Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 0602184A / *Soldier Applied Research*							
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	-	-	11.064	15.716	-	15.716	16.059	18.028	22.482	22.060	0.000	105.409
CK9: *Advancing Concepts and Technology Forecasting Tech*	-	-	2.289	2.529	-	2.529	2.575	2.558	2.559	2.558	0.000	15.068
CN2: *Intelligent Weapons Concepts and Technologies*	-	-	2.178	3.335	-	3.335	3.611	3.607	3.609	3.608	0.000	19.948
CN9: *Soldier Enabling University Applied Research*	-	-	0.939	0.396	-	0.396	0.455	2.159	2.759	2.758	0.000	9.466
CO1: *Soldier Power And Energy Concepts and Technologies*	-	-	1.241	2.387	-	2.387	2.422	2.419	2.420	2.420	0.000	13.309
CO2: *Soldier-Intelligent Technology Research*	-	-	4.417	1.543	-	1.543	-	-	-	-	0.000	5.960
CV9: *Technical-SAVVY Soldier Applied Research*	-	-	-	2.331	-	2.331	3.381	3.637	3.743	3.326	0.000	16.418
CW9: *Syn Bio for Reactive-Resp Matls-Soldiers & Sys*	-	-	-	3.195	-	3.195	3.615	3.648	7.392	7.390	0.000	25.240

Note

Project CV9 (Technical-SAVVY Soldier Applied Research) is a New Start in Fiscal Year 2023 (FY23).

A. Mission Description and Budget Item Justification

This Program Element (PE) investigates, designs, and performs research focused on technologies necessary for capability enhancements for the Soldier and Squad over the long-term well beyond those technologies planned within the Soldier Lethality Cross- Functional Team. Applied research projects investigate nascent and enduring science and technology areas that are applicable to the individual Soldier and Squads of Soldiers needs with emphasis on maximizing Soldier and Squad performance, lethality, mobility and survivability. This PE also designs and validates technologies that are necessary and foundational for future capabilities with far-reaching impact on mission success. The outputs of these efforts transition to advanced research efforts that mature and demonstrate potential opportunities to realize improved Soldier performance and inform technical requirements for future Soldier systems.

The PE will fund civilian salaries for in-house researchers/scientists and program managers collaborating with external subject matter experts in academia and industry who are leaders in these technology research areas. This PE is coordinated with PE 0602143A (Soldier Lethality Technology), 0602785A (Manpower, Personnel and Training Technology), 0603007A (Manpower, Personnel and Training Advanced Tech), 0603044A (Soldier Advanced Technology), and 0603118A (Soldier Lethality Advanced Technology).

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602184A / *Soldier Applied Research*

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

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	0.000	11.064	0.000	-	0.000
Current President's Budget	0.000	11.064	15.716	-	15.716
Total Adjustments	0.000	0.000	15.716	-	15.716
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	15.716	-	15.716

Change Summary Explanation

Fiscal Year (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 / 2	R-1 Program Element (Number/Name) PE 0602184A / *Soldier Applied Research*	Project (Number/Name) CK9 / *Advancing Concepts and Technology Forecasting 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
CK9: *Advancing Concepts and Technology Forecasting Tech*	-	-	2.289	2.529	-	2.529	2.575	2.558	2.559	2.558	0.000	15.068

A. Mission Description and Budget Item Justification

This Project works across the Army Futures Command Combat Capabilities Development Command (AFC CCDC) and with the Futures & Concepts Center (FCC) to explore current and future emerging and disruptive applied scientific research in order to translate, integrate, and ingrain applied research outcomes with Army Warfighting Concepts to describe how the Army will fight in the mid and far-term future. Applied research outcomes describe the projected future operational effects of science in the context of Army concepts to mitigate risk for future Army capabilities and enable informed decision making across the Army Modernization Enterprise. This Project ensures Army Concepts are grounded by recent discoveries in applied scientific research, Army applied research is capability use-inspired to deliver the right future capability identified in the Army Concepts, and learning opportunities are created to advance Army Concepts and operationalize science for transformational overmatch.

