Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	154.161	152.369	100.935	-	100.935	92.336	93.015	107.234	115.561	0.000	815.611
AY5: *Soldier Squad Small Arms Armaments Advanced Tech*	-	9.797	11.447	6.516	-	6.516	6.622	6.615	6.616	6.615	0.000	54.228
AY7: *Small Arms Fire Control Advanced Technology*	-	13.315	13.094	3.066	-	3.066	2.564	-	-	-	0.000	32.039
AY9: *Body Armor & Integrated Headborne Advanced Tech*	-	9.520	7.704	8.112	-	8.112	8.211	10.666	10.589	10.563	0.000	65.365
AZ6: *Soldier Signature Management Advanced Technology*	-	1.605	2.969	3.084	-	3.084	3.116	3.131	3.132	3.132	0.000	20.169
BB3: *Dismounted Soldier Survivability Equip/Tech Integ*	-	1.238	3.026	3.458	-	3.458	3.522	3.518	3.519	3.518	0.000	21.799
BB6: *Physical Augmentation: Adv Tech for Field Demo*	-	2.865	-	-	-	-	-	-	-	-	0.000	2.865
BB8: *Soldier Centric Advanced Technology*	-	5.622	5.292	2.391	-	2.391	1.880	-	-	-	0.000	15.185
BC1: *Human Performance AdvTech for Mobility & Lethality*	-	12.207	13.944	9.415	-	9.415	6.986	7.374	7.325	7.321	0.000	64.572
BC4: *Soldier Decision Making&Comms Performance AdvTech*	-	1.925	-	-	-	-	-	-	-	-	0.000	1.925
BC8: *Training Advanced Technology (Other than STE)*	-	4.140	2.993	7.078	-	7.078	7.650	10.289	23.443	31.277	0.000	86.870
BC9: *Adv Soldier Sensors/ Displays AdvTech for Dismounts*	-	8.738	13.151	25.963	-	25.963	27.040	26.606	28.425	28.937	0.000	158.860
BD7: *Soldier Sys Interfaces/ Integration-Sensor AdvTech*	-	9.110	8.374	8.535	-	8.535	8.196	8.590	9.311	9.309	0.000	61.425
BD9: *Soldier & Sm Unit Tactical Energy AdvTech*	-	6.041	3.171	4.189	-	4.189	4.269	4.520	4.518	4.517	0.000	31.225

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603118A *I Soldier Lethality Advanced Technology*							
BE2: *Joint Service Combat Feeding Advanced Technology*	-	2.367	2.424	1.988	-	1.988	2.019	2.016	2.121	2.120	0.000	15.055
BE5: *Personnel & Airdrop Safety Advanced Technology*	-	5.707	6.879	6.484	-	6.484	6.603	6.668	7.306	7.304	0.000	46.951
BE9: *STE Advanced Technology*	-	14.764	13.401	10.656	-	10.656	3.658	3.022	0.929	0.948	0.000	47.378
BS8: *Soldier Lethality Advanced Technology*	-	45.200	44.500	-	-	-	-	-	-	-	0.000	89.700

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates Soldier Lethality technologies that improve Soldier operational performance by increasing lethality, mobility, protection, and optimizing situational awareness across the spectrum of operating environments and missions. This PE matures Soldier weapons and enabling components / subsystems, demonstrates lethal weapons systems with potential to provide greater lethality, target acquisition, fire control, and range at a significantly reduced weight for optimized Soldier and Small Unit system performance. The major focus areas for Soldier Lethality Science and Technology are Soldier weapons and ammunition technologies, protection technologies, cognitive and physical performance measures, training in synthetic training environments, and mission support capabilities such as situational awareness sensors and displays, dismounted power and energy technologies, and Soldier and Small Unit sustainment capabilities. This technology diverse PE also matures and demonstrates sensor technologies that increase Warfighter situational understanding, survivability, and lethality by providing sensor capabilities to acquire and engage all targets and threats at longer ranges in complex environments and operational conditions (e.g. day/night, obscured, smoke, adverse weather, and other degraded visual environments), and for advancing live training technologies that accurately replicate and realistically represent the effects of current and future weapons systems during force-on-force and force-on-target training. This PE matures and demonstrates effective technology in personal combat clothing, protective equipment such as personal armor, helmets, and eyewear, combat rations, shelters, logistical support items for aerial delivery of personnel and cargo, and energy systems to power current and emerging Soldier-born Intelligence, Surveillance, and Reconnaissance (ISR), sensor, optical, and communication systems with the least weight and sustainment burden on the Soldiers and Small Combat Units. This PE also matures and demonstrates technologies supporting the Army's Synthetic Training Environment (STE), a single, interconnected synthetic training system that will enable Army units and leaders to conduct realistic multi-echelon / multi-domain combined arms maneuver and mission command training, increasing proficiency through repetition. A specific research thrust area is applying systems-based practices to mature and demonstrate scientific and tailored knowledge of Soldiers' physical and cognitive architecture to facilitate rapid and efficient designs, assessments and trade-off analyses of technology insertions on the Soldier. Significant science and technology (S&T) investments are directed to improve the effectiveness of the technologies a Soldier utilizes while reducing the size and weight of the form factor of the equipment.

Research in this PE complements PE 0602143A (Soldier Lethality Technology).

This PE is directly aligned to the Soldier Lethality and STE Modernization Priorities.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	151.370	107.966	0.000	-	0.000
Current President's Budget	154.161	152.369	100.935	-	100.935
Total Adjustments	2.791	44.403	100.935	-	100.935
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	44.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	2.791	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	100.935	-	100.935
• FFRDC Transfer	-	-0.097	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: BS8: *Soldier Lethality Advanced Technology*		
Congressional Add: *Program Increase - Advanced AI/AA Analytics for Modernization and Readiness*	10.000	10.000
Congressional Add: *Program Increase - Small Arms Fire Control Advanced Technology*	8.000	8.000
Congressional Add: *Program Increase: Advanced Technology for Maneuver Support and Protection*	10.000	-
Congressional Add: *Program Increase - Military Engineering Technology for Infield Waste*	2.000	-
Congressional Add: *Program Increase - Flexible LED Lighting for Tents and Shelters*	5.200	-
Congressional Add: *Program Increase*	10.000	-
Congressional Add: *Ferrium Steel for Improved Personal Protective Equipment*	-	5.000
Congressional Add: *Human Machine Teaming*	-	4.000
Congressional Add: *Impact Attenuation Materials for Limb Protection*	-	1.500
Congressional Add: *Soldier Situational Awareness*	-	8.000
Congressional Add: *Squad Operations Advanced Resupply*	-	8.000
Congressional Add Subtotals for Project: BS8	45.200	44.500
Congressional Add Totals for all Projects	45.200	44.500

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603118A *I Soldier Lethality Advanced Technology*

Change Summary Explanation

Fiscal Year 2023 (FY23) funding increase reflects the fact that the FY22 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) AY5 / *Soldier Squad Small Arms Armaments Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
AY5: *Soldier Squad Small Arms Armaments Advanced Tech*	-	9.797	11.447	6.516	-	6.516	6.622	6.615	6.616	6.615	0.000	54.228
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project demonstrates individual and crew-served weapon designs and technologies that enhance the fighting capabilities and survivability of the dismounted Warfighter in support of the Army's Soldier Lethality Modernization priority and all of the Services. All work is led by the Joint Service Small Arms Program (JSSAP) and is based upon the Joint Service Small Arms Master Plan (JSSAMP) and the Joint Capabilities Integration Development System's Small Arms Analyses.

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

This Project complements work done in Program Element (PE) 0602143A (Soldier Lethality Technology) / AY6 (Soldier Squad Small Arms Armaments Technology).

