Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army											Date: March 2023	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603042A *I C3I Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	3.036	12.716	19.225	-	19.225	23.223	20.022	22.011	21.622	0.000	121.855
CN3: *Network Enabling University Adv Development*	-	3.036	3.993	4.031	-	4.031	3.924	3.587	3.590	3.629	0.000	25.790
CX7: *Intelligent Env Battlefield Awareness Adv Tech*	-	-	4.892	6.396	-	6.396	10.661	10.185	8.571	6.543	0.000	47.248
CX8: *Persistent Geophysical Sensing-Infrasound Adv Tech*	-	-	2.334	2.635	-	2.635	3.131	2.081	2.606	2.988	0.000	15.775
CX9: *Sensing in Contested Environments Adv Technologies*	-	-	1.082	1.104	-	1.104	2.079	0.151	-	2.983	0.000	7.399
CZ5: *Subterranean Detection and Monitoring Adv Tech*	-	-	0.415	1.272	-	1.272	1.429	1.430	2.323	-	0.000	6.869
DB5: *Enabling Long Standoff 3D (ELS3D) Adv Tech*	-	-	-	1.045	-	1.045	1.999	2.588	4.921	5.479	0.000	16.032
DE7: *Understanding Environment as a Threat Adv Tech*	-	-	-	2.742	-	2.742	-	-	-	-	0.000	2.742

A. Mission Description and Budget Item Justification

This Program Element (PE) matures, demonstrates, optimizes, and validates Network Command, Control, Communications, and Intelligence (C3I) technologies through the integration of future equipment and systems that improve overmatch and meet mission needs in the future operating environments. This PE provides mid-to-long term tactical C3I capabilities (e.g. networking, cyber, electronic warfare, Positioning, Navigation, and Timing (PNT), space, persistent surveillance) based upon promising technologies that address emerging and future threats, and includes research critical and unique to the Army and DoD. Efforts focus on advanced maturation and demonstration of materials, technologies, methodologies and systems that span the range from electronics, protective technologies, electronic warfare, and mission support capabilities such as situational awareness. These efforts directly inform and transition key capabilities to Army programs of record that support the Army 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.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army					Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*			R-1 Program Element (Number/Name) PE 0603042A *I C3I Advanced Technology*		
B. Program Change Summary ($ in Millions)	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**
Previous President's Budget	3.151	12.716	16.409	-	16.409
Current President's Budget	3.036	12.716	19.225	-	19.225
Total Adjustments	-0.115	0.000	2.816	-	2.816
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.115	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	2.816	-	2.816

Change Summary Explanation

Increase in funding is due to two new start efforts to support integration and demo of low-SWAP, and risk assessments in complex urban environments.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CN3 / *Network Enabling University Adv Development*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
CN3: *Network Enabling University Adv Development*	-	3.036	3.993	4.031	-	4.031	3.924	3.587	3.590	3.629	0.000	25.790
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced Network Command, Control, Communications, and Intelligence (C3I) technologies into future equipment and systems. This Project accelerates advanced technologies originating from extramural research in academia, will enable intelligent networks, self-sensing/self-healing network, network security, advanced teaming and operations in a Global Positioning System (GPS) degraded or denied environment. This Project also accelerates the Army modernization in next generation Network and Assured Positioning, Navigation, and Timing (APNT) systems. Work in this Project will lead to emerging technologies in areas of strategic importance to the Army in communications and networking, by engaging competitively selected Universities.

Work in this Project complements Program Element (PE) 0602182A (C3I Applied Research) / Project CN4 (Network Enabling University Applied Research).

