Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Army										DATE: February 2012	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603606A: *Landmine Warfare and Barrier Advanced Technology*							
COST ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**Cost To Complete**	**Total Cost**
Total Program Element	26.089	31.491	27.204	-	27.204	28.738	30.608	32.306	34.351	Continuing	Continuing
608: *COUNTERMINE & BAR DEV*	21.320	26.488	24.684	-	24.684	26.025	26.518	27.726	28.872	Continuing	Continuing
683: *Area Denial Sensors*	4.769	5.003	2.520	-	2.520	2.713	4.090	4.580	5.479	Continuing	Continuing

Note

FY 13 funding realigned to higher priority efforts

A. Mission Description and Budget Item Justification

This program element (PE) matures components, subsystems and demonstrates sensor and neutralization technologies that can be used by dismounted forces and on ground and/or air platforms to detect, identify and then mitigate the effects of landmines, minefields, other explosive hazards and obstacles. 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) 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 Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Belvoir, VA.

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APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*		R-1 ITEM NOMENCLATURE PE 0603606A: *Landmine Warfare and Barrier Advanced Technology*			
B. Program Change Summary ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**
Previous President's Budget	26.953	31.541	31.566	-	31.566
Current President's Budget	26.089	31.491	27.204	-	27.204
Total Adjustments	-0.864	-0.050	-4.362	-	-4.362
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.629	-			
• Adjustments to Budget Years	-	-	-4.362	-	-4.362
• Other Adjustments 1	-0.235	-0.050	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603606A: *Landmine Warfare and Barrier Advanced Technology*	PROJECT 608: *COUNTERMINE & BAR DEV*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
608: *COUNTERMINE & BAR DEV*	21.320	26.488	24.684	-	24.684	26.025	26.518	27.726	28.872	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates counter explosive hazard technologies for finding and neutralizing surface and buried threats in varying vegetation, soil, weather, and diurnal conditions. Activities include remote/standoff detection of individual explosive hazards and minefields and neutralization of explosive threats, landmines, and minefields. This project also evaluates airborne explosive hazard detection sensors and fabricates them for lightweight plug-and-play use, on manned and Unmanned Aerial Systems (UASs) in mission specific applications. 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.

This project supports Army science and technology efforts in the Ground, Soldier, Air and Command Control and Communications portfolios.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC), Ft. Belvoir, VA. Minefield neutralization efforts are closely coordinated with Navy/US Marine Corps.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Threat Detection and Neutralization for Route Clearance: ***Description:*** This effort demonstrates capabilities to detect and neutralize surface and shallow buried threats on primary and secondary roads from tactical standoff ranges. ***FY 2011 Accomplishments:*** Completed fabrication of prototypes for the standoff detection and standoff neutralization grenade technologies; performed tests and conducted demonstrations of the brassboards for the standoff detection and standoff neutralization grenade technologies as systems-of-systems concepts. ***FY 2012 Plans:*** Conduct trade studies to establish system level options for neutralization of individual explosive devices and for mine fields; validate emerging high energy laser techniques to neutralize individual explosive hazards; substantiate evolving burst laser techniques to neutralize threats detected by primary sensors.	10.035	8.418	-
Title: Explosive Hazard Detection for Manned and Unmanned Aerial Systems (Previously titled: Mine and Minefield Detection Payload for Tactical Unmanned Aerial Systems (TUAS)):	4.886	8.360	8.210

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Description: This effort utilizes lessons learned from the Threat/Mine Detection for In Road Obstacles to provide manned and unmanned aerial systems (UASs) the capability to detect explosive threats, threat deployment activities, minefields and Home Made Explosives (HME). ***FY 2011 Accomplishments:*** Completed demonstrator payload build and sensor integration; completed laboratory evaluation of payload; integrated payload on a manned aircraft; conducted initial flight testing in a relevant environment to baseline payload and target detection performance; completed the payload and began testing to verify performance. ***FY 2012 Plans:*** Integrate shortwave infrared (SWIR) into initial payload and integrate the payload on a manned aircraft; complete baseline aided target recognition (AiTR) integration and conduct initial flight testing in a relevant environment to baseline payload and AiTR detection performance; optimize payload from test data, perform final verification testing, specify and initiate build of a 3-band longwave infrared (LWIR) demonstrator; perform system design trade studies; conduct concept evaluation exercise with representative sensors. ***FY 2013 Plans:*** Will fabricate and integrate a specialized sensor meeting size, weight, and power (SWaP) requirements for the Pointer Upgraded Mission Ability (PUMA) small unmanned aerial vehicle (SUAV); mature and integrate baseline algorithm and threat cueing approaches.			
Title: Threat/Mine Detection for In Road Obstacles: ***Description:*** This effort advances ground penetrating radar (GPR) and metal detection (MD) technologies integrated onto vehicles to detect the evolving underbelly threats on primary and secondary roads. This effort leverages the technology results from forward looking radar technology investigations under the Threat Detection and Neutralization for Route Clearance effort. ***FY 2011 Accomplishments:*** Completed fabrication of system demonstrators for the integrated Metal Detection (MD)/Ground Penetrating Radar (GPR) detection technologies; performed tests and conducted demonstrations of a MD/GPR system on a manned ground vehicle. ***FY 2012 Plans:*** Perform SWaP analysis and system tradeoff studies for potential sensor payloads for the Pointer Upgraded Mission Ability Unmanned Aerial Vehicle (PUMA UAV) and evaluate complimentary sensors for a ground-based platform; design a 3-band imaging sensor compatible with a forward motion compensation pointer; evaluate aided target recognition approaches for	6.399	9.710	-