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Small Arms Technology Demonstration	2.900	4.720	6.516
Description: This effort matures and demonstrates the Next Generation Family of Ammunition by optimizing small arms ammunition and weapon system technologies for integration into live fire demonstrations. It refines weapon system integration and supports the Joint Warfighter's small arms capability needs as well as validates small arms weapon system technology readiness levels and confidence of design functionality in advanced operating scenarios.			
FY 2022 Plans: Will mature and demonstrate technological advancements of small arms systems in relevant environments; mature and demonstrate automated target recognition and engagement technologies, signature reduction devices, technologies and evaluations for legacy and Next Gen weapons, ammunition design optimizations for novel targets, augmented weapon system controllability, and advanced optical systems with machine learning algorithms for technology insertions into emerging systems identified by the Joint Warfighters.			
FY 2023 Plans: Will validate small arms system/subsystem models in relevant environments to ensure optimal performance against relevant targets; optimize automated target recognition and engagement technologies, signature reduction devices, and technologies and evaluations for legacy and next generation weapons; improve performance of: ammunition for novel targets; augmented weapon			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** AY5 / *Soldier Squad Small Arms Armaments Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
system controllability and maintainability, and advanced optical systems with machine learning algorithms; demonstrate potential technology insertions into current and emerging systems identified by the Joint Warfighter. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase provides for further maturation of prior Applied Research investments into Technical Readiness Level (TRL) 6 technology demonstrations and transitions to the Program Managers focused on dismounted Soldier improvements in denied and austere environments in the areas of remote powered armament systems, increased probability of hit, Next Generation Soldier Weapon supporting technologies, signature reduction technologies, and small arms lethality increases.			
Title: Next Generation Family of Ammo ***Description:*** This effort matures and demonstrates the next generation of small arms live training ammunition by optimizing it through integration into new weapon systems that will provide an increased level of lethality. ***FY 2022 Plans:*** Will improve performance of initial base technologies of the combat tracer and reduced range tracer concepts to validate and demonstrate capability as fully functional projectiles. Ammunition effort aligned with the Next Generation Squad Weapon (NGSW). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Fiscal Year 2022 (FY22) is the final year of execution for this task.	6.897	6.309	-
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.418	-
Accomplishments/Planned Programs Subtotals	9.797	11.447	6.516

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) AY7 / *Small Arms Fire Control Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
AY7: *Small Arms Fire Control Advanced Technology*	-	13.315	13.094	3.066	-	3.066	2.564	-	-	-	0.000	32.039
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates fire control and targeting sensor technologies and techniques to improve targeting and lethality in order to maintain overmatch at longer ranges in all operational environments and to meet the capability needs of Army Science and Technology Soldier Lethality, Next Generation Combat Vehicle, and Long Range Precision Fires modernization priorities.

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

This Project complements work done in Program Element (PE) 0602143A (Soldier Lethality Technology) / AY8 (Small Arms Fire Control Technology).

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Small Arms Fire Control Advanced Technology	13.315	11.310	-
Description: This effort will mature and demonstrate fire control and targeting sensor technologies and techniques to improve targeting and lethality, and maintain overmatch at longer ranges in all environments. ***FY 2022 Plans:*** Will complete maturation of digital weapon sight fire control system prototypes; demonstrate final digital weapon sight configuration; execute technology demonstrations in relevant environments to support system optimization of target handoff and target cueing capabilities; optimize capability to enable seamless integration with Enhanced Night Vision Goggle-Binocular (ENVG-B), Integrated Visual Augmentation System (IVAS), and Next Generation Squad Weapon (NGSW); complete prototype integration for fire support and dismounted scout operations; demonstrate multifunction precision targeting capabilities in military relevant environments. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Task ends in Fiscal Year 2022 (FY22)			
Title: Advanced Fire Control Tech	-	1.306	3.066

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** AY7 / *Small Arms Fire Control Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: This effort will mature and demonstrate fire control and targeting sensor technologies and techniques to improve targeting and lethality, and maintain overmatch at longer ranges in all environments. ***FY 2022 Plans:*** Will mature and demonstrate technologies of integrated circuit boards to improve performance and reliability under pyro-shock and reduced power consumption ***FY 2023 Plans:*** Will mature machine vision databases for target recognition, to include optimization for dismounted weapon identification; validate approach for demonstration of platform architecture; improve internal communication to include the use of open source standards; demonstrate integration of augmented reality and polymer optic components for future live fire capability demonstration. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase in FY 2023 is due to natural task execution ramp up from requirements generation to tech maturation and demonstrations.			
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.478	-
Accomplishments/Planned Programs Subtotals	13.315	13.094	3.066

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) AY9 / *Body Armor & Integrated Headborne Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
AY9: *Body Armor & Integrated Headborne Advanced Tech*	-	9.520	7.704	8.112	-	8.112	8.211	10.666	10.589	10.563	0.000	65.365
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates body armor weight reductions and improves the performance of personal protection and survivability equipment. It also demonstrates combat helmet ballistic, blast, and small arms protection performance enhancements and the integration and optimization of power, energy, and digital sensor and display headborne technologies.

This Project supports Force Protection capability demonstrations for Soldiers and Small Units and demonstrated technologies from this effort transition to various Program Executive Office (PEO) Soldier programs.

This Project complements work done in Program Element (PE) 0602143A (Soldier Lethality Technology) / AZ2 (Body Armor & Integrated Headborne Technology).

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

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Body Armor and Integrated Headborne Advanced Technology	9.520	7.422	8.112
Description: This effort focuses on maturing, integrating and demonstrating personal protective capabilities against ballistic, blast, and directed energy threats as well as the development and demonstration of Soldier worn platform architectures to optimize the integration of personal protective equipment and Soldier lethality enabling technologies. Demonstrates advanced test methods to validate personal protective equipment performance enhancements against current and emerging small arms, fragmentation, and blast threats from anti-personnel munitions. The objective of these technology development efforts is to significantly increase Soldier lethality by enhancing the protective capabilities and reducing sub-system and system-level weight of individual protective equipment to reduce the Soldier burden and increase survivability.			
FY 2022 Plans: Will exploit state of the art high performance ballistic materials for body armor against small arms threats to provide trade space analysis regarding art of the possible to Army stakeholders and inform future requirements for torso protection against small arms threats; Exploit novel and emerging processing techniques and latest developmental materials for combat helmets to assess state			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** AY9 / *Body Armor & Integrated Headborne Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
of the art helmet performance against small arms threats and inform future protection requirements for Army combat helmets; Design power and data interface architectures for combat helmets to develop common interface design standards for Soldier headborne technology; Develop communication headset subsystems with new wireless down links to the individual radio and integrate preliminary enhanced audio capabilities to provide hearing protection and situational awareness cues. ***FY 2023 Plans:*** Will mature designs for personnel body armor against classified small arms threat that increase body armor protection capabilities without increasing the weight of armor material required; exploit anti-personnel munitions to characterize Soldier survivability against near-peer munition capabilities to further the optimization of personal body armor against high energy fragmenting munitions; mature novel fabric constructions integrated in the Soldier combat protective ensemble for ballistic protection; mature power and data interface architectures for combat helmets to develop common interface design standards for Soldier headborne technology; optimize the integration of communication headset subsystems with wireless down links to the individual radio and demonstrate enhanced audio capabilities to provide hearing protection and situational awareness cues; demonstrate integrated eye protection capability with enhanced fragmentation performance and situational awareness. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.282	-
Accomplishments/Planned Programs Subtotals	9.520	7.704	8.112

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) AZ6 / *Soldier Signature Management Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
AZ6: *Soldier Signature Management Advanced Technology*	-	1.605	2.969	3.084	-	3.084	3.116	3.131	3.132	3.132	0.000	20.169
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project optimizes, matures and demonstrates advances in novel materials, technologies, techniques, and applications increasing the capabilities of camouflage, concealment, and deception against known and emerging sensor threats. These technologies will produce proof of concept systems that decrease the probability of detection and targeting by peer and near-peer adversaries, enabling freedom of movement of semi-independent and dispersed formations, and increase protection of high-valued assets. This Project will demonstrate disruptive Camouflage, Concealment and Deception technologies, supporting expeditionary maneuver in the Multi-Domain Battle Environment to open and retain windows of advantage.