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

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Advanced Intelligent, Secure and Self-Sensing/Self-Healing Networks	0.361	0.400	0.420
Description: Mature and integrate advanced intelligent network solutions with autonomous or self-sensing intelligence to deny corruption, and/or attacks and to execute operational missions securely and reliably. ***FY 2023 Plans:*** Will continue maturation of artificial intelligence and machine learning (AI/ML) software for Network technologies, predictive analytics software, intelligent data integration software, edge computer processing platforms, edge sensing systems, and other technologies; Will demonstrate these algorithms on simulator software built to emulate tactical networks using the network topologies and positions that are produced in on-field situations, as well as Army experimental platform/devices. ***FY 2024 Plans:*** Will continue maturation and demonstration of AI/ML emerging technologies for Network solutions, optimal network usage and network inference, RF-based deceptive tactical networks, improve cyber defense systems through secure and reliable ML, multi-modal and multi-vantage sensing for joint inference, and network localization. ***FY 2023 to FY 2024 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CN3 / *Network Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding increase reflects planned lifecycle of this effort.			
Title: Advanced Real-Time Tactical Networks ***Description:*** Develop tactical network technology platforms consisting of a fleet of ground and air vehicles that will perform an autonomous reconnaissance mission in a relevant environment. ***FY 2023 Plans:*** Will continue to develop, and integrate Artificial Intelligence/Machine Learning Autonomy-related algorithms with improved holistic network functionalities, overlay for reliably supporting tactical cyberphysical systems over unreliable communication and computation networks for advanced teaming operations. Will demonstrate cache network with information reuse across components and continue to integrate mature technologies with/to experimental Ground and Air platforms for accelerated development and prototyping. Will mature algorithms for collaborative RF sensing and inference for distributed tactical networks and demonstrate on Army network testbeds. ***FY 2024 Plans:*** Mature and demonstrate an information network that will resiliently support information pathways for sensing, computing, and control in cyber-physical systems, such as autonomous vehicle teams over unreliable communication networks. Mature and demonstrate an information network that responds dynamically to changes in operating conditions through real-time adaptation and evolution to enable continuity of the core services that it provides to the networked system. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle of this effort.	1.262	1.346	1.307
Title: Advanced Sensors and Non-GPS PNT Systems ***Description:*** Develop advanced sensors with enhanced signal processing software/algorithms to improve assurance against both electronic and kinetic attacks relative to GPS, and that can provide matured Positioning, Navigation and Timing (PNT) technology in disrupted, degraded or denied Global Positioning System (GPS) environments. ***FY 2023 Plans:*** Will continue to design, fabricate, and integrate GPS signal integrity monitoring global and tactical sensors and reporting systems to enhance Soldier awareness in disrupted, degraded or denied GPS environments and inform regarding local threat emitter detection, characterization and geolocation. Will mitigate effects of threats on Soldier PNT solution. ***FY 2024 Plans:***	1.413	2.101	2.304

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CN3 / *Network Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Will continue the development and integration of GNSS global and tactical sensors, exploitation of LEO satellites for robust PNT back up to GPS, and demonstrate capability on a sensor fusion framework. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle of this effort.			
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638	-	0.146	-
Accomplishments/Planned Programs Subtotals	3.036	3.993	4.031

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CX7 / *Intelligent Env Battlefield Awareness Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
CX7: *Intelligent Env Battlefield Awareness Adv Tech*	-	-	4.892	6.396	-	6.396	10.661	10.185	8.571	6.543	0.000	47.248
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project optimizes and demonstrates technologies to allow Soldiers to maneuver faster around or through existing environmental (urban/industrial) conditions and physical landscape constraints. This effort matures and demonstrates web modules/software tools delivering crucial geo-chemical resources and advanced knowledge of geo-environmental infrastructure to mission planners. This Project delivers critical technologies that provide situational awareness for multi-source intelligence, particularly for anti-access/area denied (A2/AD) outside the continental United States (OCONUS) sites.

Work in this Project complements PE 0602182A (C3I Applied Research) / Project CX3 (Intelligent Env Battlefield Awareness Apl Tech).

