Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army												Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603462A *I Next Generation Combat Vehicle Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	294.491	471.434	217.394	-	217.394	195.971	200.168	204.645	216.450	0.000	1,800.553
BF4: *Combat Vehicle Robotics Adv Tech*	-	25.788	29.321	34.703	-	34.703	36.430	45.160	45.440	45.935	0.000	262.777
BF7: *Crew Augmentation and Optimization Adv Tech*	-	3.630	4.326	3.812	-	3.812	4.358	4.415	4.418	4.466	0.000	29.425
BG1: *Sensors for Auto Oper and Survivability Adv Tech*	-	10.275	12.450	12.726	-	12.726	12.735	12.734	12.742	12.880	0.000	86.542
BG3: *Modeling and Simulation for MUMT Advanced Tech*	-	4.999	5.975	6.276	-	6.276	7.215	7.578	7.418	7.923	0.000	47.384
BG4: *Adv Mobility Experimental Prototype Adv Tech Demo*	-	2.716	-	-	-	-	-	-	-	-	0.000	2.716
BG7: *Ground Systems Active Defense (GSAD) Advanced Tech*	-	50.267	60.371	60.617	-	60.617	54.856	58.356	61.319	67.853	0.000	413.639
BG9: *Obscuration Advanced Technology*	-	2.416	2.765	-	-	-	-	-	-	-	0.000	5.181
BH4: *Ground Vehicle Holistic Defense Adv Tech*	-	0.033	-	-	-	-	-	-	-	-	0.000	0.033
BH6: *Platform Electrification and Mobility Adv Tech*	-	29.997	46.679	65.647	-	65.647	43.766	43.743	41.341	45.079	0.000	316.252
BH8: *Enhanced VETRONICS Advanced Technology*	-	9.227	10.776	10.268	-	10.268	10.618	9.378	12.735	12.873	0.000	75.875
BI3: *Sensor Protection Advanced Technology*	-	1.585	1.708	1.746	-	1.746	1.748	1.745	1.747	1.766	0.000	12.045
BI5: *Materials Application and Integration Adv Tech*	-	4.645	5.279	5.502	-	5.502	4.606	4.767	4.769	4.821	0.000	34.389
BJ1: *Vehicle System Security Advanced Technology*	-	2.365	-	-	-	-	-	-	-	-	0.000	2.365
BK1: *Autonomous Mobility Adv Tech*	-	5.859	6.221	5.305	-	5.305	5.316	-	-	-	0.000	22.701

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army											Date: March 2023	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603462A *I Next Generation Combat Vehicle Advanced Technology*							
BK4: *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech*	-	1.664	2.198	4.328	-	4.328	-	-	-	-	0.000	8.190
BK6: *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech*	-	-	1.534	2.062	-	2.062	9.905	12.292	12.716	12.854	0.000	51.363
BP6: *Ground Vehicle Advanced Technology(CA)*	-	135.250	278.450	-	-	-	-	-	-	-	0.000	413.700
BZ9: *Smart Targeting Environment for Lower Level Assets*	-	3.775	3.381	4.402	-	4.402	4.418	-	-	-	0.000	15.976

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.

This PE is directly aligned to the NGCV Army Modernization Priority.

Research is performed by the United States (U.S.) Army Futures Command and the U.S. Army Engineer Research and Development Center.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army	Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603462A *I Next Generation Combat Vehicle Advanced Technology*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	299.712	193.242	212.497	-	212.497
Current President's Budget	294.491	471.434	217.394	-	217.394
Total Adjustments	-5.221	278.192	4.897	-	4.897
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	278.450			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-5.221	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	4.897	-	4.897
• FFRDC Transfer	-	-0.258	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: BP6: *Ground Vehicle Advanced Technology(CA)*		
Congressional Add: *Program Increase - Additive Manufacturing for Jointless Hull*	15.000	20.000
Congressional Add: *Carbon Fiber and Graphite Foam Technology*	5.000	-
Congressional Add: *Program Increase - ATE5.2 Engine Development*	5.000	10.000
Congressional Add: *Combat Vehicle Weight Reduction Initiative*	5.000	-
Congressional Add: *Program Increase - Virtual and Physical Prototyping*	8.000	8.000
Congressional Add: *Program Increase - HMMWV Automotive Enhancements*	3.000	9.000
Congressional Add: *Program Increase - Advanced Adhesives*	5.000	5.000
Congressional Add: *Program Increase - Combat Vehicle Lithium 6T Battery Development*	5.000	-
Congressional Add: *Advanced Materials Applications*	12.000	-
Congressional Add: *Augmented Reality for Denied Environments*	7.000	-
Congressional Add: *Program Increase - Autonomous Minefield Clearance*	7.000	8.000
Congressional Add: *Autonomous Vehicle Mobility*	10.000	-
Congressional Add: *Program Increase - Carbon Fiber Tires*	5.000	5.000
Congressional Add: *Force Protection Vehicle Kit*	5.000	-
Congressional Add: *Fuel Cell Technology*	5.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army	Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603462A *I Next Generation Combat Vehicle Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Congressional Add: *Program Increase - Machine Learning for Advanced Lightweight Combat Vehicle Structures*	6.000	19.000
Congressional Add: *Program Increase - Maneuverable Lightweight Electric Weight Reducer*	5.000	7.500
Congressional Add: *Program Increase - Off-Road Maneuver*	5.000	5.000
Congressional Add: *Program Increase - Predictive Maintenance System*	2.000	2.000
Congressional Add: *RCV-L*	5.000	-
Congressional Add: *Short Fiber Thermoplastic Applications*	4.000	-
Congressional Add: *Program Increase - Unmanned Navigational Technology*	2.500	3.000
Congressional Add: *Virtual Autonomy Environment*	3.750	-
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
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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army	Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603462A *I Next Generation Combat Vehicle Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
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	135.250	278.450
Congressional Add Totals for all Projects	135.250	278.450

Change Summary Explanation

Increased funding to support higher priorities within the Science & Technology (S&T) portfolio which include platform electrification and mobility.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BF4 / *Combat Vehicle Robotics Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BF4: *Combat Vehicle Robotics Adv Tech*	-	25.788	29.321	34.703	-	34.703	36.430	45.160	45.440	45.935	0.000	262.777
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates innovative enabling technologies that enable 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.