Research in this Project supports key Army needs and leverages/complements the technical research of several Program Elements (PEs) and Projects to include PE 0602143A (Soldier Lethality Technology) / BB4 (Dismounted Soldier Survivability Materials), Project AZ5 (Soldier Protection Technology - Vulnerability), Project AZ9 (Soldier Protection Advanced Tech - Detectability); PE 0601102A (Defense Research Sciences; and PE 0602145A (Next Generation Combat Vehicle Technology) / Project BI2 (Sensor Protection Technology).

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

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Soldier Camouflage, Concealment and Decoys Demonstration	1.605	2.861	3.084
Description: This effort demonstrates innovative camouflage, concealment, and deception technologies for the dismounted Soldier to defeat advanced current and emerging adversary Intelligence, Surveillance and Reconnaissance (ISR) threats and to reduce the probability of detection and identification across the electromagnetic spectrum. Matures physics-based models for material and system performance that support probability of detection metrics in the multi-domain operational environment, assisting to close the capability gap between current camouflage, concealment, and deception technologies and defeating enemy sensorial capabilities in future operating environments.			
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** AZ6 / *Soldier Signature Management Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Will optimize down- selected textile coatings and functional garment designs for Soldier clothing and individual equipment to inconspicuously transfer Soldier thermal emissions away from the Soldier?s body to reduce the probability of Soldier detection from battlefield thermal sensors while integrating other key garment performance requirements; continue to mature and demonstrate additional topical applications using engineered optical materials within binder agents to conceal exposed skin (i.e., face, hands) from thermal sensors; collect imagery data of Soldiers and squad formations against ground and aerial sensor threats in multiple bands of the electromagnetic spectrum to assess highest impact improvement opportunities; apply newly developed aided target detection techniques against Soldier camouflage and concealment capabilities to assess Soldier detectability capability gaps against emerging threat sensors and sensor platform. ***FY 2023 Plans:*** Will mature materials specifically designed to reduce the radar cross section of individual Soldiers and their equipment from detection by ground surveillance radar threats; integrate and demonstrate passive ground surveillance radar threat detection capability into the Soldier?s equipment to provide early threat detection and warning; attain and collect imagery data of Soldiers and squad formations against ground and aerial sensor threats to validate ground-force vulnerabilities in multiple bands of the electromagnetic spectrum against sensor threats to assess high impact camouflage and concealment opportunities; exploit and demonstrate aided target detection algorithms and provide vulnerability analysis of Soldier camouflage and concealment capabilities to support continued assessment of Soldier signature capability gaps. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.108	-
Accomplishments/Planned Programs Subtotals	1.605	2.969	3.084

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** AZ6 / *Soldier Signature Management Advanced Technology*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BB3 / *Dismounted Soldier Survivability Equip/Tech Integ*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BB3: *Dismounted Soldier Survivability Equip/Tech Integ*	-	1.238	3.026	3.458	-	3.458	3.522	3.518	3.519	3.518	0.000	21.799
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates the integration of Soldier survivability materials and technologies to increase the speed and efficiency of dismounted Soldier movement and maneuver. This Project focuses on reducing Soldier-worn equipment weight, improving Soldier and system integration and reducing the dismounted Soldier's detectability, susceptibility, and vulnerability to operational threats. Operational threats are characterized as combat threats (e.g., flame and thermal, blast and ballistic, multispectral sensors, and laser threats), environmental threats (e.g., cold, heat, wet, vector, water contamination, concealment, etc.), and Soldier system components and system limitations (e.g., size, weight, and bulk). This Project includes the demonstration and validation of integrated technologies, novel subsystems/ systems, and test methods.

This Project complements work done in Program Element (PE) 0602143A (Soldier Lethality Technology) / Project BB4 (Dismounted Soldier Survivability 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 is performed by the United States Army Futures Command (AFC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Dismounted Soldier Survivability Equipment and Technology Integration	1.238	2.915	3.458
Description: This effort matures and integrates multifunctional protective materials, sub-components, and systems for field demonstrations to significantly increase the survivability of Soldiers through their multi-functional clothing and individual protective equipment. This effort also demonstrates and validates tradeoff analyses in sub-component and system-level designs of ballistic, blast, signature management and integrated protection clothing and equipment technologies.			
FY 2022 Plans: Will mature and optimize the systems engineering architecture, framework and physical demonstrator units that demonstrate integrated body-worn Soldier survivability technologies for Soldier user assessments in support of the Combat Protective Ensemble (CAPE) program; validate combat ensemble components that address gaps in extremities protection, thermal management, and moisture control through optimizing operational clothing and individual equipment for (1) temperate to extreme cold climates and (2) temperate to extreme heat and high humidity environments; exploit recent advancements in power and data transfer mechanisms to mature multiple candidate modular load management systems integrating body-worn power and			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BB3 / *Dismounted Soldier Survivability Equip/Tech Integ*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
data distribution to optimize the Soldier system integration of body-worn individual equipment with particular focus on system level weight reduction and enhanced ergonomics to greatly improve Soldier ability to shoot, move and communicate; validate and demonstrate maturing candidate camouflage and concealment materials from PE 0602143A (Soldier Lethality Technology) with a focus on visible through infrared bands of the electromagnetic spectrum; validate and demonstrate maturing high performance materials for integrated and modular ballistic and blast protection from PE 0602143A (Soldier Lethality Technology) against anti-personnel munitions and small arms threats. ***FY 2023 Plans:*** Will demonstrate an improved load-management system that integrates body-worn individual equipment, power and data distribution network, hydration system, and torso protection to greatly improve Soldier lethality and maneuverability; mature enhancements in the combat ensemble that provide greater situational awareness of battlefield threats in (1) temperate to extreme cold environments and (2) temperate to extreme heat and high humidity environments to optimize Soldier readiness to shoot, move and communicate; perform Soldier user assessments of integration of matured camouflage and concealment materials from PE 0602143A (Soldier Lethality Technology) and modular ballistic and blast protection from PE 0602143A (Soldier Lethality Technology) against anti-personnel munitions and small arms threats to evaluate compatibility with matured and optimized systems-engineering architecture for Soldier ensembles in support of the CAPE program. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding changes reflect planned life cycle of effort.			
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.111	-
Accomplishments/Planned Programs Subtotals	1.238	3.026	3.458

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BB3 / *Dismounted Soldier Survivability Equip/Tech Integ*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BB6 / *Physical Augmentation: Adv Tech for Field Demo*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BB6: *Physical Augmentation: Adv Tech for Field Demo*	-	2.865	-	-	-	-	-	-	-	-	0.000	2.865
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project investigates human augmentation technologies for enhanced Soldier mobility & lethality to provide an advantage over adversaries during close combat and infantry tasks. This will be achieved by demonstrating and validating operationally ready physical augmentation systems that meet the mission requirements by optimizing movement & maneuver and logistics sustainment task performance.