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

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Arctic Threats Demonstrations	-	1.082	-
Description: This effort matures and demonstrates visualization tools which enable geospatial decisions based on anticipated physical threats, hazards and dependencies posed by terrain and weather extremes in cold regions. ***FY 2023 Plans:*** Integrate weather models into high resolution remotely sensed terrain data platform demonstrating terrain state changes such as freeze/thaw, snowmelt, and ice vulnerability to aid in preventing risks to operational effectiveness and efficiency in cold regions. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding decrease reflects the planned lifecycle conclusion of this effort and capability transition to Predictive GIS Mapping (physical) Demonstration.			
Title: Geo-Forensics for Reconnaissance Exploitation	-	0.985	1.134
Description: This effort provides unique terrestrial patterns to describe and predict the geological, biological, and overall ecological information associated with anti-access/area denial (A2/AD) sites from the continental United States (CONUS) analogs.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CX7 / *Intelligent Env Battlefield Awareness Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: Demonstrate geospatial platform implementation of geo-forensic predictive framework to geo-locate unknown soil samples and predict soil provenance. ***FY 2024 Plans:*** Will provide a global soil analog tool application in which soil diversity and functionality can be predicted to inform mobility operations. Will also provide final documentation of geo-forensic capabilities for predicting soil provenance and properties within a predictive GIS platform. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects the planned lifecycle of this effort scheduled to complete in FY 2024.			
Title: Predictive Geographic Information Systems (GIS) Mapping (physical) Demonstration ***Description:*** This effort reduces the impact of unknown and changing terrain conditions by automating the integration of disparate datasets and overlays of terrain obstacles producing a high-fidelity map that integrates soil composition, vegetation, hydrology, and permafrost/ice data. ***FY 2023 Plans:*** Prototype, validate, and integrate geospatial tools describing geophysical models in a unified geospatial framework. ***FY 2024 Plans:*** Will integrate high resolution remotely sensed weather models demonstrating terrain state changes such as freeze/thaw, and global soil analog tools into a predictive GIS platform. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding decrease reflects the planned lifecycle for this effort for model integration.	-	1.585	1.248
Title: Hydrology Mapping Demonstrations ***Description:*** This effort matures and demonstrates data tools and models to support high-fidelity battlefield overlay maps that accurately show hydrologic/soil moisture threats (soil, hydrology, and snow/ice) not captured by current terrain mapping capabilities. ***FY 2023 Plans:*** Demonstrate existing hydrologic and watershed tools and integrate applied research products (data, models, and algorithms) in the Predictive GIS platform. ***FY 2024 Plans:***	-	0.473	1.753

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CX7 / *Intelligent Env Battlefield Awareness Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Will mature hydrologic modeling to support soil moisture change predictions on a prototype GIS platform from field data gained at CONUS test bed sites. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned field experiments at three CONUS test bed sites.			
Title: Vegetation Property Demonstrations ***Description:*** This effort correlates forest metrics with other Intelligent Environmental Battlefield Awareness Tech threat area parameters to inform global ecological analogues in areas with limited data. ***FY 2023 Plans:*** Generate datasets and demonstrate models that identify global-scale forest ecotones that inform regional planning. ***FY 2024 Plans:*** Will validate interactive machine learning models to assign to global forest analogs (e.g., digital forest twins) incorporated from the U.S. Forest Service. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects the planned lifecycle of this effort.	-	0.588	0.627
Title: Extreme Environmental Effects on Operations Demonstrations ***Description:*** This effort designs and develops modeling of natural terrain following extreme disturbances that impact operational environments such as wildfires, flash floods, earthquakes and landscape changes induced by high intensity military conflict. ***FY 2024 Plans:*** Will assess sources and linkages to meet foundational and dynamic environmental data requirements for extreme event capabilities within a predictive GIS platform. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort.	-	-	1.634
Title: SBIR/STTR ***Description:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:***	-	0.179	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CX7 / *Intelligent Env Battlefield Awareness Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding transferred in accordance with Title 15 USC §638			
Accomplishments/Planned Programs Subtotals	-	4.892	6.396

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CX8 / *Persistent Geophysical Sensing-Infrasound Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
CX8: *Persistent Geophysical Sensing-Infrasound Adv Tech*	-	-	2.334	2.635	-	2.635	3.131	2.081	2.606	2.988	0.000	15.775
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates kitted hardware and software solutions that provide passive, persistent, non-line-of-sight, multi-modal sensing capable of providing fused battlefield intelligence for increased situational awareness in a dynamic operational environment. These technologies provide near-real-time data collection, processing, and alerting on evolving cross-domain threats including strategic and tactical fires, air and ground platforms, as well as critical transportation infrastructure (bridges) and explosive events with applications for deep sensing. These technologies deliver time-critical intelligence for engineer and intelligence communities to provide decisive advantage.

Work in this Project complements PE 0602182A (C3I Applied Research) / Project CX4 (Persistent Geophysical Sensing-Infrasound Apl Tech).

