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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603134A / <i>Counter Improvised-Threat Simulation</i>
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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	-	24.087	24.747	21.486	-	21.486	21.571	21.551	21.817	21.811	0.000	157.070
CD3: <i>Counter Improvised-Threat Simulation</i>	-	24.087	24.747	21.486	-	21.486	21.571	21.551	21.817	21.811	0.000	157.070

A. Mission Description and Budget Item Justification

This Program Element (PE) develops technology for detecting and defeating Improvised Explosive Devices (IEDs). The goal of this research is to increase the ability of deployed forces to positively identify IEDs with minimal false alarms and positively neutralize or mitigate the effects of IEDs with minimal collateral damage.

This PE is executed by the Army Futures Command (AFC) in coordination with the Under Secretary of Defense for Research and Engineering (USD/R&E) and the Defense Threat Reduction Agency (DTRA).

B. Program Change Summary (\$ in Millions)

	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>
Previous President's Budget	24.087	24.747	0.000	-	0.000
Current President's Budget	24.087	24.747	21.486	-	21.486
Total Adjustments	0.000	0.000	21.486	-	21.486
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	21.486	-	21.486

Change Summary Explanation

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

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Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603134A / <i>Counter Improvised-Threat Simulation</i>				Project (Number/Name) CD3 / <i>Counter Improvised-Threat Simulation</i>			
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
CD3: <i>Counter Improvised-Threat Simulation</i>	-	24.087	24.747	21.486	-	21.486	21.571	21.551	21.817	21.811	0.000	157.070
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project develops technology for detecting and defeating improvised explosive devices (IEDs). The goal of this research is to increase the ability of deployed forces to positively identify IEDs with minimal false alarms and increase the rate of advance of deployed forces as well as to identify vehicle and personnel borne IEDs at fixed sites. Additionally the objective is to positively neutralize or mitigate the effects of IEDs with minimal collateral damage.