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 Army Futures Command (AFC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Wearable Assistive Devices Advanced Technology for Feld Demo	2.865	-	-
Description: This effort demonstrates wearable physical augmentation devices to validate Soldier metrics such as endurance, survivability, speed, and strength, as well as system metrics such as power consumption and duration, actuator and controller performance, and integration with Soldier clothing and individual equipment (CIE). Results will demonstrate if the Army will benefit from leveraging industry investments and determine if these systems enhance Soldier mobility and lethality in operational environments.			
Accomplishments/Planned Programs Subtotals	2.865	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BB8 / *Soldier Centric Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BB8: *Soldier Centric Advanced Technology*	-	5.622	5.292	2.391	-	2.391	1.880	-	-	-	0.000	15.185
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates an optimized training systems to enable effective training and provide increased levels of Soldier proficiency and readiness. This Project matures and demonstrates Soldier centric technologies for the Soldier/Squad virtual environment to support the Army's Synthetic Training Environment (STE). The STE is the next generation holistic collective training capability that will train units where they will fight, with whom they will fight with, and in complex operational environments to include dense urban and sub-terrain; within the entire range of combined arms maneuver tasks in support of Multi-Domain Operations. The Soldier/ Squad virtual environment combines and integrates several individual Soldier and Squad training capabilities, STE Squad Capability (SSC), Weapon Skill Development (WSD), Joint Fires Training (JFT), and Use of Force (UoF), into a single capability that can be conducted simultaneously or individually and enable physical movement/ exertion related to the execution of Soldier/Marine individual and Squad collective training tasks. The STE will provide the realistic repetitions necessary to fight 25 bloodless battles before the first battle.

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

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: STE Soldier/Squad Virtual Trainer	5.622	5.099	2.391
Description: This effort matures and demonstrates a common battle drill squad-level mixed reality based system that allows for the rapid conduct and repetition of squad-level training. The training system will make it possible to conduct diverse, repeatable and effective training without extensive training infrastructure. This effort matures and demonstrates novel and realistic training environments that provide increased levels of proficiency and readiness through immersive training scenarios conducted at the point of need.			
FY 2022 Plans: Will mature device agnostic camera and tracking technologies required for dynamic occlusion to successfully perform in all potential training environments; validate technologies that enhance immersion (haptic suits, three-dimensional (3D) sound,			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BB8 / *Soldier Centric Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
etc.) for Soldier training in mixed reality environments; improve performance of weapon tracking algorithms by utilizing better processing technologies and deep learning algorithms using markerless tracking. ***FY 2023 Plans:*** Will demonstrate the performance of agnostic camera and tracking technologies required for dynamic occlusion to perform in daylight training environments successfully; improve individual Soldier position- and orientation-tracking; demonstrate multi-modal, Soldier interfaces (e.g., haptic suits, 3D sound, acoustics, etc.) for individual Soldiers in live training environments. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding decrease supports shift to long-term objectives of merging live and synthetic training.			
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.193	-
Accomplishments/Planned Programs Subtotals	5.622	5.292	2.391

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BC1 / *Human Performance AdvTech for Mobility & Lethality*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BC1: *Human Performance AdvTech for Mobility & Lethality*	-	12.207	13.944	9.415	-	9.415	6.986	7.374	7.325	7.321	0.000	64.572
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures technologies, methodologies, and human performance models to demonstrate increased mobility and lethality of the individual and small unit to achieve overmatch. It validates and integrates human performance assessment methods and algorithms into training/education, test and evaluation methodologies, and materiel solutions to compare performance impacts between different materiel and non-materiel solutions to maximize the individual Warfighter and small unit. These methods and algorithms have potential to enable the development of aspects of doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) improvements and efficiencies. This Project also uses Soldier assessments to iteratively improve the performance of, optimize, and integrate technologies to augment Soldier function (e.g. shoot, move, perceive, decide, and communicate) during missions for maximizing performance. This Project supports the Measuring and Advancing Soldier Tactical Readiness and Effectiveness (MASTR-E) Science and Technology program supported by the Office of the Secretary of Defense Close Combat Lethality Task Force.

This Project supports key Army needs and complements the technical research of Program Element (PE) 0602143A (Soldier Lethality Technology) / Project BC6 (Human Perf-Tech for Warfighter Enhancement) and project BC2 (Next Gen Mobility & Lethality Tech for Warfighters). This research is also supported by and fully coordinated with efforts conducted by Medical Research & Development Command (MRDC), Army Research Institute (ARI), U.S. Military Academy (USMA), and other academic and industry partners. This research is in partnership with Forces Command (FORSCOM) operational units and the appropriate Training and Doctrine Command (TRADOC) organizations as well as established transition partners, including Army Test and Evaluation Command (ATEC) & Program Executive Office-Soldier (PEO-S). This Project also complements and is fully coordinated with work performed across Army, Navy, and Air Force under the Reliance 21 Human Systems Community of Interest: Systems Interfaces & Cognitive Processes and Protection, Sustainment, and Warfighter Performance.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Close Combat Lethality Task Force, the Army Modernization Strategy and supports the Soldier Lethality Cross Function Team (CFT) efforts.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Soldier/Squad Performance Metrics for Lethality	5.152	4.468	-
Description: This effort validates and matures technologies, methodologies, and human performance models to demonstrate increased Soldier and Small Unit mobility & lethality to achieve overmatch. The effort validates and integrates human performance sensors, models, and design guidance into training/education, test and evaluation, and materiel. The results of this work will allow			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC1 / *Human Performance AdvTech for Mobility & Lethality*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
the Army to develop equipment, systems and training devices that maximize the close combat Soldier and small unit performance in multi-domain operations. ***FY 2022 Plans:*** Will demonstrate an instrumented test bed (squad Situational Training Exercise lane and Shoot House) for the evaluation of Soldier and small unit mobility and lethality; utilizing the test bed, demonstrate the linkages between individual technical performance measures, measures of performance, and squad measures of effectiveness under controlled conditions to optimize repeatability and reliability; train and validate predictive performance algorithms in relevant environments; demonstrate down-selected machine learning performance algorithms developed in PE 0602143A (Soldier Lethality Technology) in multidimensional human performance datasets (such as the 72-hr mission field study). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This effort ends in Fiscal Year 2022 (FY22).			
Title: Operational Unit Partnership and Soldier Touch Point ***Description:*** This effort optimizes innovation through Science and Technology touch points with the Operational force, resulting in rapid iteration, concept maturation, integration, validation of laboratory findings, and transition of technologies and methodologies in response to operational unit demand signal. This effort streamlines demonstration, data collection, and technology maturation for near term DOTMLPF solutions, enabling faster delivery of materiel and non-materiel products/knowledge refined with direct Soldier input. This body of work allows validated, empirical, assessment of any equipment capability or training intervention as part of the Soldier architecture to inform future acquisition investments, training, and operational trade space decisions. ***FY 2022 Plans:*** Will conduct small and large scale field studies to fully mature dataset to train and validate human performance algorithms and analyze findings and data sets from expert and novice units performing mission essential tasks in realistic, constructive tactical environments; provide and advance a front end solution to access and visualize database elements; demonstrate human performance data visualization tools to increase situational awareness and improve decision making. ***FY 2023 Plans:*** Will conduct field and simulation studies to validate prediction models (previously trained with human performance data) in relevant environments/scenarios under realistic operational states (e.g., high stress, thermal load, dehydration, sleep restriction, etc.) in order to evaluate the correspondence between predictions and performance outcomes; conduct field studies testing the effectiveness of enhancement strategies on close combat performance outcomes and readiness. ***FY 2022 to FY 2023 Increase/Decrease Statement:***	7.055	8.965	9.415

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC1 / *Human Performance AdvTech for Mobility & Lethality*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Funding change reflects planned lifecycle of this effort.			
Title: FY2022 SBIR/STTR Transfer	-	0.511	-
Description: Funding transferred in accordance with Title 15 USC ?638			
FY 2022 Plans: Funding transferred in accordance with Title 15 USC ?638			
FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638			
Accomplishments/Planned Programs Subtotals	12.207	13.944	9.415