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

Work in this Project is performed at the United States Army Engineer Research and Development Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Battlefield Intelligence by Geophysical Sensing (BIGS) Demonstration	-	2.249	2.635
Description: This effort matures and demonstrates geophysical and geo-sensing technologies to persistently assess battlefield elements to include infrastructure (algorithm refinements) and additional sources of interest, such as explosive and fires events and various threats. Optimization of the array sensors and geometry to improve array performance for new sources of interest while reducing logistics will also be matured and demonstrated. New detection and classification signal processing algorithms will be validated throughout the life of the task in a phased demonstration schedule.			
FY 2023 Plans: Validate and demonstrate classification algorithms of sources of interest as determined by stakeholders and provide software updates; and utilize a military user assessment to evaluate alternate array geometry for feedback loop.			
FY 2024 Plans: Will optimize and demonstrate algorithm components. Will demonstrate alternate array geometry in a simulated operational environment.			
FY 2023 to FY 2024 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CX8 / *Persistent Geophysical Sensing-Infrasound Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding increase reflects planned lifecycle of this effort to support demonstrations with transition partner, Program of Record ENFIRE.			
Title: SBIR/STTR Transfer ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638	-	0.085	-
Accomplishments/Planned Programs Subtotals	-	2.334	2.635

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CX9 / *Sensing in Contested Environments Adv Technologies*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
CX9: *Sensing in Contested Environments Adv Technologies*	-	-	1.082	1.104	-	1.104	2.079	0.151	-	2.983	0.000	7.399
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced sensor technologies that characterize hazards posed to warfighters by non-weaponized biological hazards in subterranean environments. Demonstrations of previously developed sensor packages and adaptive commercial off the shelf sensor technologies on existing unmanned ground vehicles (UGV) platforms to gather end-user feedback. The capabilities resulting from this project provide Soldiers the capability to understand biological hazards present in subterranean environments and take necessary steps to mitigate or avoid these threats.

Work in this Project complements PE 0602182A (C3I Applied Technology) / Project CX5 (Sensing in Contested Environments Technologies).

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

Work in this Project is performed at the United States Army Engineer Research and Development Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Non-traditional Threat Detection in Contested Environments Tech	-	1.043	1.104
Description: This effort identifies, examines, prioritizes, and exploits commercial of the shelf capabilities from multiple sources that can accurately detect biological and water quality hazards relevant to operations in subterranean environments from point of ingress/egress to evaluate exposure potential and affects. ***FY 2023 Plans:*** Demonstrate a new sensor with the ability to detect 1-3 macroscopic organisms; Also evaluate field-ready COTS sensors that utilize polymerase chain reaction (PCR) and DNA sequence technologies to accurately detect biological hazards. ***FY 2024 Plans:*** Will demonstrate macroscopic and microscopic organism classification and hazard detection in a field realistic environment. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase reflects the planned lifecycle of this effort.			
Title: SBIR/STTR Transfer	-	0.039	-
FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CX9 / *Sensing in Contested Environments Adv Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638			
Accomplishments/Planned Programs Subtotals	-	1.082	1.104

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CZ5 / *Subterranean Detection and Monitoring Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
CZ5: *Subterranean Detection and Monitoring Adv Tech*	-	-	0.415	1.272	-	1.272	1.429	1.430	2.323	-	0.000	6.869
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project validates and demonstrates advanced subterranean monitoring and vulnerability assessment technologies providing mobile and man-portable solutions to enhance survivability and threat awareness during urban operations and negate enemy subterranean operation advantage. This Project also optimizes and demonstrates enhanced technologies to detect tunnels and tunneling activity in complex and varied environments. These capabilities are critical to provide greater situational awareness of the subterranean domain and enhanced survivability for the Soldier.

Work in this Project complements Program Element (PE) 0602182A (Network C3I Enabling Technologies) / Project CX6 (Subterranean Detection and Monitoring Apl Tech).

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

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Cavity Assessment in Variable Environments-Subterranean (CAVES) Demonstrations	-	0.400	1.272
Description: This effort validates and demonstrates an integrated suite of tunnel detection and perimeter security systems for application in variable terrain, and complex geologic environments, such as mountains, and hard rock geology common in the western pacific.			
FY 2023 Plans: Validate which legacy tunnel detection systems will be evaluated in demonstrations in FY24 in hard rock geology.			
FY 2024 Plans: Will conduct field experimentation to baseline capabilities of tunnel detection and perimeter security technologies in an operationally relevant environment.			
FY 2023 to FY 2024 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CZ5 / *Subterranean Detection and Monitoring Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding increase reflects the planned lifecycle of this effort to align resources for demonstrations as technologies are transitioned from PE 0602182A (Network C3I Enabling Technologies) / Project CX6 (Subterranean Detection and Monitoring Apl Tech).			
Title: SBIR/STTR Transfer ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638 ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638	-	0.015	-
Accomplishments/Planned Programs Subtotals	-	0.415	1.272

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) DB5 / *Enabling Long Standoff 3D (ELS3D) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
DB5: *Enabling Long Standoff 3D (ELS3D) Adv Tech*	-	-	-	1.045	-	1.045	1.999	2.588	4.921	5.479	0.000	16.032
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Enabling Long Standoff 3D (ELS3D) Adv Tech is a new start within the C3I Advanced Technology program in FY 2024.

