |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | | | | | | | | | | Date: March 2024 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 3 | | | | | R-1 Program Element (Number/Name)<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | | | | Project (Number/Name)<br>BZ9 / *Smart Targeting Environment for Lower Level Assets* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2023** | **FY 2024** | **FY 2025 Base** | **FY 2025 OCO** | **FY 2025 Total** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **Cost To Complete** | **Total Cost** |
| BZ9: *Smart Targeting Environment for Lower Level Assets* | - | 3.331 | 4.402 | 4.206 | - | 4.206 | - | - | - | - | 0.000 | 11.939 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This Project matures and demonstrates mission targeting support software and algorithms, to include Electronic Warfare capabilities, leveraged from the Defense Advanced Research Project Agency (DARPA) System-of-System Enhanced Small Unit (SESU), current force, and Science and Technology (S&T) in order to enable small units to continuously build and share targeting data and access strike assets in multi-domain operations.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center

| **B. Accomplishments/Planned Programs ($ in Millions)** | **FY 2023** | **FY 2024** | **FY 2025** |
|---|---|---|---|
| ***Title:*** Small Targeting Environment for Lower Level Assets (STELLA ) | 3.331 | 4.402 | 4.206 |
| ***Description:*** This effort matures and demonstrates integrated target search and electronic warfare data dissemination algorithms to speed the overall targeting process. This improved process will utilize automated target search algorithms based on mission parameters to reduce processing time and interface with systems for detecting concealed targets and setting target priority. It will fuse local data processing and payload data to increase accuracy for target engagement, optimize data dissemination algorithms based on local network conditions, and streamline interfaces for small units to access joint strike assets. | | | |
| ***FY 2024 Plans:***<br>Will develop electronic warfare capability datasets to be used in conjunction with pairing of effects. Will mature pairing of electronic warfare target effects in coordination with kinetic effects. Will evaluate additional electronic warfare system use cases and develop end-to-end system demonstrations. Will conduct larger-scale, field-based demonstration activities to ensure project meets threshold metrics. Will conduct additional Soldier Touchpoint evaluations to refine front-end user interfaces. Will pursue information assurance activities and generation of necessary artifacts for authority to operate on military networks. | | | |
| ***FY 2025 Plans:*** | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Army | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603462A / *Next Generation Combat Vehicle Advanced Technology* | **Project (Number/Name)**<br>BZ9 / *Smart Targeting Environment for Lower Level Assets* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Will demonstrate novel mission planning approaches leveraging real-time situational awareness of the battlespace. Will provide software demonstration of initial threat alert concept using simulation data.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>Funding change is consistent with the planned lifecycle of this effort. | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.331 | 4.402 | 4.206 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A