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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army **Date:** March 2023

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604134A / <i>Counter Improvised-Threat Demonstration, Prototype Development, and Testing</i>
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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	-	12.891	14.840	16.426	-	16.426	17.306	17.326	17.510	17.705	0.000	114.004
CD4: <i>Counter Improvised-Threat Demonstration</i>	-	12.891	14.840	16.426	-	16.426	17.306	17.326	17.510	17.705	0.000	114.004

A. Mission Description and Budget Item Justification

This Program Element (PE) develops prototypes and demonstrates technology for detecting and defeating Improvised Explosive Devices (IED). The goal of this Project is to mature technology to increase the ability of deployed forces to positively identify IEDs with minimal false alarms and increase the rate of advance of route clearance missions. Additionally the objective is to positively neutralize or mitigate the effects of IEDs with minimal collateral damage. Driven by the current threat facing deployed U.S. forces, this PE enables rapid development and delivery of capabilities that enable the detection, neutralization, and risk mitigation of IEDs and their effects. These technologies are intended to be matured and demonstrated for integration onto existing Department of Defense weapon systems.

This PE is coordinated with the Under Secretary of Defense for Research and Engineering (USD/R&E) and the Defense Threat Reduction Agency (DTRA).

Work in this PE was previously conducted under PE 0604134BR, Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing.

B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	13.379	15.840	16.773	-	16.773
Current President's Budget	12.891	14.840	16.426	-	16.426
Total Adjustments	-0.488	-1.000	-0.347	-	-0.347
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.488	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-0.347	-	-0.347

Change Summary Explanation

Decreased funding to support higher Army priorities.

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Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0604134A / <i>Counter Improvised-Threat Demonstration, Prototype Development, and Testing</i>				Project (Number/Name) CD4 / <i>Counter Improvised-Threat Demonstration</i>			
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
CD4: <i>Counter Improvised-Threat Demonstration</i>	-	12.891	14.840	16.426	-	16.426	17.306	17.326	17.510	17.705	0.000	114.004
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project develops prototypes and demonstrates technology for detecting and defeating Improvised Explosive Devices (IED). The goal of this Project is to mature technology to increase the ability of deployed forces to positively identify IEDs with minimal false alarms and increase the rate of advance of maneuver forces. An additional goal is to positively neutralize IEDs with minimal collateral damage. Driven by the current threat facing deployed U.S. forces, this project enables rapid development and delivery of capabilities that enable the detection, neutralization, and mitigation of IEDs and their effects.

This Project is coordinated with the Under Secretary of Defense for Research and Engineering (USD/R&E) and the Defense Threat Reduction Agency (DTRA).

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024
<p>Title: Radio Controlled IED Detection Technology Demonstration</p> <p>Description: This effort demonstrates Radio Controlled IED detection exploiting advanced network techniques. This effort demonstrates the ability to detect Radio Controlled IEDs with minimal false alarms.</p> <p>FY 2023 Plans: Will demonstrate advanced network techniques to identify Radio Controlled IEDs at standoff distances. Will demonstrate flexible modular open systems to mitigate IED's without impacting other electro-magnetic systems on the platform.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: This Phase 2 Radio Controlled IED Demonstration completes in FY23.</p>	1.883	1.823	-
<p>Title: Anti-Armor IED Detection Technology Demonstration</p> <p>Description: This effort demonstrates anti-armor IED detection using technologies to include high resolution electro-optical / infrared and other sensors to detect component characteristics to identify the location of IEDs prior to detonation.</p> <p>FY 2023 Plans:</p>	1.739	1.539	2.850