This Project also performs long-range technology forecasts and trend analysis, informed by the threat and the predicted future state of technology, of Army-relevant applied research topics to enable informed decision making for the near-, mid-, and far-terms.

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: Advancing Concepts and Technology Forecasting	-	2.206	2.529
Description: Advancing Concepts and Technology Forecasting identifies and translates emerging and disruptive applied scientific research current and future outcomes in order to integrate and ingrain applied scientific data and knowledge with Army Warfighting Concepts which describe how the Army will fight in the mid- and far-term future. This effort also provides long-range, scientifically grounded technology forecasts and trend analysis, informed by the threat and future predicted state of technology, of applied research topics to enable informed decision-making for the near-, mid-, and far-terms.			
FY 2022 Plans: Will integrate knowledge of applied scientific research outcomes with warfighting concepts with a focus on mid- and far-term Maneuver, Fires, and Mission Command Army Warfighting Concepts; perform long-range technology forecasts and near/mid-			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602184A / *Soldier Applied Research*	**Project (Number/Name)** CK9 / *Advancing Concepts and Technology Forecasting Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
term horizon scanning of the Army Priority Research Areas; provide reports, briefings, and information papers to the Army Modernization Enterprise to influence personnel and funding decisions. ***FY 2023 Plans:*** Will integrate applied scientific research outcomes into emerging Army Warfighting Concept priorities for mid- and far-term decision dominance, sustained operations, and maximizing human potential; determine objective estimates of anticipated technology advances, across the Army Priority Research Areas, for Army decision-makers to aid in applied research program formulation. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 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	-	0.083	-
Accomplishments/Planned Programs Subtotals	-	2.289	2.529

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 / 2	R-1 Program Element (Number/Name) PE 0602184A / *Soldier Applied Research*	Project (Number/Name) CN2 / *Intelligent Weapons Concepts and Technologies*	

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
CN2: *Intelligent Weapons Concepts and Technologies*	-	-	2.178	3.335	-	3.335	3.611	3.607	3.609	3.608	0.000	19.948

A. Mission Description and Budget Item Justification

This Project focuses on far-term, overarching lethality technologies by investigating techniques for Soldiers to guide the in-field adaptation of intelligent small arms technologies to respond to changing mission requirements, novel environments, and adversarial actions. Research areas include cognition-centric displays to ensure Soldiers maintain appropriate situational awareness in augmented reality (AR) environments, opportunistic shooter sensing, and interactive machine learning techniques to ensure small arms technologies can adapt to changing situations quickly and with reduced data requirements as compared to non-human guided machine learning and Artificial Intelligence (AI). The results of this Project will enhance operational performance of individuals and teams of Soldiers in the future operational environment through novel weapon and human-agent interaction technologies.

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-Agent Interactions for Intelligent Squad Weapons	-	2.098	3.335
Description: This effort investigates enhanced target acquisition, situational awareness, and shooting performance through Soldier-centered integration of intelligent technologies and distributed information in augmented squad weapons. Enhances operational performance of individuals and teams of Soldiers through novel weapon and human-agent interaction technologies. ***FY 2022 Plans:*** Will investigate methods to label relevant data from Soldier-systems interactions through opportunistic sensing and drive the adaptation of intelligent small-arms technology; design initial approaches for human-computer vision teamed augmented reality. ***FY 2023 Plans:*** Will determine methods for expanding prior opportunistic sensing approaches to increasingly realistic scenarios; investigate capabilities derived from fusion of opportunistically sensed data from small arms and small unmanned aerial systems; design and develop enhanced approaches for small arms fire control based on aim augmentation. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding increase supports additional research into enhanced approaches for small arms fire control based on aim augmentation.			
Title: SBIR/STTR Transfer	-	0.080	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602184A / *Soldier Applied Research*	**Project (Number/Name)** CN2 / *Intelligent Weapons Concepts and Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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	-	2.178	3.335

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 / 2	R-1 Program Element (Number/Name) PE 0602184A / *Soldier Applied Research*	Project (Number/Name) CN9 / *Soldier Enabling University Applied Research*	