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

Research in this Project supports the Next Generation Combat Vehicle (NGCV) Army Modernization Priority.

Research is performed by the United States (U.S.) Army Futures Command (AFC).

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Platform Electronic Control	11.411	8.786	6.229
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 2023 Plans: Mature and continue optimization of an expanded closed loop DBW system for robotic ground systems. Optimization of a platform side vehicle control architecture which will be aligned to a known safety standard to mature the current safety pedigree of ground robotic systems this will enable more stable interface controls enabling ease of autonomy integration. Demonstrate these enhancements through EET to show technical maturity. Continue to mature and validate RAS safety standards for unmanned ground vehicle systems based on EET activities. 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. Validation of Ground Vehicle Robotics Safety Board processes will result in improved safety pedigree which will enable			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF4 / *Combat Vehicle Robotics Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
higher confidence in receipt safety confirmation to enable testing and reduced developmental time for testing of autonomous ground combat systems. ***FY 2024 Plans:*** 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 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding decrease in FY24 is due to the development of stabilized safety processes which reduce integration risks and provide guidelines for safety certifiable unmanned systems.			
Title: Unmanned Maneuver ***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. ***FY 2023 Plans:*** Optimize and demonstrate autonomous vehicle maneuvering in hostile environments using government owned autonomy software, Robotic Technology Kernel (RTK). Mature and demonstrate the ability to conduct Manned-Unmanned Teaming maneuvers including human team members. Improve cybersecurity posture in development of autonomy. Demonstrate advanced collaborative surveillance behaviors for unmanned ground vehicles. Demonstrate all enhancements though EET to ensure the autonomous technology has been fully evaluated for system safety, thereby demonstrating technical maturity. Mature the Autonomous Ground Vehicle Reference Architecture (AGVRA) framework by developing conceptual, logical and physical data models while connecting them to exiting instantiated architectures and further develop safety and cyber models and associated libraries to support these evolving model viewpoints. Develop and mature the Robot Operating System - Military (ROS-M) to support the registration and distribution of Robotic and Autonomous System models. ***FY 2024 Plans:***	9.099	14.135	20.346

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF4 / *Combat Vehicle Robotics Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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). ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increased in FY 2024 due to transition of capabilities from PE 0602145A / Next Generation Combat Vehicle Advanced Technology Project BF3: Combat Vehicle Robotics Tech - Autonomous Behaviors & Perception. Funding also increased for the Autonomous Forward Surveillance effort which will bring additional capability for clandestine surveillance and night-time operation			
Title: Soldier-Robotic Interface Integration	5.278	4.104	5.657
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. ***FY 2023 Plans:*** Mature and demonstrate an enhanced human robot interaction technology to improve the effectiveness of the robot as a tool for the human to complete the mission utilizing built in government owned Warfighter Machine Interface (WMI) software. Exploit Manned /Unmanned Teaming technologies that will allow the operator to be at a longer standoff distance while enabling efficient control of robotic platforms. Optimize novel control methods leveraging a wide range of hardware interfaces to improve robotic control across multiple control methods (mounted interface / dismounted-tablets/heads-up displays). Demonstrate these technology enhancements through EET to validate the autonomous technology system safety and technical maturity. ***FY 2024 Plans:*** 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			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF4 / *Combat Vehicle Robotics Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase in FY24 covers the transition of Combat Vehicle Robotics Technology Human Robotic Interaction technologies. .			
Title: : Small UGV as Deployable Sensor ***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. ***FY 2023 Plans:*** Develop and optimize small robot autonomy built within the government owned RTK autonomy software to overcome size, weight and power (SWaP) limitations of small platforms. Develop and implement enhanced functionality and task-distribution (swarming) to overcome mobility and functional limitations of small robots for effective reconnaissance. Mature and demonstrate MMPs interoperable across multiple platforms that provide commanders with options to configure systems to the mission needs. Demonstrate these enhancements through Engineering EET to ensure the autonomous technology and integrated MMPs have been fully evaluated for system safety, performance and technical maturity. ***FY 2024 Plans:*** 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 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:***	-	2.296	2.471

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF4 / *Combat Vehicle Robotics Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding increased in FY24 to advance autonomy behaviors technologies, integrate advanced ISR sensors and optimize system performance.			
Accomplishments/Planned Programs Subtotals	25.788	29.321	34.703

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BF7 / *Crew Augmentation and Optimization Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BF7: *Crew Augmentation and Optimization Adv Tech*	-	3.630	4.326	3.812	-	3.812	4.358	4.415	4.418	4.466	0.000	29.425
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.

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 conducted by the United States (US) Army Futures Command.

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).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Crew Augmentation and Optimization Advanced Technology	3.630	4.326	3.812
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			
FY 2023 Plans: Integrate and demonstrate a threshold capability to adapt autonomous technologies by providing information regarding battlefield context inferred from Soldier behaviors. Integrate and demonstrate technology aids with basic integrated decision support tools for automated play calling and task allocation. Integrate and demonstrate after-action review (AAR) technology that enables Soldier-driven adaption of autonomy behavior from mission to mission. Validate effectiveness in an operationally-relevant and motion-based Modeling & Simulation (M&S) virtual validation.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF7 / *Crew Augmentation and Optimization Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort to execute platoon-level field demonstration.			
Accomplishments/Planned Programs Subtotals	3.630	4.326	3.812

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BG1 / *Sensors for Auto Oper and Survivability Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BG1: *Sensors for Auto Oper and Survivability Adv Tech*	-	10.275	12.450	12.726	-	12.726	12.735	12.734	12.742	12.880	0.000	86.542
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 Next Generation Combat Vehicle, Soldier Lethality, and Future Vertical Lift modernization priorities.