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
compatibility with selected sensors; conduct concept evaluation exercises of representative air and ground-based sensors using mission scenarios in a relative environment.			
Title: Ground Vehicle Explosive Hazard Detection ***Description:*** Current Ground Penetrating Radar (GPR) capabilities for detection of emerging low metal and other low contrast explosive threats in an electronic warfare environment are limited by radar receiver technology and detection latency. This project improves capabilities to detect buried Improvised Explosive Devices (IEDs) and antitank landmines and enhances Rate of Advance (RoA) by improving detection and reducing false alarm rates through improving signal to noise and acquisition rate, which reduce susceptibility to electromagnetic interference, and improving the interoperability with electronic countermeasures. This effort leverages the technology results from forward looking radar technology investigations under the Threat Detection and Neutralization for Route Clearance effort and Threat/Mine Detection for In road Obstacles. ***FY 2013 Plans:*** Will fabricate a ground vehicle based, three-band infrared sensor prototype and integrate onto a representative route clearance patrol vehicle; implement baseline algorithm and threat cueing approaches. Will conduct bench-level tests and collect initial field data with the first multi-channel prototype digital GPR receiver array; incorporate technical improvements into the GPR design; build and begin evaluation of a full size four-panel GPR array; begin maturation of new target detection algorithms.	-	-	13.474
Title: Dismounted Explosive Hazard Detection ***Description:*** This effort matures, fabricates and evaluates lab demonstrators based on two different technologies to improve dismounted forces' capability to detect IEDs and landmines. This effort develops an illumination capability and modifies target detection algorithms for integration into current prototype digital goggles. This will be a helmet mounted capability to aid the dismounted forces as they execute route clearance missions by improving detection of command initiation wires, trip wires, and indicators of IED emplacement such as disturbed earth. A next generation handheld explosive hazard detector technology will also be developed and matured with improved IED detection capabilities and SWaP characteristics. The next generation handheld detector technology may be inserted into the current AN/PSS-14 Mine Detector as an upgrade or may be a new handheld detector. ***FY 2013 Plans:*** Will conduct a forward operational assessment with the modified digital goggle demonstrators integrated during the Threat/ Mine Detection for In Road Obstacles project; collect field data, evaluate performance and address Soldier feedback for additional hardware and detection algorithm development. Will integrate novel hand held GPR and wideband metal detectors into demonstrators for data collections and explosive hazard detection algorithm improvements.	-	-	3.000
Accomplishments/Planned Programs Subtotals	21.320	26.488	24.684

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C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603606A: *Landmine Warfare and Barrier Advanced Technology*	PROJECT 683: *Area Denial Sensors*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
683: *Area Denial Sensors*	4.769	5.003	2.520	-	2.520	2.713	4.090	4.580	5.479	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates surveillance, command and control technology components for alternative area protection systems that minimize the risk of injury or loss to non-combatants from exposure to anti-personnel landmines (APLs). The technology includes distributed personnel surveillance systems and command and control systems to be used with man-in-the-loop overwatch fires. This project uses modeling and simulation to evaluate new concepts and modify doctrine. This project also fabricates components, as well as system architectures and conducts evaluations at the system level 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.

This project supports Army science and technology efforts in the Ground and Command Control and Communications portfolios.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Belvoir, VA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Area Denial Sensors:	4.769	5.003	2.520
Description: This effort provides demonstration of surveillance technology components for area protection systems that minimize the risk of injury or loss to non-combatants from exposure to anti-personnel landmines (APLs).			
FY 2011 Accomplishments: Fabricated sensor hardware and integrated algorithms into demonstrators; conducted initial laboratory tests in a simulated relevant environment of next generation sensor and discrimination system.			
FY 2012 Plans: Continue the maturation and demonstration of the personnel detection system in an operationally relevant environment; validate the detection system components and sensor algorithm for the sensor detection and discrimination of combatants/non-combatants, and image processing for false alarm reduction.			
FY 2013 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Will demonstrate a remote low power infrared system to search and track personnel with 360 degree coverage; extend these algorithms and sensors to vehicle detection and track; develop a cued day/night imaging sensor system with algorithms for automated detection and image capture.			
Accomplishments/Planned Programs Subtotals	4.769	5.003	2.520

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.