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
CN9: *Soldier Enabling University Applied Research*	-	-	0.939	0.396	-	0.396	0.455	2.159	2.759	2.758	0.000	9.466

A. Mission Description and Budget Item Justification

This Project investigates technologies from academia that will improve capabilities and systems to advance Soldier and Squad lethality-overmatch and Soldier performance. This Project funds collaborative, enduring applied extramural university-based research and brings together competitively selected universities with Army research teams into Technical Alliances. This Project will determine discovery solutions and inform capabilities development for mid- to far-term Army modernization priorities while also maintaining delivery of near-term technologies fundamental to the modernization priorities. The technical scope of this Project includes the investigation and design of overarching Soldier-centric technologies including, human systems integration, robotics, synthetic environments for training, advanced materials, power management, energy, Warfighter endurance, and computational technologies. This Project conducts applied research for potential emerging technologies in areas of strategic importance to the Army in Soldier capabilities related to increased protection, performance, agility, situational awareness, and lethality. This Project will also continuously strive to engage and collaborate with entities that might not otherwise collaborate with the Department of Defense (DoD) to identify and determine novel Soldier-centric technologies for accelerating the adoption of emerging technologies for the Warfighter in the Army Soldier portfolio.

Research in this Project supports the Synthetic Training Environment and Soldier Lethality and the overall Soldier portfolio Army Modernization Priorities.

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

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

Research in this Project complements and transitions to Soldier Enabling University Advanced Development in Program Element (PE) 0603044A (Soldier Advanced Technology).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Soldier Training and Performance	-	0.622	0.396
Description: Collaboratively investigate technologies for Soldier capabilities related to increased protection, performance, agility, situational awareness, training, and lethality. ***FY 2022 Plans:*** Investigate automated testing framework to guarantee that synthetic training environments are highly trustworthy, reliable, and usable, to ensure that Soldiers are efficiently trained; Optimize intelligent real time edge processing of streams for wide area persistent surveillance, signature event detection and tracking towards the Army's next generation active protection and situational			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602184A / *Soldier Applied Research*	**Project (Number/Name)** CN9 / *Soldier Enabling University Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
awareness systems; investigate timely and reliable monitoring and assessment technologies for the health and readiness of Warfighters through digital biomarkers and biosensors. ***FY 2023 Plans:*** Will expand investigation in common software platform the automated testing framework to guarantee that synthetic training environments are highly trustworthy, reliable, and usable, to ensure that Soldiers are efficiently trained; investigate cognitive state and readiness of Warfighters through digital biomarkers and biosensors. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects the realignments to PE 0602141A (Lethality Technology) / CJ1 (Lethality Enabling University Applied Research).			
Title: Soldier Electronics for the Integrated Combat Platform ***Description:*** Design and determine advanced materials and electronics that are standardized to the Soldier and their equipment through integrated combat platform. ***FY 2022 Plans:*** Funds research to design and investigate Soldier electronics and standardize data, and power interfaces and connection points across the Soldier and Squad combat platform. Investigate and develop energy storage and other materials such as self-healing and super materials for increased protection, flexible electronics, and power generation. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects the realignments to Program Element 0602141A (Lethality Technology) / CJ1 (Lethality Enabling University Applied Research).	-	0.283	-
Title: SBIR/STTR Transfer ***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	-	0.034	-
Accomplishments/Planned Programs Subtotals	-	0.939	0.396

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 / 2	**R-1 Program Element (Number/Name)** PE 0602184A / *Soldier Applied Research*	**Project (Number/Name)** CN9 / *Soldier Enabling University Applied Research*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602184A / *Soldier Applied Research*	Project (Number/Name) CO1 / *Soldier Power And Energy Concepts and Technologies*	

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
CO1: *Soldier Power And Energy Concepts and Technologies*	-	-	1.241	2.387	-	2.387	2.422	2.419	2.420	2.420	0.000	13.309