This is a New Start FY 2024

A. Mission Description and Budget Item Justification

This Project will integrate and demonstrate a fully matured low-SWAP laser transmitter, processing algorithms and calibration models tailored for higher resolution 3D data collections over larger areas from longer stand-off for mapping, Intelligence Surveillance and Reconnaissance (ISR) and targeting.

Work in this Project complements PE 0602182A (Network C3I Enabling Technologies) / Project DB4 (Enabling Long Standoff 3D (ELS3D) Tech).

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

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Enabling Long Standoff 3D (ELS3D) Demonstration	-	-	1.045
Description: This effort will demonstrate and integrate a prototype airborne system to collect long standoff high-resolution quick turnaround 3D data. ***FY 2024 Plans:*** Will conduct hardware design for SWAP-optimization of lidar components, as initial phase of the advanced collection methodology. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** This is a New Start in FY 2024			
Accomplishments/Planned Programs Subtotals	-	-	1.045

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** DB5 / *Enabling Long Standoff 3D (ELS3D) Adv Tech*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) DE7 / *Understanding Environment as a Threat Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
DE7: *Understanding Environment as a Threat Adv Tech*	-	-	-	2.742	-	2.742	-	-	-	-	0.000	2.742
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In Fiscal Year (FY) 2024 funding is realigned from Program Element (PE) 0603463A (Network C3I Advanced Technology) / Project AR6 (Understanding the Environment as a
Threat Adv Tech)

A. Mission Description and Budget Item Justification

This Project matures and demonstrates tools that provide capability to inform the Solider of different routes through a complex urban landscape. Optimizes tools that balance exposure to environmental threats with mission constraints to provide a risk versus reward capability of operating in different areas of the urban theater. This Project matures and demonstrates predictive software accurately integrating the risks of physical, chemical, and biological threats in an urban environment into route planning tools.

Work in this Project complements Program Element (PE) 0602182A (C3I Applied Technology) / Project DE6 (Understanding the Environment as a Threat Tech).

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

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Environmental Threat Technology Demonstrations for route planning	-	-	0.682
Description: This effort matures and demonstrates a software tool that informs and balances the risk of exposure to environmental threats with maneuver constraints along potential routes. The software integrates the risks associated with different environmental matrices in complex urban environments and includes the capability for routing in off-road scenarios. ***FY 2024 Plans:*** Will demonstrate operational viability of individual course-forecasting algorithms. Will demonstrate final threat-overlay software products and validate performance within an established interface.			
FY 2023 to FY 2024 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** DE7 / *Understanding Environment as a Threat Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding reflects the final year of Technical Readiness Level (TRL) 6 demonstration for this effort.			
Title: Hazard Prediction Demonstration ***Description:*** This effort matures and demonstrates a mission planning platform that provides Soldiers with a predictive visualization technology to identify, track and plan for industrial or commercial chemical/environmental threats in operational environments. ***FY 2024 Plans:*** Will demonstrate and validate suite of standalone air, water, and soil media model algorithms using toxic industrial chemical/ material (TIC/TIM) databases. Will demonstrate final threat-overlay software product and validate performance within an established interface. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding reflects the planned lifecycle of this effort.	-	-	1.030
Title: Subsurface Forensics Demonstration ***Description:*** This effort matures and demonstrates sensing technologies for TIC/Ms to detect illicit activities with authentic wastewater treatment influent. ***FY 2024 Plans:*** Will validate capabilities to exploit pre-existing physical, chemical, and biological information from urban subterranean systems for threat identification with special and temporal resolution in current and future operational environments. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase the planned lifecycle of this effort as work transitions from PE 0602146A, Network C3I Technology, Project AR3 Intelligent Environmental Battlefield Awareness for maturation and demonstration.	-	-	1.030
Accomplishments/Planned Programs Subtotals	-	-	2.742

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A