Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification									DATE: May 2009	
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 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	30.038	37.534	30.317						Continuing	Continuing
608: COUNTERMINE & BAR DEV	21.756	27.365	25.431						Continuing	Continuing
64C: COUNTERMINE DEMONSTRATIONS (CA)	5.410	6.838	.000						Continuing	Continuing
683: Area Denial Sensors	2.872	3.331	4.886						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates sensor and neutralization technologies required to detect, identify, and then mitigate the effects of landmines, minefields, and obstacles. This PE also conducts modeling and simulation activities to assess the effectiveness of system concepts. This PE supports the maturation and demonstration of enabling component and subsystems for countermine technologies in the areas of countermine and barrier development (project 608), and area denial sensors (project 683). Project 64C funds congressional special interest items.

Work in this PE is related to and fully coordinated with PE 0602120A, (Sensors and Electronic Survivability), PE 0602624A, (Weapons and Munitions Technology), PE 0602712A, (Countermine Systems), PE 0602784A (Military Engineering Technology), PE 0603710A, (Night Vision Advanced Technology), and the US Marine Corps.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

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.

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification	DATE: May 2009
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 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	30.700	30.797	32.541	
Current BES/President's Budget	30.038	37.534	30.317	
Total Adjustments	-.662	6.737	-2.224	
Congressional Program Reductions	.000	-.123		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	6.860		
Total Reprogrammings	.010	.000		
SBIR/STTR Transfer	-.672	.000		

Change Summary Explanation

FY09 funding increase is due to congressional adds.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER 608	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
608: COUNTERMINE & BAR DEV	21.756	27.365	25.431						Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project mature and demonstrate countermine technologies for finding and neutralizing surface and buried threats in varying vegetation, soil, weather, and diurnal conditions. Activities include remote/standoff detection of minefields and neutralization of booby traps, landmines, and minefields. This project also evaluates airborne threat detection sensors and matures them for lightweight plug-and-play use on 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 Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE 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 Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.575	.000	
Mine and Minefield Detection Payload for Tactical Unmanned Aerial Systems (TUAS): This effort provides the TUAS with a capability to detect booby traps, threat deployment activity, minefields and homemade explosives (HME). In FY09, conduct trade studies and modeling of sensor candidates to meet size, weight, and power constraints of a medium altitude TUAS airborne payload; mature sensors and algorithms tailored to sensor selection and mission; integrate sensor package for manned flight test. In FY10, will perform flight testing/data collections on manned aircraft; will mature algorithms based on sensor data collections and analysis; will complete detailed payload design.	.000	7.932	8.442	
Threat Detection and Neutralization for Route Clearance: This effort demonstrates capabilities to detect and neutralize surface and shallow buried threats on primary and secondary roads from tactical standoff ranges. In FY08, completed sensor effects data analysis to facilitate design of the radio frequency/high power microwave neutralizer; matured the design of the next generation neutralizer; demonstrated detection capabilities of existing forward looking radar systems against representative threats; demonstrated a baseline graphical user interface (GUI) used by	10.107	6.286	10.664	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER 608

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
operators to rapidly manipulate sensor to improve target search; began integration of the electro optic infrared (EO/IR) sensor suite data with the baseline GUI and development of detection algorithms to improve target search. In FY09, continue development of detection and neutralization components and algorithms for the EO/IR GUI system to reduce operator workload; conduct series of demonstrations and select the promising technologies for convoy escort and route clearance prototypes; demonstrate sensor fusion algorithms to reduce false alarm rates in high clutter/urban environments. In FY10, will demonstrate standoff detection system integration concepts on manned ground vehicles; will mature EO/IR GUI algorithms to improve system performance; will mature radar fusion algorithms to reduce false alarms; and will improve performance of grenade shape charge munitions from PE 0602712/project H24 for standoff explosive neutralization capability.				
Threat/Mine Detection for In Road Obstacles: This effort advances ground penetrating radar and metal detection technologies integrated onto vehicles to detect the evolving booby traps underbelly threat 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. In FY08, matured down looking ground penetrating radar (GPR) modules, improved performance of GPR sensor and signal processing; matured electromagnetic/magnetometer detection technologies for deeply buried in-road threats; matured fabrication and integration of GPR prototype to vehicle for detection of buried in road threat. In FY09, mature GPR capabilities by combining modules into vehicle sized sensor array; mature electromagnetic detection technologies for deeply buried in-road metallic threats while increasing on route speeds; mature metal detection capabilities and begin integration onto unmanned ground vehicle; demonstrate the improved unmanned GPR capability. In FY10, will complete GPR demonstration; will begin integration of a combined metal detection and GPR sensor suite which includes a modular lightweight mount to interface with tactical ground vehicles; will begin fabrication of combined metal detection/GPR sensor.	11.649	12.572	6.325	
Total	21.756	27.365	25.431	

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER 608

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER 64C	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
64C: COUNTERMINE DEMONSTRATIONS (CA)	5.410	6.838	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Countermine advanced technology development.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Advanced Demining Technology	3.865	5.715	.000	
Enhanced Landmine and IED Detection Technology	1.545	.931	.000	
SBIR/STTR	.000	.192	.000	
Total	5.410	6.838	.000	

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER 683	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
683: Area Denial Sensors	2.872	3.331	4.886						Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project maturate and demonstrate 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 constructs components, as well as, system architectures and conducts evaluations at the system level in field tests.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

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 Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Area Denial Sensors: The effort provides demonstration of surveillance technologies components for area protection systems that minimize the risk of injury or loss to non-combatants from exposure to anti-personnel landmines (APLs). In FY08, continued maturation of personnel discrimination algorithms; incorporated advanced personnel detection sensors into testbed Unmanned Ground Sensors (UGS); and demonstrated modeling and simulation of sensor and operator interface. In FY09, demonstrate detection and discrimination of combatant/noncombatant targets with testbed UGS in the laboratory environment; begin development of next generation detection and discrimination target sensor system by conducting trade studies and analysis of candidate sensing approaches with the potential to meet power and bandwidth constraints as well as range and environment requirements. For FY10, will continue development of personnel detection sensors and algorithms demonstration in laboratory environment; will develop and assess concepts on how to use the sensors with alternative personnel landmine systems; and will continue maturation of detection algorithms and sensors.	2.872	3.257	4.886	
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.074	.000	
Total	2.872	3.331	4.886	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER 683

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.