A. Mission Description and Budget Item Justification

This Project conducts applied research to improve safe, compact, efficient, rugged, lightweight, and energy dense power sources for increased capabilities for the mounted and dismounted force. This Project also investigates materials, processes, and component level energy storage and conversion technologies that enable tactical overmatch and reduce the physical and cognitive burden on Soldiers. Research will focus on safe electrochemical energy storage, high specific energy storage and conversion, novel materials and processing for energy and power, and new cell designs that address the power needs of future capabilities including the Next Generation Squad Weapons (NGSW), Integrated Visual Augmentation System (IVAS), and other advanced sensors, communications systems, and electronic Warfighting capabilities. Enabling and emerging technologies are supported in this Project to address future Soldier power needs necessary for increased lethality, increased mobility, and longer mission durations at reduced physical burden to the Soldier in the future operating environment.

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: Tactical Energy Sources and Energy Materials	-	1.195	2.387
Description: This effort conducts overarching power and energy research to determine and design alternative energy capabilities to replace current energy systems. Research focuses on new materials and processing techniques as well as energy storage technologies that support advanced sensors, communications systems, and electronic Warfighting capabilities.			
FY 2022 Plans: Will investigate improved anodes and cathode materials and electrode structures for aqueous electrolyte batteries including silicon based anode materials for high energy, safe, non-flammable aqueous batteries; extend aqueous electrolytes to other multivalent cations including zinc rechargeable systems; investigate zinc metal reversibility for high energy rechargeable safe batteries; explore the solvation, interface, and transport of highly concentrated electrolytes and the effects on electrode/electrolyte interfaces; assess energy conversion materials and technologies for Fiscal Year 2023 (FY23) inclusion.			
FY 2023 Plans: Will investigate anode protection schemes for high capacity and high charge rate anode materials to enable high energy, safe, non-flammable aqueous electrolyte batteries; identify processes and methods to scale materials and component fabrication to larger format and multilayer pouch cells; investigate high energy cathodes including halide intercalation and conversion cathodes;			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602184A / *Soldier Applied Research*	**Project (Number/Name)** CO1 / *Soldier Power And Energy Concepts and Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
develop protective interphases at the electrode/electrolyte interfaces to enable selective transport in aqueous electrolytes for reversible lithium (Li), zinc (Zn), and multivalent rechargeable batteries; validate and asses key metrics related to energy density, cycle life, columbic and cycle efficiency, rate capability, and safety of rechargeable batteries; design and generate catalysts and perform modelling with atomic precision to gain an accurate understanding of the fundamental factors dictating carbon dioxide reduction reaction mechanisms and conversion product selectivity; determine the most impactful fuels for synthesis from carbon dioxide; investigate the use of stretchable power devices with textile-woven conductors for a full body power management system with integrated data communication. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding increase supports additional research in the area of high energy cathodes and catalysts.			
Title: 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	-	0.046	-
Accomplishments/Planned Programs Subtotals	-	1.241	2.387

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 / 2	R-1 Program Element (Number/Name) PE 0602184A / *Soldier Applied Research*	Project (Number/Name) CO2 / *Soldier-Intelligent Technology Research*	

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
CO2: *Soldier-Intelligent Technology Research*	-	-	4.417	1.543	-	1.543	-	-	-	-	0.000	5.960

A. Mission Description and Budget Item Justification

This Project investigates research gaps related to human and intelligent systems to enhance decision making in response to changing conditions. Applied research is conducted on novel and emerging visualization technologies as well as methodologies for intelligent systems and Soldier to co-adapt for the real-time quantification, prediction, and enhancement of squad-level shared situational awareness (SA) and situational understanding (SU) across dynamic, complex, and uncertain operating environments, leading to demonstrated increases in mission effectiveness. The result of this Project will inform various efforts that rely on human and intelligent system interactions including systems that adapt the behavior of autonomous assets and intelligent Soldier tools, based on dynamic needs of the Soldier/squad, using real-time opportunistic measures of Soldier SA and changing mission environment. In addition, this Project will design novel approaches to represent uncertain and dynamically changing information, to increase Soldier comprehension and enhanced mission effectiveness, with reduced Soldier/squad burden and training requirements.