Research in this Project is performed by the United States (US) Army Futures Command.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Advanced Sensors with Embedded Processing	5.539	8.695	8.989
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 2023 Plans: Optimize novel uncooled infrared sensors, incorporating low power processing to minimize system size, weight, and power. Optimize targeting and threat detection sensors with embedded multifunction processing against threats at increased range in complex environments. Mature and provide advanced targeting and navigation laser technologies, novel image processing approaches and infrared sensors for on-the-move target detection, ranging and tracking. Validate image processing approaches to enable optimized transmission from sensor to shooter systems.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG1 / *Sensors for Auto Oper and Survivability Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 2023 to FY 2024 Increase/Decrease Statement:*** Funding represents planned lifecycle of effort			
Title: Multi-Mission Payload ***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. ***FY 2023 Plans:*** Demonstrate rotary wing unmanned aerial system optionally tethered with a manned or unmanned ground vehicle (UGV) for detection of threats in complex environments, day or night. Demonstrate real time feature extraction and target detection capabilities to increase detection of near-pear threats and suppress clutter. Exploit fusion of polarization sensors and advanced lasers to enhance detection of a wider range of threats and improve target location accuracy. ***FY 2024 Plans:*** 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 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding represents planned lifecycle of effort	4.736	3.634	3.737
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:***	-	0.121	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG1 / *Sensors for Auto Oper and Survivability Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding transferred in accordance with Title 15 USC §638			
Accomplishments/Planned Programs Subtotals	10.275	12.450	12.726

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BG3 / *Modeling and Simulation for MUMT Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BG3: *Modeling and Simulation for MUMT Advanced Tech*	-	4.999	5.975	6.276	-	6.276	7.215	7.578	7.418	7.923	0.000	47.384
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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Simulation Tools for Combat Vehicle Robotics (CoVeR) Demonstrations	4.999	5.816	-
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. ***FY 2023 Plans:*** Mature and demonstrate advanced algorithms to detect obstacles to maneuver in unstructured and operationally relevant environments. Mature and demonstrate computational environment test bed to support development of autonomous vehicle platforms and components; release of M&S tools with high-fidelity software-in-the-loop capability. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding decrease reflects planned lifecycle conclusion of this effort and transition of technologies.			
Title: SBIR/STTR Transfer	-	0.159	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG3 / *Modeling and Simulation for MUMT Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638			
Title: Autonomous Vehicle/Terrain Interactions Demonstration ***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. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** This is a new effort in FY2024 to mature and demonstrate the vehicle terrain interface and enhancements to the VANE for formations.	-	-	6.276
Accomplishments/Planned Programs Subtotals	4.999	5.975	6.276

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 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BG4 / *Adv Mobility Experimental Prototype Adv Tech Demo*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BG4: *Adv Mobility Experimental Prototype Adv Tech Demo*	-	2.716	-	-	-	-	-	-	-	-	0.000	2.716
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced powertrain, power generation and running gear technologies into a combat vehicle that will reduce the percentage of no- go terrain for ground vehicles, increase the maneuver speeds across all traversable terrain, reduce fuel demands thus extending operation time between resupply, and provide onboard power generation to enable the integration of energy-based capabilities such as directed energy weapons and electromagnetic armor.

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 conducted by the United States (US) Army Futures Command.

Research in this Project is coordinated with Program Element (PE) 0604115A (Technology Maturation Initiatives).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Advanced Mobility Experimental Prototype (AMEP) Advanced Technology	2.716	-	-
Description: This effort develops and demonstrates the advanced powertrain, track and running gear, and unmanned robotic technologies for integration into a ground combat vehicle that will provide increased mobility, maneuver speeds, and optionally manned capabilities in order to validate performance and capability enhancements at increased vehicle weights to inform ground combat vehicle design.			
Accomplishments/Planned Programs Subtotals	2.716	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BG7: *Ground Systems Active Defense (GSAD) Advanced Tech*	-	50.267	60.371	60.617	-	60.617	54.856	58.356	61.319	67.853	0.000	413.639
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.

Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

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 is performed by the United States (US) Army Futures Command.

Research in 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).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Advanced Radar and Soft-Kill (A-RASK) Suite	0.938	6.567	6.836
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 2023 Plans: Begin development of universal threat detection sensor hardware and algorithms to detect priority ATGM threats. Evaluate sensor system level requirements based upon the latest live fire demonstration results from Fiscal Year 2022 (FY22). Conduct sensor sub-system derived requirements analysis with modeling and simulation.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: Soft-Kill System Development ***Description:*** This effort focuses on maturing and demonstrating soft-kill system technologies to protect combat vehicles from current and emerging ATGM threats at stand-off distances with an unlimited magazine and low collateral hazard. This capability will also enhance 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 MAPS Framework and Controller. They will be demonstrated in a relevant environment. ***FY 2023 Plans:*** Develop components and other hardware needed for FY23 demonstration and vehicle integration in FY24. Integrate the soft-kill subsystems matured in FY22 utilizing the MAPS Framework and Controller. Optimize ground vehicle system performance and continue lab and field demonstrations to assess system performance of integrated subsystems. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The funding increase reflects additional effort in subsystem maturation as system integration work is accelerated.	9.827	15.046	16.867
Title: Survivability Capability Characterization and Demonstration ***Description:*** This effort evaluates 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). ***FY 2023 Plans:***	2.412	2.354	2.389

