Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army	Date: February 2018
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603606A *I Landmine Warfare and Barrier Advanced Technology*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	16.798	17.948	11.104	-	11.104	11.238	11.873	12.018	7.922	0.000	88.901
608: *Countermine & Bar Dev*	-	14.888	15.957	11.104	-	11.104	11.238	11.873	12.018	7.922	0.000	85.000
683: *Area Denial Sensors*	-	1.910	1.991	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.901

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates sensors, subsystems, and neutralization technologies that can be used by dismounted forces as well as ground and air platforms to detect, identify and mitigate the effects of landmines, improvised explosive devices, minefields, and other explosive hazards. This PE also conducts modeling and simulation activities to assess the effectiveness of detection and neutralization concepts. Project 608 supports the maturation and demonstration of enabling component and subsystems for counter explosive hazards and countermine technologies in the areas of countermine and barrier development and Project 683 funds efforts on area denial sensors.

Work in this PE is fully coordinated with PE 0602120A (Sensors and Electronic Survivability), PE 0602622A (Chemical, Smoke and Equipment Defeating Technology), PE 0602624A (Weapons and Munitions Technology), PE 0602712A (Countermine Systems), PE 0602784A (Military Engineering Technology), PE 0603004 (Weapons and Munitions Advances Technologies), PE 0603270 (Electronic Warfare Technology), and PE 0603710A (Night Vision Advanced Technology).

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

Work in this PE is performed by the United States (U.S.) Army Research, Development, and Engineering Command (RDECOM).

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	17.451	17.948	13.097	-	13.097
Current President's Budget	16.798	17.948	11.104	-	11.104
Total Adjustments	-0.653	0.000	-1.993	-	-1.993
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.645	-			
• Adjustments to Budget Years	-	-	-1.993	-	-1.993
• FFRDC	-0.008	-	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army	Date: February 2018
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603606A *I Landmine Warfare and Barrier Advanced Technology*

Change Summary Explanation

The FY19 funding reduction occurred in order to support funding shifts to other higher priority efforts that impact C3I/Network senior leader priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army			Date: February 2018
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603606A / *Landmine Warfare and Barrier Advanced Technology*	Project (Number/Name) 608 / *Countermine & Bar Dev*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
608: *Countermine & Bar Dev*	-	14.888	15.957	11.104	-	11.104	11.238	11.873	12.018	7.922	0.000	85.000

A. Mission Description and Budget Item Justification

This Project matures and demonstrates technologies for finding and neutralizing explosive hazards in varying vegetation, soil, and weather conditions both day and night. Activities include maturation and demonstration of modular, semi-autonomous, and autonomous air, ground, and Soldier borne technologies to enable standoff and close-in detection and neutralization of explosive threats. Efforts are supported by modeling and simulation assessments to define potential system effectiveness.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Ground Vehicle Explosive Hazard Detection	14.888	15.957	-
Description: This effort improves detection, marking, and defeat of low metal/low contrast explosive threats buried in the road and along the sides of roads, Improvised Explosive Devices (IEDs), and antitank landmines. This effort also matures technologies to increase standoff detection and defeat distances, both in roads and off routes, enabling faster rates of advance and safer operations for early entry and route clearance missions. ***FY 2018 Plans:*** Demonstrate and evaluate an integrated forward looking electro-optical (EO)/infrared (IR) sensor suite with multi-step target detection algorithms and automated decision making tools in relevant outdoor environments; demonstrate real-time on-the-move forward looking EO/IR to down looking Ground Penetrating Radar (GPR) sensor cueing with integrated graphical user interface; demonstrate and evaluate Light Detection and Ranging (LIDAR) sensor capability to identify side attack targets using vehicle test bed; validate optimized target detection algorithms to detect in-road and road side explosive hazards. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Effort ends in FY18.			
Title: Autonomous Explosive Hazard Detection	-	-	11.104
Description: This effort demonstrates an integrated modular sensor and sensor data processing capability to enable remote and semi-autonomous detection of mines, other explosive hazards, and indicators of emplacement, such as command wires and initiation devices from a safe standoff distance using small unmanned ground and air platforms. This effort also matures and demonstrates explosive hazard (EH) detection technologies that can be adapted to address near-peer threats in multiple environments.			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603606A / *Landmine Warfare and Barrier Advanced Technology*	**Project (Number/Name)** 608 / *Countermine & Bar Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2019 Plans: Will mature sensors to detect wire components from standoff distances and sensor configurations for implementation on unmanned platforms; exploit novel sensor phenomenologies for optimization of explosive threat detection approaches; improve threat detection algorithms and signal processing techniques for the detection of buried explosive hazards using data collected in near-peer environments; mature low contrast target marking schemas and approaches; improve performance of close-in explosive threat confirmation sensors. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Investment to support explosive threat detection efforts.			
Accomplishments/Planned Programs Subtotals	14.888	15.957	11.104

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army			Date: February 2018
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603606A / *Landmine Warfare and Barrier Advanced Technology*	Project (Number/Name) 683 / *Area Denial Sensors*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
683: *Area Denial Sensors*	-	1.910	1.991	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.901

A. Mission Description and Budget Item Justification

This Project matures and demonstrates surveillance and command and control technology components for anti-access area denial systems that inform maneuver elements and minimize the risk to non-combatants from exposure to anti-personnel landmines (APLs) and related maneuver barriers. The technology includes distributed personnel surveillance systems and command and control systems to be used with human-in-the-loop threat confirmation. This Project uses modeling and simulation to evaluate new concepts and doctrine. This Project also matures and optimizes components and system architectures, and it validates components in field settings.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Area Denial Sensors	1.910	1.991	-
Description: This effort matures and demonstrates networked sensor and sensor fusion technology efforts to provide detection, identification, and classification in support of remotely delivered sensor systems and area denial munitions. Key technologies to be matured and demonstrated include deployable multi-mode sensors, fused sensor information, and local area network communications to meet requirements for human-in-the-loop command and control. ***FY 2018 Plans:*** Demonstrate scatterable deployed sensor fields, develop image and data processing techniques to improve data management to decision cycle time; demonstrate sensor target data connection to fire control, optimize sensor performance and coordinate interfaces with Fires elements. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Effort ends in FY18.			
Accomplishments/Planned Programs Subtotals	1.910	1.991	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603606A / *Landmine Warfare and Barrier Advanced Technology*	**Project (Number/Name)** 683 / *Area Denial Sensors*

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A