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 Performance in Sociotechnical Environments	-	2.872	1.543
Description: Technologies for squad-level situational awareness assessment (information visualization) that provide command-level decision support with communication and intervention capabilities. Research focuses on algorithms for the quantification and visualization of collective uncertainty at the squad level for mission command decision making. This effort also supports the monitoring and assessing of Soldier tactical readiness and effectiveness through technologies and approaches for opportunistic human sensing.			
FY 2022 Plans: Will explore methods for how autonomous systems can leverage real-time measures of squad-level situational awareness to improve mission outcomes; design initial capability to opportunistically assess group performance in dismounted virtual environments; validate group performance measures in augmented reality systems.			
FY 2023 Plans: Will develop algorithms for autonomous systems to use opportunistically sensed data from groups in dismount virtual environments to adapt a learned behavior, or set of behaviors, for improved squad-autonomy performance.			
FY 2022 to FY 2023 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602184A / *Soldier Applied Research*	**Project (Number/Name)** CO2 / *Soldier-Intelligent Technology Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Funding decrease reduces research into human cyber operations assessments and advanced human decision-support capabilities to deploy cyber work systems that optimize human-machine interactions and account for operator and adversary behavior.			
Title: Algorithms for Sensing Soldiers in Mission Context ***Description:*** This effort investigates novel and emerging visualization technologies representing complex, time-sensitive information in the dynamic operating environment as well as technologies for human and artificial intelligence (AI) situational understanding for enhanced operational performance and decision making under conditions of time sensitive and dynamically changing information. ***FY 2022 Plans:*** Will design techniques for tailoring the representation of uncertain battlespace information in time-sensitive environments for increased Soldier situation awareness and improved mission relevant decision making. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.	-	1.384	-
Title: 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	-	0.161	-
Accomplishments/Planned Programs Subtotals	-	4.417	1.543

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 / 2	R-1 Program Element (Number/Name) PE 0602184A / *Soldier Applied Research*	Project (Number/Name) CV9 / *Technical-SAVVY Soldier Applied Research*	

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
CV9: *Technical-SAVVY Soldier Applied Research*	-	-	-	2.331	-	2.331	3.381	3.637	3.743	3.326	0.000	16.418

Note

This is a new start in FY 2023.

Project CV9 (Technical-SAVVY Soldier Applied Research) is a New Start in Fiscal Year 2023 (FY23).

A. Mission Description and Budget Item Justification

This Project conducts applied research to provide critical breakthroughs in developing a "technologically" fluent force. This research will develop models of technological fluency(TF) (TF Modeling), methods and measures to assess and develop the technological fluency of Soldiers across a career (TF Personnel Assessments), and technologies to maximize technological fluency resilience and performance in Soldiers and units (Maximizing TF). TF is defined as the ability of Soldiers and units to use and rapidly adapt new and intelligent technologies without formal training on these technologies, and it will be a decisive factor in a future operating environment in which Soldiers and squads are teamed with increasingly sophisticated and evolving technologies. Soldiers and leaders in specialty areas (e.g., Cyber and Emerging Tech) and General Purpose Forces will require increased technological aptitudes and skills to adapt emerging technologies to evolving mission sets and avoid being overmatched by Artificial Intelligence (AI)-enabled "smart" technologies.

This Project supports key Army needs and will coordinate with and/or leverage findings of several Program Elements (PEs) to include PE 0602785A (Manpower, Personnel and Training Technology), 0602143A (Soldier Lethality Technology), and 0602145A (Next Generation Combat Vehicle Technology).