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
<p>Will conduct an integrated demonstration of a multi-sensor system including advanced electro-optical, infrared, lidar, and radio-frequency sensor processing techniques to detect and geo-locate anti-armor IEDs at a standoff distance. Will perform test and evaluation of the integrated multi-sensor system.</p> <p>FY 2024 Plans: Will continue prototype development of unmanned system mounted multi-sensor detection and geo-location of IEDs at standoff distances. Will conduct testing to confirm detection performance.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: IED Detection effort increases because of prototype hardware development and testing in FY24.</p>				
<p>Title: Booby Trap Structure IEDs Detection Technology Demonstration</p> <p>Description: This effort demonstrates detection techniques developed by DTRA in FY 2020 using small unmanned aerial systems (UAS) with compact sensor technologies including light detection and ranging (LIDAR) to develop high resolution imagery of structures with the ability to inspect multi-level structures for the presence of IEDs. This effort demonstrates the ability to develop high fidelity mapping of multi-level structures to identify potential locations of IEDs.</p>		1.210	-	-
<p>Title: Personnel Borne IED Detection Technology Demonstration</p> <p>Description: This effort demonstrates Personnel Borne IED (PBIED) detection by aggregating information from a network of small, inexpensive sensor technologies including electro-optical and millimeter wave radar imagers to sense the presence of PBIEDs attached to personnel through thin walls. This effort demonstrates the ability to aggregate sensor data to identify PBIEDs with minimal false alarms.</p> <p>FY 2023 Plans: Will demonstrate multi-mode sensor technologies integrated to increase the probability of detecting concealed Personnel Borne IEDs in various environments. Will perform test and evaluation of the prototype sensor technologies and document for urgent material release purposes.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: The first effort completes with prototype of integrated infrared and radar hardware for entry control points in FY23.</p>		2.641	3.812	-
<p>Title: Off-Route IED Detection Technology Demonstration</p>		3.173	2.593	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
<p>Description: This effort will demonstrate a proof of concept IED detection system using miniaturized sensors developed in the Counter-Improvised Threat Simulation Program Element 0603134A integrated with unmanned aerial systems to detect off-route IEDs to support combat maneuver forces.</p> <p>FY 2023 Plans: Will conduct multi-mode sensor unmanned air and ground systems off-route detection proof of concept demonstration. Will optimize sensor technologies to increase rate of advance and standoff detection range.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Initial off-route IED detection concept completes with demonstration of capability from unmanned systems in FY23.</p>			
<p>Title: Water-Borne IED Detection Technology Demonstration</p> <p>Description: This effort conducts a technology demonstration to evaluate the performance of IED detection technologies in coastal water and water gap crossings. The focus is on detecting devices in water using detection mechanisms at standoff distances to protect troop landings and water gap crossings for the military.</p> <p>FY 2023 Plans: Will continue to mature sensor technologies and autonomous behaviors for a platform capable of operating ahead of formations in both troop landings and water gap crossings. Will continue to develop plans for an FY 2024 demonstration to detect IED threats in both a coastal and water crossing scenario.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: This effort completes demonstration of water-borne IED detection in FY23 with prototype hardware transitioning to a U.S. Marine Corps program.</p>	2.245	2.995	-
<p>Title: Teamed IED Detection Technology Demonstration</p> <p>Description: This effort demonstrates the teaming of small unmanned aerial and ground systems to cooperatively detect IED emplacements and indicators of IED emplacements. This effort optimizes unmanned system teaming to increase the confidence in IED detection using multiple platforms with multiple sensor modes, and integrating their information. This effort will conduct a demonstration in FY 2025 using multiple heterogenous platforms to reduce false alarms for IED detection.</p> <p>FY 2023 Plans: Will mature unmanned system behaviors to optimize IED detection using multiple systems for detection, including including orthogonal detections for confirmation. Will mature sensor processing techniques to integrate information from multiple sensor</p>	-	1.536	3.356

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
<p>systems to reduce the likelihood of false alarms. Will develop scenario plans to demonstrate value of multi-sensor detection schemes to be conducted in FY 2025.</p> <p>FY 2024 Plans: Will continue maturation of teamed unmanned system detection of IEDs using multiple platforms, algorithms and sensors. Will evaluate coordinated maneuver schemes to optimize detection probability from multiple platforms leveraging work in PE 0603134A.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: This effort continues with initial testing being conducted with unmanned system payloads being developed in PE 0603134A.</p>				
<p>Title: SBIR/STTR Transfer</p> <p>FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638</p>		-	0.542	-
<p>Title: IED Detection Evaluation in Varied Environments</p> <p>Description: This effort conducts characterization of mature IED detection system in in varying environments to ensure performance is known in high humidity environments. Will conduct a series of annual assessments in varying environments, including hot, wet, and arctic to ensure necessary performance.</p> <p>FY 2024 Plans: Will conduct evaluation of mature IED detection systems in arctic environments to assess performance and provide system optimization. Evaluation will be conducted using electro-optical, infrared and radio frequency, and other sensing modalities at appropriate test facilities.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: This is a new effort in FY24 to evaluate IED detection performance in varying environments.</p>		-	-	2.118
<p>Title: Radio Controlled IED Interoperability Evaluation</p> <p>Description: This effort conducts regular assessments of interoperability of Radio Control IED neutralization technologies in the presence of battlefield and commercial radio frequency signals to ensure performance is maintained. This will be conducted with foreign partners and hosted by different countries.</p>		-	-	1.520