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Demonstrate and validate the selected survivability subsystem. Transition relevant information to our acquisition stakeholders and help determine the feasibility of further maturing the subsystem. Analyze available survivability subsystems capability and applicability to current ground vehicle platforms, targeting threats. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: Sensors for Adaptive Armor ***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. ***FY 2023 Plans:*** Improve trajectory prediction algorithm of the sensor technology to enable adaptive armor system. Mature sensor subsystem integration and demonstrate capabilities against pacing applicable threats in a relevant environment. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** In FY 2024, funding realigned to APS Residuals Protection Maturation and Complex Threat Attack Protection (CTAP) within this Project.	1.629	1.476	-
Title: APS Residuals Protection Maturation and Complex Threat Attack Protection (CTAP) ***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.	9.714	7.313	9.471

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: Build upon prior year work to integrate and demonstrate packaged component for protection against threat residuals at the system-level. Mature and optimize components through integrated system-level environmental and automotive durability testing, followed by ballistic testing, to validate performance against system-level requirements. Validate compliance with vehicle system architecture. Provide capstone demonstrations of capabilities to protect from pacing threats in a relevant environment. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** This funding increase is due to a shift in focus towards threats with complex defeat mechanisms and maturing technologies that defeat them.			
Title: Controls and Architecture ***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. ***FY 2023 Plans:*** Optimize active survivability architecture for single platform protection. Conduct build of base kit hardware and software products, to include enhancements, and will perform component level validation and verification. Verify available components for coordinated efforts. Validate software performance against new enhancements through regression testing to ensure backward compatibility. Perform studies for collaborative active defense across multiple platforms. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:***	5.253	5.520	5.560

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding change reflects planned lifecycle of this effort.			
Title: Hard Kill Active Protection System (HK APS) Development, Integration, and Demonstration	20.494	21.055	19.494
Description: This effort matures, integrates, and demonstrates a HK APS capable of defeating 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 sub-systems; counter-measure, launcher, and sensors (active/passive). Will demonstrate HK APS capabilities in a virtual and live fire demonstration in a relevant operational environment. 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. 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. 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. 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. ***FY 2023 Plans:*** Improve and optimize the sub-system requirements and design through analysis. Conduct a down-selection of the countermeasure (CM) warhead, guidance, and other sub-system components. Mature design of the sensor sub-system, with industry partners, to tailor the performance to meet the requirements of the CM sub-system. Optimize the system architecture within the established APS framework to ensure components are designed for system compliance and compatibility. Begin			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
planning virtual tests and demonstrations of the sub-systems. Continue planning integration of the sub-systems to develop the system-level design. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638	-	1.040	-
Accomplishments/Planned Programs Subtotals	50.267	60.371	60.617

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BG9 / *Obscuration Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BG9: *Obscuration Advanced Technology*	-	2.416	2.765	-	-	-	-	-	-	-	0.000	5.181
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY24, funding administratively realigned to Program Element 0603119A Project DG2 Advanced Development of Obscurants to correctly align effort to proper Army modernization priority.

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.

Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

Research is performed by the United States (U.S.) Army Futures Command.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Advanced Obscuration	2.416	2.664	-
Description: This effort matures and demonstrates the dissemination of new and advanced obscurants. ***FY 2023 Plans:*** Conduct field demonstration of a bi-spectral screening obscuration module and transition to Program Manager. Down-select material coating and conduct flammability testing. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** This project is administratively realigned to Program Element 0603119A, Project DG2, Advanced Development of Obscurants.			
Title: SBIR/STTR Transfer	-	0.101	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG9 / *Obscuration Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638			
Accomplishments/Planned Programs Subtotals	2.416	2.765	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BH4 / *Ground Vehicle Holistic Defense Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BH4: *Ground Vehicle Holistic Defense Adv Tech*	-	0.033	-	-	-	-	-	-	-	-	0.000	0.033
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will be the basis for a holistic survivability design framework utilizing virtual design models in a Modeling and Simulation (M&S) environment as well as conducting hardware in the loop and live fire demonstration. This Project will inform multiple system level demonstrations to validate that layered survivability technologies are optimized to defeat emerging near-peer threats. Data collected will be used to further validate and verify M&S tools. This Project also provides a design approach available to analyze and adjust the family of protection technologies for combat vehicles in relevant operational theaters.

Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

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 is performed by the United States (US) Army Futures Command.

Research in this Project is coordinated with Program Element (PE) 0603462A (Next Generation Combat Vehicle Advanced Technology) / Project BG7 (Ground Systems Active Defense (GSAD) Advanced Tech) and transitions to PE 0604852A (Suite of Vehicle Protection Systems - EMD).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Layered Survivability Demonstration	0.033	-	-
Description: This effort will utilize virtual models in a M&S environment to analyze layered survivability technologies for integration to a demonstration platform. Selected technologies will be demonstrated in a relevant environment to include, virtual, hardware/software in the loop, and live fire environments. This effort will validate that layered Survivability technologies are optimized to defeat threats consistent with the threat defeat capabilities of the selected technologies.			
Accomplishments/Planned Programs Subtotals	0.033	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH4 / *Ground Vehicle Holistic Defense Adv Tech*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BH6 / *Platform Electrification and Mobility Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BH6: *Platform Electrification and Mobility Adv Tech*	-	29.997	46.679	65.647	-	65.647	43.766	43.743	41.341	45.079	0.000	316.252
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 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).

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 supports the Next Generation Combat Vehicle Army Modernization Priority.