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BC4 / *Soldier Decision Making&Comms Performance AdvTech*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BC4: *Soldier Decision Making&Comms Performance AdvTech*	-	1.925	-	-	-	-	-	-	-	-	0.000	1.925
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project integrates research, theory and applied operations to maximize effectiveness of Soldiers and their equipment. Efforts in this Project support early application of Human Systems Integration (HSI) during Advanced Technology Development by translating research findings into performance-based prototype subsystem, component, and software interface design criteria for use in the Army's requirements definition process and materiel acquisition process for Army Modernization. Application of this work will yield reduced workload, fewer errors, reduced task times, enhanced Soldier protection, user acceptance, and allow the Soldier to extract maximum performance from the equipment. Representative major efforts address Soldier cognitive load and cognitive fusion research, advanced aircraft design to include flight in degraded visual environments, and development of human performance measures and methods to address current and future human system integration challenges. Individual efforts exploit adaptive learning methods and strategies, applied methods to accelerate expertise development, integration of displays for ease of use and optimized situational awareness, and development of technical frameworks for crew automation integration in Command and Control Systems (C2). Efforts also support flight crew decision-aiding and autonomy, advanced crew station design for aircraft, full mission operations in degraded visual environments, and advanced manned-unmanned teaming concepts.

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 Army Futures Command (AFC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Human System Integration Demonstration	1.925	-	-
Description: This effort provides early front end analysis and assessment for HSI in Army systems acquisition to influence Advanced Technology Development and prototype design specifications. Research findings translate into performance-based design specifications and human performance analyses for use in the Army's requirements definition process, training development, and materiel acquisition process. Results of these efforts provide quantified, data-driven analysis on the value of applying HSI early in Army technology development and systems acquisition and are transitioned to technology developers, evaluators, and other Advanced Technology Development stakeholders to include the Future Vertical Lift and Air Missile Defense Program Offices, TRADOC, and the ATEC.			
Accomplishments/Planned Programs Subtotals	1.925	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC4 / *Soldier Decision Making&Comms Performance AdvTech*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BC8 / *Training Advanced Technology (Other than STE)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BC8: *Training Advanced Technology (Other than STE)*	-	4.140	2.993	7.078	-	7.078	7.650	10.289	23.443	31.277	0.000	86.870
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced training technologies in support of the Army's need for simulations that accurately replicate and realistically represent the effects of current and future weapons systems during live and synthetic training. Integration of the live and synthetic environments into a single synthetic training environment will modernize the current Live Training Environment and allow fair fight engagements across all training environments and training devices.

This Project complements work done in Program Element (PE)0602143A (Soldier Lethality Technology) / Project BC7 (Training Technology (Other than STE).

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 Army Futures Command (AFC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: STE: Live Training Applications	4.140	2.884	-
Description: This effort exploits technology to demonstrate enhanced fidelity of live training systems and develops future live training capabilities for conducting force-on-force, combined arms exercises to enhance readiness at Army home stations and Combat Training Centers. ***FY 2022 Plans:*** Will mature and demonstrate software algorithms that calculate weapon orientation or position for direct or indirect fire weapons based on a number of different sensor inputs (e.g. inertial, computer vision, Light Detection and Ranging (LIDAR)); improve the size, weight, and power consumption of the Weapon Orientation Module; demonstrate a matured position tracking capability suitable for crew served indirect fire weapons. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects a shift in research focus from the near term development of the STE capabilities to the support technologies necessary to enable more realistic live-synthetic training where and when it is needed with lower cost.			
Title: Advanced Processing Technologies for Live Training	-	-	3.969

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC8 / *Training Advanced Technology (Other than STE)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: This effort will improve technologies that reduce the computational burden, latency, and power consumption (battery weight) associated with training dismounted Soldiers in live training environments that leverage simulated tactical engagements. Such live training use-cases require virtual ballistic flyout calculations, casualty assessment, and visualization of terminal effects (e.g., munition impacts). ***FY 2023 Plans:*** Will demonstrate methods to couple lethality, vulnerability, and terrain models with real-world sensors to generate realistic virtual ballistic flyout and casualty assessment models that reduce weight and functional impacts to the Soldier; validate architectures to account for truncated calculation space, data compression, parallelization, 3D terrain tiling, high-speed commercial hardware, and smart RF network packet routing. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects a shift in research focus from the near term development of the Synthetic Training Environment (STE) capabilities to the support technologies necessary to enable more realistic live-synthetic training where and when it is needed with lower cost.			
Title: Synthetic Cyberspace Effects for Training ***Description:*** This effort matures, demonstrates, and validates a data exchange model for cyberspace effects and a brokering architecture to propagate those cyberspace effects across Live, Virtual and Constructive models and simulations within distributed training environments for collective training. ***FY 2023 Plans:*** Will mature cyberspace data model and effects brokering architecture to incorporate cyber, electronic warfare, and Global Positioning System (GPS) effects for Brigade-level collective training; validate multi-domain use-cases and identify large-scale exercises to leverage for data collection and demonstration. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort to progress into advanced technology development from the Cyberspace Electromagnetic Activities (CEMA) Effects Modeling and Simulation task in PE 0602143A (Soldier Lethality Technology) / BC7 (Training Technology (Other than STE)).	-	-	3.109
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:***	-	0.109	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC8 / *Training Advanced Technology (Other than STE)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638			
Accomplishments/Planned Programs Subtotals	4.140	2.993	7.078

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BC9 / *Adv Soldier Sensors/Displays AdvTech for Dismounts*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BC9: *Adv Soldier Sensors/ Displays AdvTech for Dismounts*	-	8.738	13.151	25.963	-	25.963	27.040	26.606	28.425	28.937	0.000	158.860
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures, optimizes, and demonstrates fully digital sensor systems, architectures, and interfacing capabilities to fuse sensors, and network situational understanding information and targeting capabilities to enable maintained mounted and dismounted visual advantage, increased situational awareness, decreased fratricide, and decreased response times to all threats in all environments.

Research in this Project supports the Army Science and Technology Soldier Lethality, Next Generation Combat Vehicle, and Future Vertical Lift Army Modernization priorities.

This Project complements work done in Program Element (PE) 0602143A (Soldier Lethality Technology) / BD1 (Advanced Soldier Sensors/Displays Tech for Dismounts).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Modernization Strategy, and supports the Soldier Lethality Cross Functional Team (CFT).

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Advanced Soldier Sensors/Displays Advanced Technology for Dismounts	8.738	12.671	25.963
Description: This effort will mature and demonstrate low cost Soldier-borne situational understanding systems with greater fidelity for improved maneuver and lethality, as well as integrates automated target cueing to increase probability of recognition/ identification and tracking of threats in all environments.			
FY 2022 Plans: Will improve performance of augmented reality (AR) systems for mounted/mechanized infantry interactions by providing heading corrections and providing self-location to infantry within a combat vehicle; mature sensor systems and integrate with command and control systems for information sharing capabilities between dismounted and mounted Soldiers on a tactical vehicle platform; mature novel sensor payloads with enhanced processing to improve detection, localization and notification capabilities required			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC9 / *Adv Soldier Sensors/Displays AdvTech for Dismounts*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
for improved situational awareness against all threats; optimize performance of sensors to enable effective range of threats, and framerates required for dismounted hostile fire detection; mature opto-acoustic techniques to enable dismounted multi-modal hostile fire detection. ***FY 2023 Plans:*** Will mature advanced infrared sensors leveraging emerging multiple sensor modalities for incorporation into various soldier borne sensor systems; mature covert eye tracking, parallax correction and multi-plane display technologies to enable the next generation of digital sensor and head mounted display capabilities for dismounted Soldier situational awareness and mobility; improve performance of optics detection capability against concealed infrared threats while reducing size and weight for small platform use; optimize sensor approaches enabling low false alarms, stand-off range, signature reduction, and threat location accuracy; demonstrate AR systems for mounted infantry interactions with heading corrections and self-location capabilities within a combat vehicle while on the move; optimize sensor systems integrated with command and control systems for information sharing capabilities between dismounted and mounted Soldiers on a tactical vehicle platform for soldier touchpoint assessment on representative platforms; optimize sensor payloads and processing approaches for enhanced autonomy to enable target localization and notification capabilities on smaller aerial platforms enabling improved situational awareness against all threats; optimize performance of image processing techniques to improve threat detection at longer ranges, and frame rates required for dismounted hostile fire detection; validate optical and acoustic techniques to enable dismounted multi-modal hostile fire detection. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase represents funding for technology maturation needed to leverage breakthroughs in sensors and sensor fusion and inject them into critical dismounted Soldier systems.			
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.480	-
Accomplishments/Planned Programs Subtotals	8.738	13.151	25.963