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
<p><i>FY 2024 Plans:</i> Will conduct an assessment of interoperability of Radio Control IED neutralization technologies in the presence of other radio frequency signals including participation from international partner systems to ensure function in the presence of battlefield and commercial signals. This will be conducted in the United States in coordination with foreign and industry partners.</p> <p><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i> This is a new effort beginning in FY24 to ensure performance of RCIED systems.</p>			
<p><i>Title:</i> Enhanced Personnel Borne IED Detection Prototyping</p> <p><i>Description:</i> This effort evaluates the performance of prototype millimeter wave radar and imaging infrared sensors to detect concealed Personnel Borne IEDs (PBIEDs) while deployed. The focus will be on low size, weight and power with high probability of detection and low false alarm rates. This effort will evaluate mature solutions for applicability to PBIED detection in environments with both combatant and non-combatant populations.</p> <p><i>FY 2024 Plans:</i> Will conduct evaluation of mature, lightweight, integrated millimeter wave and infrared radar systems to detect Personnel Borne IEDs. Will improve aided detection algorithms for increased detection capability against varied target configurations and clothing types.</p> <p><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i> This is a new effort to address the need for deployed forces to identify IED threats in a crowded area.</p>	-	-	2.756
<p><i>Title:</i> Maneuver IED Detection and Mitigation Technology Demonstration</p> <p><i>Description:</i> This effort focuses on the challenges of the force to detect and mitigate hidden IEDs in a battlefield environment. The detection is focused on anti-armor threats with mitigation through device neutralization or marking. The demonstration will employ detection capabilities on multiple platforms, manned and unmanned, to integrate mature technologies for detection and neutralization of IEDs.</p> <p><i>FY 2024 Plans:</i> Will integrate mature detection and neutralization technologies on manned and unmanned platforms for demonstration. Will develop scenarios to evaluate the integrated performance of IED detection sensors and radio controlled IED neutralization technologies.</p> <p><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></p>	-	-	3.826

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
This is a new effort in FY24 to integrate IED detection and neutralization technologies developed in PE 0603134A and other sources.			
Accomplishments/Planned Programs Subtotals	12.891	14.840	16.426

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

N/A

Remarks

D. Acquisition Strategy

The Army will coordinate plans with USD (R&E), DTRA, and other Services to prototype and demonstrate CIED technologies, with Army and Service Laboratories and/or industry performing the demonstration activities. The Army will use existing and new contracts to perform these efforts with selected industry partners based on solicitations issued. The Army will continue promising technology demonstrations started in FY20 by DTRA based on review with DTRA, USD (R&E) and other Services.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army **Date:** March 2023

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Management Services (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SBIR/STTR Transfer	C/TBD	TBD : TBD	-	-		0.542		-		-		-	0.000	0.542	-
Subtotal			-	-		0.542		-		-		-	0.000	0.542	N/A

Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Remote Controlled IED Detection Technology Demonstration	C/CPFF	PEO IEW&S : Aberdeen, MD	2.500	1.883	Mar 2022	1.823	Jan 2023	-		-		-	0.000	6.206	-
Anti-Armor IED Detection Technology Demonstration	C/Various	DEVCOM C5ISR : Ft. Belvoir, VA	2.489	1.739	Mar 2022	1.539	Feb 2023	2.850	Feb 2024	-		2.850	0.000	8.617	-
Booby Trap Structure IEDs Detection Technology Demonstration	C/Various	DEVCOM ARL : Adelphi, MD	2.444	1.210	Mar 2022	-		-		-		-	0.000	3.654	-
Personnel Borne IED Detection Technology Demonstration	C/Various	DEVCOM CBC : Aberdeen, MD	2.168	2.641	Mar 2022	3.812	Dec 2022	-		-		-	0.000	8.621	-
Off-Route IED Detection Technology Demonstrator	C/Various	DEVCOM GVSC : Warren, MI	-	3.173	Mar 2022	2.593	Dec 2022	-		-		-	0.000	5.766	-
Water-Borne IED Detection Technology Demonstration	MIPR	Office of Naval Research (ONR) : Arlington, VA	-	2.245	Mar 2022	2.995	Jan 2023	-		-		-	0.000	5.240	-
Teamed IED Detection Technology Demonstration	TBD	DEVCOM GVSC : Warren, MI	-	-		1.536	Feb 2023	3.356	Dec 2023	-		3.356	0.000	4.892	-
IED Detection Evaluation in Varied Environments	C/Various	ARL : Adelphi, MD	-	-		-		2.118	Jan 2024	-		2.118	0.000	2.118	-
Radio Controlled IED Interoperability Evaluation	C/TBD	PEO IEW&S : Aberdeen, MD	-	-		-		1.520	Dec 2023	-		1.520	0.000	1.520	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Army		Date: March 2023
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Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Radio Controlled IED Detection Technology Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Radio Controlled IED Detection Phase 2 Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Anti-Armor IED Detection Technology Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Mounted Anti-Armor IED Detection Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Anti-Armor Multi-Sensor IED Detection Technology Demonst...	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Booby Trap Structure IEDs Detection Technology Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Personnel Borne IED Detection Technology Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Personnel Borne IED Detection Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Off-Route IED Detection Technology Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Off-Route IED Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Water-Borne IED Detection Technology Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Teamed IED Detection Technology Demonstration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Unmanned System Teaming Integration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Army		Date: March 2023
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Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Teamed IED Detection Demonstration									[Blue Bar]				[Blue Bar]																			
IED Detection Evaluation in Varied Environments																	[Blue Bar]				[Blue Bar]											
IED Detection Evaluation in Varied Environments Eval 1																	4 Arctic Evaluation															
IED Detection Evaluation in Varied Environments Eval 2																					5 Temperate Evaluation											
IED Detection Evaluation in Varied Environments Eval 3																									6 Jungle Evaluation							
Radio Controlled IED Interoperability Evaluation																	[Blue Bar]				[Blue Bar]											
Radio Controlled IED Interoperability Evaluation Event																	3 Radio Controlled IED Interoperability Evaluation Event															
Enhanced Personnel Borne IED Detection Prototyping																	[Blue Bar]				[Blue Bar]											
Maneuver IED Detection and Mitigation Technology Demonstr...																	[Blue Bar]				[Blue Bar]				[Blue Bar]				[Blue Bar]			

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Army		Date: March 2023
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Vehicle Borne IED Detection Technology Demonstration	1	2021	4	2021
VBIED Detection Integration	1	2021	3	2021
VBIED Detection Demonstration	4	2021	4	2021
Vehicle Borne IED Warnings and Indicators Technology Demonstration	1	2021	4	2021
Radio Controlled IED Detection Technology Demonstration	1	2021	4	2023
Radio Controlled IED Detection Technique Maturation	1	2021	4	2021
Radio Controlled IED Detection Demonstration	4	2021	4	2021
Radio Controlled IED Detection Phase 2 Demonstration	1	2022	4	2023
Anti-Armor IED Detection Technology Demonstration	1	2021	4	2022
Anti-Armor IED Detection Technique Maturation	1	2021	3	2021
Anti-Armor IED Detection Demonstration	3	2021	4	2021
Mounted Anti-Armor IED Detection Demonstration	1	2022	4	2022
Anti-Armor Multi-Sensor IED Detection Technology Demonstration	2	2023	4	2025
Mitigation of Anti-Armor IED Technology Demonstration	2	2021	3	2021
Booby Trap Structure IEDs Detection Technology Demonstration	1	2021	4	2022
Personnel Borne IED Detection Technology Demonstration	1	2021	4	2023
Personnel Borne IED Detection Demonstration	4	2023	4	2023
Off-Route IED Detection Technology Demonstration	1	2022	4	2023
Off-Route IED Demonstration	4	2023	4	2023
Water-Borne IED Detection Technology Demonstration	1	2022	4	2023
Teamed IED Detection Technology Demonstration	2	2023	4	2025

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Army **Date:** March 2023

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Events	Start		End	
	Quarter	Year	Quarter	Year
Unmanned System Teaming Integration	2	2023	4	2023
Teamed IED Detection Demonstration	1	2024	4	2025
IED Detection Evaluation in Varied Environments	1	2024	4	2026
IED Detection Evaluation in Varied Environments Eval 1	4	2024	4	2024
IED Detection Evaluation in Varied Environments Eval 2	2	2025	2	2025
IED Detection Evaluation in Varied Environments Eval 3	4	2026	4	2026
Radio Controlled IED Interoperability Evaluation	2	2024	3	2024
Radio Controlled IED Interoperability Evaluation Event	3	2024	3	2024
Enhanced Personnel Borne IED Detection Prototyping	1	2024	4	2024
Maneuver IED Detection and Mitigation Technology Demonstration	1	2024	4	2027