Work is performed by the United States Army Futures Command.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Platform Electrification Technologies	11.615	11.652	13.636
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 2023 Plans:*** Validate subsystems for the electric sprocket drive, diesel-electric power system and thermal management system, and demonstrate all sub-systems in a system integration validation laboratory. Validate supervisory controls for the subsystem			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
controls and integrated system operation. Perform subsystem integration and laboratory evaluation of a modular high voltage energy storage system. Mature and improve performance of tactical battlefield recharging technologies. Continue to improve electric sprocket drive and electric cooling to support Heavy Combat Vehicle electrification requirements. ***FY 2024 Plans:*** 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 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 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increased to support application of electric sprocket drive and electric cooling for heavy combat vehicle electrification			
Title: Advanced Mobility Technologies ***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. ***FY 2023 Plans:*** Improve performance of composite track system technology with longer lasting compounds at higher weight carrying capacities. Optimize external suspension system design to increase mobility performance. ***FY 2024 Plans:*** Will validate segmented composite running gear and track systems to prove out component performance and supportability improvements. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding decrease reflects planned lifecycle of this effort as it completes development.	6.608	5.949	1.699
Title: Advanced Vehicle Power Technology Alliance - Electrification Technology ***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. ***FY 2023 Plans:***	2.994	2.166	2.406

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Improve energy storage module performance and validates performance at the energy pack level. ***FY 2024 Plans:*** Will demonstrate commercial based advanced energy storage system on a combat vehicle to enable all-electric capability. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle of this effort.			
Title: System/Vehicle Integration and Test ***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 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. ***FY 2023 Plans:*** Demonstrate the electrified system control, performance, and operational energy efficiency through system-level integration and laboratory testing. Integrate the modular/ scalable electrified system into surrogate platforms for future demonstration. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle of this effort to include modification of a surrogate vehicle and integration of required systems to allow in-vehicle evaluation.	3.504	3.910	8.950
Title: Scalable Electrification & Control Architecture Technology ***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. ***FY 2023 Plans:*** Demonstrate component-level performance of high voltage power distribution component that enables electrified powertrains, and integrate that component into the power subsystem to validate subsystem-level performance. Provide power subsystem software that will take advantage of the new capabilities and use-cases they enable. ***FY 2024 Plans:***	2.864	3.471	4.224

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle of this effort.			
Title: Robotic Combat Vehicle Silent Watch and Mobility Range Extension Advanced Technology ***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. ***FY 2023 Plans:*** Demonstrate initial JP8 reformer and anode supported solid oxide fuel cell system for a light robotic combat vehicle for increased silent watch and mobility. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle of this effort to optimize power density of range extender to allow greater operational duration.	2.412	1.984	3.545
Title: Parallel Hybrid Electric Combat System ***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. ***FY 2023 Plans:*** Develop architecture and controls to enable a clutch with position sensor necessary for a parallel hybrid tracked combat systems. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding for this effort continues in 'Combat Vehicle Hybrid Electric Capability Demonstration' effort within this project.	-	1.767	-
Title: Tactical and Wheeled Vehicles Hybrid Electric System ***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.	-	6.282	5.767

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: Mature hybrid electric technologies and multi-vehicle power networking node. Develop integration software for anti-idle, high voltage energy storage, and hybrid functions of regenerative braking, electric launch assist, and mobility optimization. Develop the supervisory control system that integrates the subsystems into a cohesive propulsion system including motoring and generating. Develop and integrate a multi-vehicle microgrid dashboard. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** This effort builds on previous development and then completes with evaluation in FY25.			
Title: Battery Technologies for Supply Chain Security ***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. ***FY 2023 Plans:*** Provide an assessment of industrial base risk in battery component technologies, quantifying the battery designs and common form factors needed to support future capability, and the current risk of exposure of those battery components to foreign supply influence. This assessment will inform follow on research into batteries and battery chemistries and materials that can be domestically sourced. Begin to mature, integrate, and demonstrate small battery types (such as BB2590 and Small Tactical Universal Battery (STUBS)) in vehicle and other communications-electronics applications to develop a pathway for the adoption of these standard form factor batteries. Exploit mature 6T common form factor Li-ion (Lithium ion) battery technology to demonstrate alternative uses to accelerate the electrification of other Army and DOD platforms. Validate capabilities to evaluate commercial energy storage technologies in military vehicle and other conditions. ***FY 2024 Plans:*** 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	-	8.547	16.656

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase to address defense wide critical battery supply chain issues and test capabilities that would prevent the Army from fielding electrified platforms.			
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638	-	0.951	-
Title: Combat Vehicle Hybrid Electric Capability Demonstration ***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. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects work on tracked combat systems and battlefield charging.	-	-	8.764
Accomplishments/Planned Programs Subtotals	29.997	46.679	65.647

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and 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 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BH8 / *Enhanced VETRONICS Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BH8: *Enhanced VETRONICS Advanced Technology*	-	9.227	10.776	10.268	-	10.268	10.618	9.378	12.735	12.873	0.000	75.875
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 exploits open system architectures (power and data) for military ground vehicles to enable common interfaces, standards and hardware implementations. 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.

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 United States (US) Army Futures Command.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Enhanced - Vehicle Electronics (E-Vetronics)	9.227	10.776	10.268
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			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH8 / *Enhanced VETRONICS Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
efforts enabled future vehicle capabilities, reduced dependencies on proprietary solutions, and supported increased market 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. ***FY 2023 Plans:*** Improve the ground vehicle common architecture, tactical situational awareness, and digital containerization lines of efforts. Integrate mission packages for key network functions within the common network architecture. Demonstrate open system architecture to include objective hardware available to conduct bench level demonstration. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle of this effort			
Accomplishments/Planned Programs Subtotals	9.227	10.776	10.268

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BI3 / *Sensor Protection Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BI3: *Sensor Protection Advanced Technology*	-	1.585	1.708	1.746	-	1.746	1.748	1.745	1.747	1.766	0.000	12.045
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.

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, Soldier Lethality, and Future Vertical Lift Army Modernization Priorities.

Research in this Project is performed by the United States (US) Army Futures Command.