This research will be performed collaboratively by the Combat Capability Development Command - Army Research Laboratory (ARL) and the United States (U.S.) Army Research Institute (ARI) for Behavioral and Social Sciences.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Soldier Technical Enhancement Applied Research - ARL	-	-	1.554
Description: This effort enables TF through three areas of focus: TF Modeling through the creation and utilization of novel future-focused experimental test-beds; TF Personnel Assessments through methodologies and technologies for ?opportunistic? (no Soldier burden) sensing and TF interpretation; and Maximizing TF through creating TF training approaches and in-field performance aids.			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602184A / *Soldier Applied Research*	**Project (Number/Name)** CV9 / *Technical-SAVVY Soldier Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2023 Plans: Will design the first of its kind future human-system interaction experimental environment containing multiple research grade test-beds; design and pilot initial experimental methodologies in support of TF Modeling. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This task is a new start in FY2023.			
Title: Soldier Technical Enhancement Applied Research - ARI ***Description:*** This effort enables TF through three areas of focus: TF Modeling by identifying and understanding the critical human knowledge, skills, abilities, and characteristics that enable TF in Soldiers and teams; TF Personnel Assessments by developing and validating personnel tests to assess knowledge, skills, and abilities, and characteristics to promote TF for talent management; and Maximizing TF by creating and validating TF training approaches to improve TF at both the individual and team levels of performance. ***FY 2023 Plans:*** Develop a competency model of Technological Fluency (TF) that identifies the critical knowledge, skills, abilities, and characteristics that enable TF and related elements of job performance. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This task is a new start in FY2023.	-	-	0.777
Accomplishments/Planned Programs Subtotals	-	-	2.331

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 / 2	R-1 Program Element (Number/Name) PE 0602184A / *Soldier Applied Research*	Project (Number/Name) CW9 / *Syn Bio for Reactive-Resp Matls-Soldiers & Sys*	

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
CW9: *Syn Bio for Reactive-Resp Matls-Soldiers & Sys*	-	-	-	3.195	-	3.195	3.615	3.648	7.392	7.390	0.000	25.240

Note

In Fiscal Year 2023 (FY23), funding administratively realigned from Program Element 0602143A (Soldier Lethality Technology) / Project BE6 (Reactive/Resp Surfaces & Matls-Soldiers & Sys).

A. Mission Description and Budget Item Justification

This Project designs and investigates materials through the application of biotechnology and synthetic biology advances to develop material capabilities that respond and/or can adapt to a wide range of external stimuli and biological processes. Research into innovative materials that are capable of sensing, responding, and adapting to a broad spectrum of environmental variables will be conducted. This Project will explore new biology-based methods for controlled synthesis and assembly to create multi-functional materials and advanced composites as well as develop materials that are able to self-monitor, self-heal, and self-sustain. This Project also focuses on developing models, materials characterization techniques, non-destructive testing methods, and advanced fabrication and processing methodologies as well as the identification of unique material properties.

The cited research is consistent with the Undersecretary 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: Biological Bio-Composite Materials and Processes	-	-	3.195
Description: This effort conducts applied research through the application of biotechnology advances to develop materials with capabilities to respond and adapt to a wide range of external stimuli and biological processes. Research will explore new biology-based methods for controlled synthesis and assembly to create materials with precise chemistries, microstructures, properties, and responsive functionalities through controlled molecular placement, spatial architectures, and interfacial structures. Investment in bio-enabled materials research allows for the design of materials that are capable of sensing and responding, as well as adapting to a broad spectrum of environmental variables with the ability to self-monitor, self-heal, self-sustain, and self-degrade. Investments in this area could lead to future applications in Soldier performance, situational awareness, protection, and sustainment.			
FY 2023 Plans: Will design and develop biological building blocks to interface with sensor platforms and investigate signal transfer to platform; develop a library of tunable and modular biological building blocks for advance sensing (e.g., Soldier performance, situational			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
awareness, and target tracking and locating); develop hybrid experimental and computational tools to inform design of novel biomaterials for control in the electro-optical/electromagnetic (EO/EM); assess novel adhesive molecules and structural composites for scale and integration for down-stream processing (e.g. energetics, protective coatings); determine utility of novel biomaterials for advanced composites and protective coatings; investigate rate of degradation of high value targets and validate down-selected models of accelerated degradation using laboratory experiments; design biological counter measures to prevent or mitigate material degradation and investigate dynamic range of degradation processes. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding administratively realigned from PE 0602143A (Soldier Lethality Technology) / Project BE6 (Reactive/Resp Surfaces & Matls-Soldiers & Sys).			
Accomplishments/Planned Programs Subtotals	-	-	3.195

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A