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC9 / *Adv Soldier Sensors/Displays AdvTech for Dismounts*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BD7 / *Soldier Sys Interfaces/Integration-Sensor AdvTech*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BD7: *Soldier Sys Interfaces/ Integration-Sensor AdvTech*	-	9.110	8.374	8.535	-	8.535	8.196	8.590	9.311	9.309	0.000	61.425
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will integrate and mature technologies for sensing, processing, displaying information, interfacing with users, and cognitive improvement to enhance Soldier & Small Unit situational awareness & understanding. This Project will integrate and demonstrate battlefield, body-worn sensors, and data fusion algorithms to provide the dismounted Small Unit leader with clear, actionable information for making well informed, rapid, tactical decisions. This Project will also mature and integrate advanced dismounted Soldier robotic and autonomous systems technologies to demonstrate autonomous navigation, manned-unmanned teaming, and networked reconnaissance to improve Soldier lethality, situational awareness, and survivability during tactical operations.

Research in this Project complements several Program Elements (PEs) and Projects to include PE 0602143A (Soldier Lethality Technology) / BD6 (Soldier Sys Interfaces/Integration - Sensor Tech), Project BB9 (Human Performance Tech for Mobility & Lethality), and PE 0603118A (Soldier Lethality Advanced Technology) / Project BC9 (Adv Soldier Sensors/Displays AdvTech for Dismounts).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Modernization Strategy, and the Soldier Lethality Cross Functional Team (CFT).

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Soldier System Interfaces & Integration (Sensor Advanced Technology)	9.110	8.068	8.535
Description: This effort will integrate battlefield and body-worn sensors and mature data-fusion algorithms to provide the dismounted Small Unit leader with clear, actionable information to make well informed, rapid, tactical decisions. This effort will mature and integrate advanced dismounted Soldier robotic and autonomous systems technologies to demonstrate autonomous navigation, manned-unmanned teaming, and networked reconnaissance to improve Soldier lethality, situational awareness, and survivability during tactical operations.			
FY 2022 Plans: Will mature and integrate Small Unit leader planning and decision tools, human performance algorithms and visualization tools, and Soldier equipment sensing algorithms and user interfaces; conduct field demonstrations of integrated Soldier sensor systems with Nett Warrior and the Integrated Visual Augmentation System (IVAS) in relevant field environments to validate performance			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BD7 / *Soldier Sys Interfaces/Integration-Sensor AdvTech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
and operation; demonstrate advanced autonomous tactical Small Unmanned Aerial Systems (SUAS) capabilities (ie. collision avoidance, fast flight, nighttime navigation, target detection) on representative military platforms in relevant field environments to validate the performance and operation of the technologies; mature technologies to enable hasty resupply of consumable items found in an infantry squad basic load for the Multi Domain Operations (MDO) battlespace. ***FY 2023 Plans:*** Will mature and demonstrate Small Unit leader planning tools with the IVAS to enhance tactical decision making; mature and integrate human performance, Soldier equipment, and remote sensing capabilities with IVAS to enhance Soldier situational awareness & understanding during distributed operations; conduct field demonstrations of Sensored Soldier technologies with IVAS, Soldier Lethality, and other Army systems in relevant operational environments to validate performance and functionality; mature autonomous tactical algorithms for Army SUAS (e.g., nighttime navigation, perch and stare, landing site selection) and integrate them on military relevant platforms; demonstrate SUAS autonomy capabilities in relevant field environments to validate the performance and operation of the technologies; integrate and demonstrate small unit logistical planning tools that support data driven decisions for emergency and routine resupply at the tactical edge while conducting cross domain maneuver. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.306	-
Accomplishments/Planned Programs Subtotals	9.110	8.374	8.535

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BD9 / *Soldier & Sm Unit Tactical Energy AdvTech*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BD9: *Soldier & Sm Unit Tactical Energy AdvTech*	-	6.041	3.171	4.189	-	4.189	4.269	4.520	4.518	4.517	0.000	31.225
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will demonstrate advanced Power and Energy (P&E) technologies for the dismounted Soldier to lighten equipment load, reduce resupply need, and enhance mobility. This Project will conduct Soldier and Small Unit power and energy technology maturation, integration with clothing and individual equipment, technical analysis, and operational assessment.

Work in this Project complements several Program Elements (PEs) to include PE 0602143A (Soldier Lethality Technology) / project BD6 (Soldier Sys Interfaces/ Integration - Sensor Tech), Project BB9 (Human Performance Tech for Mobility & Lethality), Project BD8 (Soldier & Sm Unit Tactical Energy Tech), and PE 0603118A (Soldier Lethality Advanced Technology) / Project BC9 (Adv Soldier Sensors/Displays AdvTech for Dismounts).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Modernization Strategy, and the Soldier Lethality Cross Functional Team (CFT).

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Dismounted Soldier Power and Energy	3.141	3.055	4.189
Description: This effort matures, integrates, and demonstrates advanced Soldier P&E technologies that are used to power the dismounted Soldier and small unit's command and control, communications, computers, and sensor devices during tactical operations. This work will result in the Army being able to provide the power and energy the future Soldier requires to operate effectively, while doing so at a reduced physical burden.			
FY 2022 Plans: Will mature, integrate, and demonstrate technologies for increasing the run-time of rechargeable battery technologies for the Soldier?s weapon, body, or helmet electronics; conduct field demonstrations to validate the performance and operation of batteries to support operational Soldier materiel; mature, integrate, and demonstrate novel power management technologies for transferring power efficiently between electronic components resident on the Soldier?s head, body, or weapon; mature and demonstrate Soldier power generation technologies for recharging batteries during a Platoon Level dismounted mission.			
FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BD9 / *Soldier & Sm Unit Tactical Energy AdvTech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Will optimize technologies to efficiently transfer power between the conformal wearable battery and the Soldier?s weapon to recharge the weapon battery during dismounted operations; mature technologies to improve the safety and increase the energy density of Soldier carried rechargeable batteries; mature Soldier carried power generators to increase efficiency, reduce weight, and improve compatibility with Soldier equipment; conduct field demonstrations to validate the performance and operation of Soldier and Squad power technologies; mature and validate a Soldier worn, portable data-acquisition system to accurately measure power and energy metrics during Soldier field evaluations. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects anticipated efforts to mature more efficient power generators for the Soldier and Squad to meet the increasing power demand on the Soldier.			
Title: Sustainment Technologies for Expeditionary Power ***Description:*** Sustainment Technologies for Expeditionary Power (STEP) is an innovation approach to engaging with industry to solve some of the toughest Army problems statements for projecting Army energy sources into an expeditionary environment. STEP utilizes a cohort approach to rapidly identify promising solutions that industry offers and pairs them with Army subject matter experts and Soldiers in the field.	2.900	-	-
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.116	-
Accomplishments/Planned Programs Subtotals	6.041	3.171	4.189

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BE2 / *Joint Service Combat Feeding Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BE2: *Joint Service Combat Feeding Advanced Technology*	-	2.367	2.424	1.988	-	1.988	2.019	2.016	2.121	2.120	0.000	15.055
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates combat ration and field feeding technologies to optimize Warfighter performance, decrease the risk of exposure to chemical and biological contaminants in foods, and reduce the logistics burden to enable semi-independent operations. The Army serves as the Executive Agent for this Department of Defense (DoD) program, with oversight and coordination provided by the DoD Combat Feeding Research and Engineering Board.