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).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Sensor Protection Advanced Technology	1.585	1.666	1.746
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 2023 Plans:*** Optimize longwave infrared (LWIR) filter coatings for newly available high sensitivity uncooled bolometer cameras. Demonstrate effectiveness of visible filter materials against relevant commercially available visible laser threats. ***FY 2024 Plans:*** 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 2023 to FY 2024 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BI3 / *Sensor Protection Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding change reflects planned lifecycle of this effort			
Title: SBIR/STTR Transfer	-	0.042	-
Description: Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638			
Accomplishments/Planned Programs Subtotals	1.585	1.708	1.746

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BI5 / *Materials Application and Integration Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BI5: *Materials Application and Integration Adv Tech*	-	4.645	5.279	5.502	-	5.502	4.606	4.767	4.769	4.821	0.000	34.389
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.

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 is performed by the United States (US) Army Futures Command.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: System Design Optimization for Lightweighting	3.992	4.544	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.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BI5 / *Materials Application and Integration Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: Continue to improve the Fiscal Year 2022 (FY22) plan for advanced lightweight armor and high-temperature / high-friction surface materials utilizing improvements made to virtual prototyping, additive manufacturing, and integration / joining techniques. Mature and demonstrate lightweight, topology optimized ballistic casting for combat weapon systems. Continue to mature and demonstrate advanced additive manufacturing feedstocks and processes for design optimization to achieve component and sub-system performance metrics, simplify complexity for reduced material waste, and reduce overall weight. Determine target integration processes for materials joining to include designs for advanced armor materials. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: Advanced Vehicle Power Technology Alliance - Materials ***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. ***FY 2023 Plans:*** Mature and demonstrate advanced/lightweight materials for weight optimization, energy storage/transfer, and protection such as Copper,Tantalum (CuTa) for conductive materials for energy transfer and high temperature alloys for critical engine components. Validate manufacturing, machining, and corrosion performance for these materials. ***FY 2024 Plans:***	0.653	0.735	0.745

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BI5 / *Materials Application and Integration Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	4.645	5.279	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 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BJ1 / *Vehicle System Security Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BJ1: *Vehicle System Security Advanced Technology*	-	2.365	-	-	-	-	-	-	-	-	0.000	2.365
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates ground vehicle cyber protection and resilience technologies to increase the cybersecurity of ground vehicles and ensure their continued operation in near-peer cyber contested environments. This Project will mature cybersecurity technologies at the platform level to defeat cybersecurity threats and maintain assured vehicle functionality and freedom of maneuver in the cyber warfighting domain.

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 is performed by the United States (US) Army Futures Command.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Vehicle System Security Advanced Technology	2.365	-	-
Description: This effort matures and demonstrates technologies required to maintain operating tempo and overmatch capability during offensive digital attacks to military ground vehicle systems. Additionally, the effort will maintain critical vehicle functionality in peer and near-peer cyber-contested environments. The effort will also mature and demonstrate technologies to mitigate risk of future and emerging cyber vulnerabilities by designing highly assured systems with cybersecurity designed from the beginning.			
Accomplishments/Planned Programs Subtotals	2.365	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BK1 / *Autonomous Mobility Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BK1: *Autonomous Mobility Adv Tech*	-	5.859	6.221	5.305	-	5.305	5.316	-	-	-	0.000	22.701
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.

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 United States (US) Army Futures Command.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Machine Learning Data Collection	3.261	1.726	1.558
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 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BK1 / *Autonomous Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Collect data from sensor and robotic ground vehicles at multiple sites to provide a database of diverse environments and scenarios. Process the data and ingest it into the project data environment to make it available for visualization, searching, sharing and ML development. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding decrease reflects planned lifecycle progression			
Title: UAS Mapping ***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. ***FY 2023 Plans:*** Mature and demonstrate teaming of unmanned air and ground vehicles in challenging environments such as mapping under canopies and in complex terrains with limited line-of-sight to validate the robustness and utility of teamed UAS/UGS to improve mobility in varying scenarios. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding decrease reflects planned lifecycle of this effort to complete in FY 2023.	2.598	1.581	-
Title: Formation Control ***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. ***FY 2023 Plans:*** Perform simulation and data collection and analysis of ML models and algorithms; collect experimental data while conducting a live demonstration of ML models and algorithms for formation control tactical maneuvers of robotic ground vehicles. ***FY 2024 Plans:***	-	2.914	3.747

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BK1 / *Autonomous Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle progression			
Accomplishments/Planned Programs Subtotals	5.859	6.221	5.305

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BK4 / *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BK4: *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech*	-	1.664	2.198	4.328	-	4.328	-	-	-	-	0.000	8.190
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.

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 United States (US) Army Futures Command.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Next Generation Intelligent Fire Control	1.664	2.118	2.328
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.			
FY 2023 Plans: Optimize fire control and modeling characteristics to improve performance of target prioritization models for current and future direct fire platforms. Mature and demonstrate the model characteristics by assessing performance against specified targets and scenarios.			
FY 2024 Plans: 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.			
FY 2023 to FY 2024 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BK4 / *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding change reflects planned lifecycle of this effort.			
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638	-	0.080	-
Title: Integration Compliant Fire Control Lethality Architecture ***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. ***FY 2024 Plans:*** 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** In FY 2024 this effort is initiated as new start in this project.	-	-	2.000
Accomplishments/Planned Programs Subtotals	1.664	2.198	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 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BK6 / *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BK6: *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech*	-	-	1.534	2.062	-	2.062	9.905	12.292	12.716	12.854	0.000	51.363
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.

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 United States (US) Army Futures Command.