This Project is executed by the Army Futures Command (AFC) in coordination 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 2021	FY 2022	FY 2023
Title: Standoff Detection of IED Threats in All Environments	9.470	9.804	10.090
<p>Description: This effort develops technology to detect IED threats at standoff distances. Technologies include electro-optical, radar, light detection and ranging (LIDAR), atomic magnetometer and other technologies applicable to detecting IEDs and their components that can be integrated on dismounted Soldiers, ground, water-based and aerial systems or at fixed sites. This effort also develops technologies and network techniques to detect the electronic signature of radio-controlled IEDs. Technologies will be evaluated on their ability to detect IEDs and their components within infrastructure, on or under ground and water, and attached to vehicles or personnel. The goal for these technologies is to achieve high probabilities of detection while minimizing false alarms from naturally occurring and man-made entities.</p> <p>FY 2022 Plans: Will further mature electro-optical/infrared and radio frequency sensor technologies applicable to detecting IEDs and their components in simulated environments. Will validate detection of radio-controlled IEDs using advanced network techniques. Will integrate sensor technologies on Soldier-borne, ground, and aerial platforms or at fixed sites to determine detection performance. Will demonstrate and assess detection of IEDs or their components when buried, camouflaged or attached to vehicles or personnel in various conditions.</p> <p>FY 2023 Plans: Will optimize electro-optical/infrared (EO/IR), electromagnetic (EM), neutron-gamma and radio frequency sensor technologies applicable to detecting IEDs and their components in simulated field environments. Will integrate sensor technologies on Soldier-</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
borne, ground, and aerial platforms or at fixed sites to validate IED detection performance. Will demonstrate and assess detection of IEDs or their components when buried, camouflaged or attached to vehicles or personnel in various operational conditions. FY 2022 to FY 2023 Increase/Decrease Statement: Funding partially realigned to Program Element (PE) 0602134A (Counter Improvised-Threat Advanced Studies) / Project CD2 (Counter Improvised-Threat Advanced Studies) to enable longer-term applied research pipeline of novel methods for detecting and defeating IEDs for transition to this project for future advanced technologies and demonstrators.				
Title: IED Neutralization, Prevention and Mitigation Description: This effort develops technology critical to neutralizing and mitigating the effects of IEDs at standoff distances. Technologies include directed energy sources, energetic or kinetic effectors, encasement of the threat and Soldier, platform and base protection technologies. These technologies will be demonstrated to neutralize IEDs in place and protect soldiers and equipment from the effects of IEDs. This effort also explores advanced techniques to robotically manipulate IEDs. The goal for these technologies is to achieve high probabilities of avoiding the IED's effects by friendly forces. FY 2022 Plans: Will mature energetic, directed energy and kinetic effector technologies to neutralize IEDs or mitigate IED effects. Will optimize protection approaches to mitigate the effects of IEDs to Soldiers, materiel and bases. Will demonstrate novel C-IED mitigation capabilities in militarily relevant environments. FY 2023 Plans: Will validate energetic and directed energy technologies to neutralize IEDs or mitigate IED effects. Will continue to demonstrate novel C-IED mitigation capabilities in militarily relevant environments. FY 2022 to FY 2023 Increase/Decrease Statement: Funding partially realigned to PE 0602134A (Counter Improvised-Threat Advanced Studies) / Project CD2 (Counter Improvised-Threat Advanced Studies) to enable longer-term applied research pipeline of novel methods for detecting and defeating IEDs for transition to this project for future advanced technologies and demonstrators.		5.319	4.833	3.108
Title: Enabling C-IED Technologies Description: This effort develops technologies that support the detection, prevention, neutralization and mitigation of IED threats. Technologies include data sciences including sensor processing algorithms, integration of sensor data, data processing and analytics, threat forecasting, and autonomous maneuver. Techniques will be demonstrated to determine detection of IED threats and to identify trends to forecast probabilities of encountering or attributing IEDs based on operational data and machine learning techniques. The goals for these technologies is to achieve high probabilities of detecting, predicting and attributing IEDs threats.		9.298	9.283	8.288

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
<p><i>FY 2022 Plans:</i> Will integrate advanced sensor processing techniques with appropriate sensor modalities and evaluate their ability to detect IED threats with reduced false alarms. Will analyze data from multiple sources to determine the signature attributes of threats and to identify the means to exploit these signatures to detect IED threats. Will apply machine learning and emerging data analysis techniques and algorithms to autonomously detect threats with limited operator input. Will analyze techniques to employ multi-sensor data inputs and networked sensor feeds to improve performance capabilities when compared to single sensor solutions.</p> <p><i>FY 2023 Plans:</i> Will validate advanced sensor processing techniques and their ability to detect IED threats with reduced false alarms. Will exploit foreign partner sources and existing U.S. data repositories to optimize emerging IED threat data sets in varying environments and develop new signature attributes that span multiple sensor modalities. Will validate machine learning and emerging data analysis techniques to autonomously detect threats with limited operator input.</p> <p><i>FY 2022 to FY 2023 Increase/Decrease Statement:</i> Funding partially realigned to PE 0602134A (Counter Improvised-Threat Advanced Studies) / Project CD2 (Counter Improvised-Threat Advanced Studies) to enable longer-term applied research pipeline of novel methods for detecting and defeating IEDs for transition to this project for future advanced technologies and demonstrators.</p>			
<p><i>Title:</i> FY2022 SBIR/STTR Transfer</p> <p><i>Description:</i> Funding transferred in accordance with Title 15 USC ?638</p> <p><i>FY 2022 Plans:</i> Funding transferred in accordance with Title 15 USC ?638</p> <p><i>FY 2022 to FY 2023 Increase/Decrease Statement:</i> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.827	-
Accomplishments/Planned Programs Subtotals	24.087	24.747	21.486

C. Other Program Funding Summary (\$ in Millions) N/A
Remarks
D. Acquisition Strategy N/A