This Project matures and demonstrates research done in Program Element (PE) 0602143A (Soldier Lethality Technology) / Project BE3 (Joint Service Combat Feeding Technology).

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

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Joint Service Combat Feeding Advanced Technology Demonstration	2.367	2.335	1.988
Description: This effort matures and demonstrates combat ration and field feeding technologies to optimize Warfighter performance, decrease risk of exposure to chemical and biological contaminants in foods, and reduce the logistics burden to enable semi-independent operations.			
FY 2022 Plans: Will validate critical limits for multispectral imaging to identify potential quality degradation of ration components; optimize field-deployable biosensor detection platforms for multiple pathogens in food matrices to reduce risk of food-borne illness on the battlefield; demonstrate baseline Close Combat Assault Ration effect on Warfighter physical performance to enable semi-independent operations; validate decontamination agent performance on ration packaging in support of Chemical Biological Radiological Nuclear (CBRN) threats; validate effects of cycling temperatures and processing methods on nutrient compounds in ration components to ensure nutrient retention during processing and prolonged storage; validate small scale atmospheric water harvester performance to decrease logistical burdens in multi-domain operations; and validate conductive materials performance during heating and sterilization processing methods to enhance ration heating efficiency.			
FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BE2 / *Joint Service Combat Feeding Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Will demonstrate field-deployable biosensor detection platforms for multiple pathogens in food matrices to reduce risk of food-borne illness on the battlefield; validate effect of Close Combat Assault Ration on Warfighter physical performance to enable semi-independent operations; optimize commercially available surface treatment chemicals for mobile field feeding kitchen surfaces to improve force health protection; demonstrate stability and safety of membrane concentrate technology to reduce combat load; continue optimization of small scale atmospheric water harvester performance using an environmental chamber technique to decrease logistical burdens in multi-domain operations; and mature and demonstrate additive manufacturing technology to provide targeted nutrition-on-demand for optimal physical performance. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding realigned to PE 0602143A (Soldier Lethality Technology) / Project BE3 (Joint Service Combat Feeding Technology). Funding decrease will enable future maturation and demonstration of combat ration and field feeding technologies.			
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.089	-
Accomplishments/Planned Programs Subtotals	2.367	2.424	1.988

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BE5 / *Personnel & Airdrop Safety Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BE5: *Personnel & Airdrop Safety Advanced Technology*	-	5.707	6.879	6.484	-	6.484	6.603	6.668	7.306	7.304	0.000	46.951
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates equipment and innovative techniques for precision aerial delivery of cargo and personnel. Technologies support Army Modernization Priority, Soldier Lethality. Aerial delivery is a key capability for rapid force projection and global precision delivery to support the mission readiness profile for Global Response Force (GRF). These efforts are designed to advance state of the art precision delivery technologies such as parachutes; guidance, navigation, and control (GNC) components and subsystems; tracking sensors; software algorithms; and safety rigging that integrates with currently equipped aircraft, unmanned aerial systems (UAS), and advanced rotary wing aircraft. These efforts provide the Warfighter with highly accurate, timely cargo/payload delivery and resupply in all terrain and weather conditions. Precision delivery/resupply reduces vulnerability of ground Soldiers, aircraft, and aircrew. Precision aerial delivery supports remote warfare with activities such as placement of battlefield sensors and reduction of Soldier load.

Research in this Project supports key Army needs and complements the technical research in Program Element (PE) 0602143A (Soldier Lethality Technology) / Project BR9 (Personnel & Airdrop Safety Technology). This Project also complements research done in the Science & Technology Precision, Navigation and Timing 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 Army Futures Command (AFC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Personnel & Airdrop Safety Advanced Technology	5.707	6.628	6.484
Description: This effort matures and demonstrates parachute materials and designs, precision guidance, navigation software and hardware, tracking sensors, and safety devices to increase the accuracy of delivering cargo to remote locations and/or complex terrains in global positioning system (GPS) denied environments. This effort also provides technologies that increase safety during personnel insertions into theaters of operation. This effort supports capability demonstrations for mitigating the Army' s challenge of overburdened Soldiers through the use of tactical aerial resupply technologies, as well as supporting Anti-Access/Area Denial (A2/ AD) and manned-unmanned teaming (MUM-T) operational concepts by demonstrating airdrop from non-traditional platforms.			
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BE5 / *Personnel & Airdrop Safety Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Will optimize heavy equipment airdrop system performance to minimize altitude loss and increase system reliability. Will demonstrate capabilities to airdrop up to at least 50,000 lbs through live airdrop testing from a C-17 aircraft. Will demonstrate advancements in high altitude insertion technology that facilitate extended offset insertions in GPS denied conditions. Will mature Next Generation Static Line parachute systems and demonstrate effectiveness in Immediate Response Force (IRF) mission. Will optimize the design of an autonomously guided powered aerial resupply system with a minimum of tenfold increase in horizontal standoff capability compared to conventional guided airdrop systems. ***FY 2023 Plans:*** Optimize and demonstrate integration of low-cost suite of guidance, navigation, and control sensors, to enable robust positioning estimates in GPS denied conditions; demonstrate and validate sensor integration on an autonomously guided aerial resupply system, in operationally relevant environment; incrementally mature and demonstrate autonomous technologies on personnel infiltration/exfiltration systems (PIES) in live environment, with both dependent and autonomous controls; demonstrate Next Generation Static Line (NGSL) advancements in control authority in a live environment that reflects IRF challenges. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.251	-
Accomplishments/Planned Programs Subtotals	5.707	6.879	6.484

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BE9 / *STE Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BE9: *STE Advanced Technology*	-	14.764	13.401	10.656	-	10.656	3.658	3.022	0.929	0.948	0.000	47.378
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates technologies supporting the Army's Synthetic Training Environment (STE). The STE is the next generation holistic collective training capability that will train units where they will fight, with whom they will fight with, and in complex operational environments to include dense urban and sub-terrain; within the entire range of combined arms maneuver tasks in support of Multi- Domain Operations. STE Information Systems (STE-IS) delivers the Common Synthetic Environment consisting of Global Terrain/One World Terrain (OWT), Training Simulation Software (TSS), and Training Management Tools (TMT). The STE will be available where training occurs (home station, combat training centers, armories, institutions, shipboard, deployed) and will include Air and Ground Reconfigurable Virtual Collective Trainers (RVCTs), a Soldier/Squad Virtual Training (S/SVT), and a live training capability. The STE will be cloud-enabled, compatible with the Army Enterprise Network, and service-based through the Common Operating Environment, including Live and Constructive. The STE will provide the realistic repetitions necessary to fight 25 bloodless battles before the first battle.