Research 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).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 medium-weight optionally manned platforms. ***FY 2023 Plans:*** Demonstrate integrated technologies for improving lethal performance of direct fire projectiles. Mature armament tracking algorithms, and enhanced targeting and engagement techniques for direct fire projectiles. ***FY 2024 Plans:*** 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 2023 to FY 2024 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BK6 / *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding increase reflects planned lifecycle of this effort.			
Title: SBIR/STTR Transfer	-	0.056	-
Description: Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638			
Accomplishments/Planned Programs Subtotals	-	1.534	2.062

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BP6 / *Ground Vehicle Advanced Technology(CA)*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BP6: *Ground Vehicle Advanced Technology(CA)*	-	135.250	278.450	-	-	-	-	-	-	-	0.000	413.700
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 2022	FY 2023
Congressional Add: Program Increase - Additive Manufacturing for Jointless Hull	15.000	20.000
FY 2022 Accomplishments: Congressional Interest Item funding provided for Additive Manufacturing for Jointless Hull		
FY 2023 Plans: Congressional Interest Item funding provided for Additive Manufacturing for Jointless Hull		
Congressional Add: Carbon Fiber and Graphite Foam Technology	5.000	-
FY 2022 Accomplishments: Congressional Interest Item funding provided for Carbon Fiber and Graphite Foam		
Congressional Add: Program Increase - ATE5.2 Engine Development	5.000	10.000
FY 2022 Accomplishments: Congressional Interest Item funding provided for ATE5.2 Engine Development		
FY 2023 Plans: Congressional Interest Item funding provided for ATE5.2 Engine Development		
Congressional Add: Combat Vehicle Weight Reduction Initiative	5.000	-
FY 2022 Accomplishments: Congressional Interest Item funding provided for Combat Vehicle Weight Reduction Initiative		
Congressional Add: Program Increase - Virtual and Physical Prototyping	8.000	8.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
FY 2022 Accomplishments: Congressional Interest Item funding provided for Virtual and Physical Prototyping ***FY 2023 Plans:*** Congressional Interest Item funding provided for Virtual and Physical Prototyping		
Congressional Add: Program Increase - HMMWV Automotive Enhancements ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for HMMWV Automotive Enhancements ***FY 2023 Plans:*** Congressional Interest Item funding provided for HMMWV Automotive Enhancements	3.000	9.000
Congressional Add: Program Increase - Advanced Adhesives ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Advanced Adhesives ***FY 2023 Plans:*** Congressional Interest Item funding provided for Advanced Adhesives	5.000	5.000
Congressional Add: Program Increase - Combat Vehicle Lithium 6T Battery Development ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Combat Vehicle Lithium 6T Battery Development	5.000	-
Congressional Add: Advanced Materials Applications ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Advanced Materials Applications	12.000	-
Congressional Add: Augmented Reality for Denied Environments ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Augmented Reality for Denied Environments	7.000	-
Congressional Add: Program Increase - Autonomous Minefield Clearance ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Autonomous Minefield Clearance ***FY 2023 Plans:*** Congressional Interest Item funding provided for Autonomous Minefield Clearance	7.000	8.000
Congressional Add: Autonomous Vehicle Mobility ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Autonomous Vehicle Mobility	10.000	-
Congressional Add: Program Increase - Carbon Fiber Tires	5.000	5.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
FY 2022 Accomplishments: Congressional Interest Item funding provided for Carbon Fiber Tires ***FY 2023 Plans:*** Congressional Interest Item funding provided for Carbon Fiber TIres		
Congressional Add: Force Protection Vehicle Kit	5.000	-
FY 2022 Accomplishments: Congressional Interest Item funding provided for Force Protection Vehicle Kit		
Congressional Add: Fuel Cell Technology	5.000	-
FY 2022 Accomplishments: Congressional Interest Item funding provided for Fuel Cell Technology		
Congressional Add: Program Increase - Machine Learning for Advanced Lightweight Combat Vehicle Structures	6.000	19.000
FY 2022 Accomplishments: Congressional Interest Item funding provided for Machine Learning for Advanced Lightweight Combat Vehicle Structures ***FY 2023 Plans:*** Congressional Interest Item funding provided for Machine Learning for Advanced Lightweight Combat Vehicle Structures		
Congressional Add: Program Increase - Maneuverable Lightweight Electric Weight Reducer	5.000	7.500
FY 2022 Accomplishments: Congressional Interest Item funding provided for Maneuverable Lightweight Electric Weight Reducer ***FY 2023 Plans:*** Congressional Interest Item funding provided for Maneuverable Lightweight Electric Weight Reducer		
Congressional Add: Program Increase - Off-Road Maneuver	5.000	5.000
FY 2022 Accomplishments: Congressional Interest Item funding provided for Off-Road Maneuver ***FY 2023 Plans:*** Congressional Interest Item funding provided for Off-Road Maneuver		
Congressional Add: Program Increase - Predictive Maintenance System	2.000	2.000
FY 2022 Accomplishments: Congressional Interest Item funding provided for Predictive Maintenance System ***FY 2023 Plans:*** Congressional Interest Item funding provided for Predictive Maintenance System		
Congressional Add: RCV-L	5.000	-
FY 2022 Accomplishments: Congressional Interest Item funding provided for RCV-L		
Congressional Add: Short Fiber Thermoplastic Applications	4.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
FY 2022 Accomplishments: Congressional Interest Item funding provided for Short Fiber Thermoplastic Applications		
Congressional Add: Program Increase - Unmanned Navigational Technology ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Unmanned Navigational Technology ***FY 2023 Plans:*** Congressional Interest Item funding provided for Unmanned Navigational Technology	2.500	3.000
Congressional Add: Virtual Autonomy Environment ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Virtual Autonomy Environment	3.750	-
Congressional Add: Program Increase - AUGMENTED REALITY FOR DENIED ENVIRONMENTS ***FY 2023 Plans:*** Congressional Interest Item funding provided for Augmented Reality for Denied Environments	-	7.000
Congressional Add: Program Increase - AUTONOMOUS SYSTEMS FOR MILITARY GROUND VEHICLES ***FY 2023 Plans:*** Congressional Interest Item funding provided for AUTONOMOUS SYSTEMS FOR MILITARY GROUND VEHICLES	-	3.750
Congressional Add: Program Increase - CYBERSECURITY FOR AUTONOMOUS GROUND VEHICLES ***FY 2023 Plans:*** Congressional Interest Item funding provided for CYBERSECURITY FOR AUTONOMOUS GROUND VEHICLES	-	9.000
Congressional Add: Program Increase - CYBERSECURITY FOR AUTONOMOUS VEHICLES ***FY 2023 Plans:*** Congressional Interest Item funding provided for CYBERSECURITY FOR AUTONOMOUS VEHICLES	-	4.200
Congressional Add: Program Increase - DIGITAL ENTERPRISE TECHNOLOGY FOR OMFV ***FY 2023 Plans:*** Congressional Interest Item funding provided for DIGITAL ENTERPRISE TECHNOLOGY FOR OMFV	-	15.000
Congressional Add: Program Increase - DIGITAL TWIN ***FY 2023 Plans:*** Congressional Interest Item funding provided for Digital Twin	-	7.000
Congressional Add: Program Increase - ELECTRIC DRIVE SYSTEM	-	5.500