This Project complements research done in Program Element (PE) 0602143A (Soldier Lethality Technology) / Project BE8 (Synthetic Training Environment (STE) Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Modernization Strategy, and supports the STE Cross Functional Team efforts.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: STE Training Management Tool	3.371	3.187	2.897
Description: This effort matures and demonstrates STE-relevant tools and technologies that automatically adapt training to the learner's skill level, conduct intelligent after action reviews, automate team training assessments, and enable the visualization of and interaction with a Mixed Reality Common Operating Picture of the battlespace.			
FY 2022 Plans: Will exploit the association between squad level performance measures for individuals and teams and optimize how to best provide instructors with data to assess their performance and readiness; mature generalized intelligent tutoring framework allowing for both individual and team tutoring capabilities within synthetic training environments; demonstrate a team competency			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BE9 / *STE Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
tracking capability that utilizes Department of Defense learning architecture standards; validate battlespace visualization tools to support large-scale simulations with synthetic training environments and mission command decision making. ***FY 2023 Plans:*** Will demonstrate the integration of automated performance measures from both live and simulated small-unit training events in a team-competency tracking architecture that uses Department of Defense standards; optimize models and algorithms to measure squad-level competencies for integration into the STE; exploit human-performance data and demonstrate dashboards that visualizes competency acquisition over time and across multiple training interactions; mature and demonstrate the integration between competency tracking architecture and visualization tools for small-unit after-action review and for Multi-Domain Operations mission planning and mission command at higher echelons. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects the planned lifecycle of this effort through a shift in research focus from the near-term development of the STE capabilities to longer term research supporting training of multi-domain operations on complex, data-intensive battlefields.			
Title: STE One World Terrain	2.816	2.805	4.294
Description: This effort matures and demonstrates tools and methods that improve the speed, fidelity and delivery of synthetic terrain and environmental data needed to support mission rehearsal and training in a representation of the globe, fully accessible through the Army network and usable by all simulation trainers. This effort also matures and develops complex representations (including megacities and subterranean) of the operational environment and the Multi-Domain battlefield in synthetic training environments. ***FY 2022 Plans:*** Will demonstrate processes, tools and software for surface level feature classification and extraction for material and terrain artifacts to support OWT application spaces for the resulting modernized three-dimensional (3-D) terrain products; improve attribution deficiencies for OWT; demonstrate runtime implementation optimizations to rapidly assemble tailored terrain datasets suitable for application-specific needs; improve methods to procedurally correct or validate 3-D terrain data; optimize the OWT data model specification to support traditional and non-traditional application domains ***FY 2023 Plans:*** Will demonstrate processes, tools and software for surface indentation, classification and extraction for material and terrain artifacts supporting the ability to access, explore, modify, and retrieve 3-D content from the OWT 3-D Foundational Data; establish processes and standards to balance the tradespace of enterprise (unconstrained) vs. point-of-need (constrained) terrain needs			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BE9 / *STE Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
conforming to network design and constraint space such as how much content should be pre-loaded vs. on-demand; demonstrate automation across the 3-D terrain generation pipeline to accelerate ground-truth 3-D content delivery. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding increase will provide and demonstrate processes and tools that could enable OWT content and applications beyond training use-cases.			
Title: STE Training Simulation Software ***Description:*** This effort matures and demonstrates technologies that support Multi-Domain Operations modeling and simulation configuration and scalability technologies for collective training. In addition, matures and demonstrates technologies that allow the synthesis of robust military behaviors that enable the scaling of STE collective training configurations and delivery to the Point of Need through the exploitation of emerging computing and networking technologies that optimize computing architectures for integrating components (models, behaviors, data, etc.) of the Training Simulation Software (TSS). ***FY 2022 Plans:*** Will mature and demonstrate the integration of simulation architecture technologies that allow for components (models, behaviors, data, etc.) to be dynamically integrated to support collective training use cases; will demonstrate technologies to generate STE-ready behavior models from authoritative sources to facilitate reuse and reduce the cost of TSS development; will improve Operational Environment (OE) models in support of emerging TSS gaps from collective training use cases; will demonstrate emerging AI techniques to represent military behaviors against OE modeling needs. ***FY 2023 Plans:*** Will demonstrate dynamic integration of STE-simulation components (models, behaviors, data, etc.) in a point-of-need collective-training use case featuring local and distributed simulation; mature and demonstrate Operational Environment models (e.g., Areas, Structures, Capabilities, Organizations, People, Events [ASCOPE]/Political, Military, Economic, Social, Information, Infrastructure- Physical environment and Time [PMESII-PT]) to enhance the representation of Multi-Domain Operations in Army simulations. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects a shift in research focus from the near-term development of the STE capabilities to longer-term research supporting training of multi-domain operations on complex, data-intensive battlefields.	5.752	6.950	3.465
Title: Weapons Effects for STE ***Description:*** This effort matures and demonstrates structural weapon effects and projectile penetration models and algorithms to integrate within the Army?s STE. This effort provides One World Terrain with accurate representation of the effects of threat	0.851	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BE9 / *STE Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
weapons (such as small arms, projectiles, indirect fire, and improvised explosives device attacks) and display of realistic vulnerabilities in the battlespace.			
Title: Live Training Thin Client Engagement and Casualty Assessment	1.974	-	-
Title: FY2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.459	-
Accomplishments/Planned Programs Subtotals	14.764	13.401	10.656

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BS8 / *Soldier Lethality Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BS8: *Soldier Lethality Advanced Technology*	-	45.200	44.500	-	-	-	-	-	-	-	0.000	89.700
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Congressional Interest Item funding provided for Soldier Lethality Advanced Technology.

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Soldier Lethality 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 2021	FY 2022
Congressional Add: Program Increase - Advanced AI/AA Analytics for Modernization and Readiness ***FY 2021 Accomplishments:*** Conducted advanced research in Advanced AI/AA Analytics for Modernization and Readiness. Work executed by Army Futures Command. ***FY 2022 Plans:*** Congressional Interest Item funding provided for Advanced AI/AA Analytics for Modernization and Readiness	10.000	10.000
Congressional Add: Program Increase - Small Arms Fire Control Advanced Technology ***FY 2021 Accomplishments:*** Conducted advanced research in Small Arms Fire Control Advanced Technology. Work executed by Army Futures Command. ***FY 2022 Plans:*** Congressional Interest Item funding provided for Small Arms Fire Control Advanced Technology	8.000	8.000
Congressional Add: Program Increase: Advanced Technology for Maneuver Support and Protection ***FY 2021 Accomplishments:*** Conducted advanced research in Maneuver Support and Protection. Work executed by Army Futures Command.	10.000	-
Congressional Add: Program Increase - Military Engineering Technology for Infield Waste	2.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BS8 / *Soldier Lethality Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
FY 2021 Accomplishments: Conducted advanced research in Military Engineering Technology for Infield Waste. Work executed by Army Futures Command.		
Congressional Add: Program Increase - Flexible LED Lighting for Tents and Shelters ***FY 2021 Accomplishments:*** Conducted advanced research in Flexible LED Lighting for Tents and Shelters. Work executed by Army Futures Command.	5.200	-
Congressional Add: Program Increase ***FY 2021 Accomplishments:*** Conducted advanced research in Soldier Lethality Advanced Technology. Work executed by Army Futures Command.	10.000	-
Congressional Add: Ferrium Steel for Improved Personal Protective Equipment ***FY 2022 Plans:*** Congressional Interest Item funding provided for Ferrium Steel for Improved Personal Protective Equipment	-	5.000
Congressional Add: Human Machine Teaming ***FY 2022 Plans:*** Congressional Interest Item funding provided for Human Machine Teaming	-	4.000
Congressional Add: Impact Attenuation Materials for Limb Protection ***FY 2022 Plans:*** Congressional Interest Item funding provided for Impact Attenuation Materials for Limb Protection	-	1.500
Congressional Add: Soldier Situational Awareness ***FY 2022 Plans:*** Congressional Interest Item funding provided for Soldier Situational Awareness	-	8.000
Congressional Add: Squad Operations Advanced Resupply ***FY 2022 Plans:*** Congressional Interest Item funding provided for Squad Operations Advanced Resupply	-	8.000
Congressional Adds Subtotals	45.200	44.500

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BS8 / *Soldier Lethality Advanced Technology*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A