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
FY 2023 Plans: Congressional Interest Item funding provided for Electric Drive System		
Congressional Add: Program Increase - ELECTRIFIED VEHICLE INFRARED SIGNATURE MANAGEMENT ***FY 2023 Plans:*** 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 ***FY 2023 Plans:*** 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 ***FY 2023 Plans:*** Congressional Interest Item funding provided for ENHANCED LETHALITY ON ARMY SMALL MULTIPURPOSE EQUIPMENT TRANSPORT	-	8.000
Congressional Add: Program Increase - HMMWV OCCUPANCY PROTECTION DEVELOPMENT ***FY 2023 Plans:*** Congressional Interest Item funding provided for HMMWV OCCUPANCY PROTECTION DEVELOPMENT	-	10.000
Congressional Add: Program Increase - HUMAN DIGITAL TWINS AND HUMAN-MACHINE INTERACTION ***FY 2023 Plans:*** Congressional Interest Item funding provided for HUMAN DIGITAL TWINS AND HUMAN-MACHINE INTERACTION	-	6.000
Congressional Add: Program Increase - MODELING AND SIMULATION ACTIVITIES FOR VEHICLE DEVELOPMENT ***FY 2023 Plans:*** Congressional Interest Item funding provided for MODELING AND SIMULATION ACTIVITIES FOR VEHICLE DEVELOPMENT	-	10.000
Congressional Add: Program Increase - MODULAR ELECTRIC MOTORS ***FY 2023 Plans:*** Congressional Interest Item funding provided for Modular Electric Motors	-	5.500
Congressional Add: Program Increase - MULTI-SERVICE ELECTRO-OPTICAL SIGNATURE CODE	-	9.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
FY 2023 Plans: Congressional Interest Item funding provided for MULTI-SERVICE ELECTRO-OPTICAL SIGNATURE CODE		
Congressional Add: Program Increase - NANO-LED FABRICATION FOR AUGMENTED REALITY CONTACT LENS ***FY 2023 Plans:*** Congressional Interest Item funding provided for NANO-LED FABRICATION FOR AUGMENTED REALITY CONTACT LENS	-	10.000
Congressional Add: Program Increase - NEXT GENERATION ELECTRIFIED TRANSMISSION ***FY 2023 Plans:*** Congressional Interest Item funding provided for NEXT GENERATION ELECTRIFIED TRANSMISSION	-	5.000
Congressional Add: Program Increase - NEXT GENERATION LIGHT TACTICAL VEHICLE MANEUVER AUTONOMY ***FY 2023 Plans:*** Congressional Interest Item funding provided for NEXT GENERATION LIGHT TACTICAL VEHICLE MANEUVER AUTONOMY	-	5.000
Congressional Add: Program Increase - SYNTHETIC GRAPHITE BATTERY ***FY 2023 Plans:*** Congressional Interest Item funding provided for Synthetic Graphite Battery	-	10.000
Congressional Add: Program Increase - VEHICLE TECHNOLOGY READINESS LEVELS ***FY 2023 Plans:*** Congressional Interest Item funding provided for VEHICLE TECHNOLOGY READINESS LEVELS	-	3.000
Congressional Add: Program Increase - ABRAMS MODERNIZATION ***FY 2023 Plans:*** Congressional Interest Item funding provided for ABRAMS Modernization	-	30.000
Congressional Add: Program Increase - SMALL UNIT GROUND ROBOTIC CAPABILITIES ***FY 2023 Plans:*** Congressional Interest Item funding provided for Small Unit Ground Robotic Capabilities	-	7.000
Congressional Adds Subtotals	135.250	278.450

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BZ9 / *Smart Targeting Environment for Lower Level Assets*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
BZ9: *Smart Targeting Environment for Lower Level Assets*	-	3.775	3.381	4.402	-	4.402	4.418	-	-	-	0.000	15.976
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.

Research in this Project is performed by the United States (US) Army Futures Command.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Small Targeting Environment for Lower Level Assets (STELLA)	3.775	3.331	4.402
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 2023 Plans: Implement pairing of electronic warfare target effects in coordination with kinetic effects. Evaluate additional electronic warfare system use cases and develop end-to-end system demonstrations. Conduct Soldier evaluations and laboratory and field-based demonstrations to ensure project meets threshold metrics.			
FY 2024 Plans: 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			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BZ9 / *Smart Targeting Environment for Lower Level Assets*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects effort to execute larger scale demonstration activities in final two years of effort to meet information assurance requirements and produce software documentation required for successful transition.			
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638	-	0.050	-
Accomplishments/Planned Programs Subtotals	3.775	3.381	4.402

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A