Exhibit R-2, PB 2011 Army **RDT&E Budget Item Justification**										**DATE:** February 2010	
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 2009 Actual**	**FY 2010 Estimate**	**Base FY 2011 Estimate**	**OCO FY 2011 Estimate**	**Total FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	36.883	34.855	26.953	0.000	26.953	32.791	31.626	32.616	35.441	0	258.118
608: *COUNTERMINE & BAR DEV*	26.789	25.299	22.022	0.000	22.022	27.780	26.534	27.432	30.174	Continuing	Continuing
64C: *COUNTERMINE DEMONSTRATIONS (CA)*	6.837	4.695	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
683: *Area Denial Sensors*	3.257	4.861	4.931	0.000	4.931	5.011	5.092	5.184	5.267	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 2011 Army RDT&E Budget Item Justification	DATE: February 2010
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 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	37.534	30.317	30.116	0.000	30.116
Current President's Budget	36.883	34.855	26.953	0.000	26.953
Total Adjustments	-0.651	4.538	-3.163	0.000	-3.163
• Congressional General Reductions		-0.182			
• Congressional Directed Reductions					
• Congressional Rescissions		0.000			
• Congressional Adds		4.720			
• Congressional Directed Transfers					
• Reprogrammings	0.190	0.000			
• SBIR/STTR Transfer	-0.841	0.000			
• Adjustments to Budget Years	0.000	0.000	-3.163	0.000	-3.163

Change Summary Explanation

FY10 funding increase is due to congressional adds.FY11 funding reduced to support higher priority Army initiatives.

Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010
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 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
608: *COUNTERMINE & BAR DEV*	26.789	25.299	22.022	0.000	22.022	27.780	26.534	27.432	30.174	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 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1	6.286	10.279	10.365	0.000	10.365
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 FY09, continued development of detection and neutralization components and algorithms for the electro optic infrared (EO/IR) graphical user interface (GUI) to reduce operator workload; conducted series of demonstrations and selected the promising technologies for convoy escort and route clearance prototypes; demonstrated sensor fusion algorithms to reduce false alarm rates in high clutter/urban environments. In FY10, demonstrate standoff detection system integration concepts on manned ground vehicles; mature EO/IR GUI algorithms to improve system performance; mature radar fusion algorithms to reduce false alarms; and improve performance of grenade shape charge munitions from PE 0602712A, project H24 for standoff explosive neutralization capability. In FY11, will complete fabrication of prototypes for the standoff detection and standoff neutralization grenade technologies; and will perform tests and conduct demonstrations of the brassboards for the standoff detection and standoff neutralization grenade technologies as systems-of-systems concepts.					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2 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, conducted trade studies and modeling of sensor candidates to meet size, weight, and power constraints of a medium altitude TUAS airborne payload; matured sensors and algorithms tailored to sensor selection and mission; integrated sensor package for manned flight test. In FY10, perform flight testing/data collections on manned aircraft; mature algorithms based on sensor data collections and analysis; and complete detailed payload design. In FY11, will complete demonstrator payload build and sensor integration; will complete laboratory evaluation of payload; will integrate payload on a manned aircraft; will conduct initial flight testing in a relevant environment to baseline payload and target detection performance; and will complete the payload and begin testing to verify performance. *FY 2009 Accomplishments:* FY 2009	7.931	8.157	5.047	0.000	5.047

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #3 Threat/Mine Detection for In Road Obstacles: 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. In FY09, matured GPR capabilities by combining modules into vehicle sized sensor array; matured electromagnetic detection technologies for deeply buried in-road metallic threats while increasing on-route speeds; matured metal detection capabilities and began integration onto unmanned ground vehicle; demonstrated the improved unmanned GPR capability.In FY10, complete GPR demonstration; begin integration of a combined MD and GPR sensor suite which includes a modular lightweight mount to interface with tactical ground vehicles; begin fabrication of combined metal detection/GPR sensor. In FY11, will complete fabrication of system demonstrators for the integrated MD/GPR detection technologies; will perform tests and conduct demonstrations of a MD/GPR system on a manned ground vehicle. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	12.572	6.293	6.610	0.000	6.610

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #4 Small Business Innovative Research/Small Business Technology Transfer Programs *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	0.570	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	26.789	25.299	22.022	0.000	22.022

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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*

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 2011 Army RDT&E Project Justification			DATE: February 2010
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 64C: *COUNTERMINE DEMONSTRATIONS (CA)*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
64C: *COUNTERMINE DEMONSTRATIONS (CA)*	6.837	4.695	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1	5.880	4.695	0.000	0.000	0.000
Advanced Demining Technology. In FY09, this Congressional Interest Item developed and integrated dual sensor deep search Unexploded Ordnance (UXO) detection system onto a robotic platform; improved clutter rejection and automatic target recognition (ATR) algorithms along with semi-autonomous navigation modules, and integrated onto robotic platform. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2	0.957	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Enhanced Landmine and IED Detection Technology. In FY09, this Congressional Interest Item developed and integrated new land mine detection techniques into operational detection systems. The Enhanced Landmine and Improvised Explosive Device (IED) Detection system (eLIDS) increased the probability of detection and decreased false alarms, allowing potential threats to be more accurately and quickly classified. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Accomplishments/Planned Programs Subtotals	6.837	4.695	0.000	0.000	0.000

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 2011 Army RDT&E Project Justification										DATE: February 2010	
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 2009 Actual**	**FY 2010 Estimate**	**Base FY 2011 Estimate**	**OCO FY 2011 Estimate**	**Total FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
683: *Area Denial Sensors*	3.257	4.861	4.931	0.000	4.931	5.011	5.092	5.184	5.267	Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project mature 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 2009	**FY 2010**	**Base FY 2011**	**OCO FY 2011**	**Total FY 2011**
Program #1	3.257	4.743	4.931	0.000	4.931
Area Denial Sensors: 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).In FY09, demonstrated detection and discrimination of combatant/noncombatant targets with testbed Unmanned Ground Sensors (UGS) in the laboratory environment; began 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. In FY10, continue development of personnel detection sensors and algorithms demonstration in laboratory environment; develop and assess concepts on how to use the sensors with alternative personnel landmine systems; and continue maturation of detection algorithms and sensors. In FY11, will fabricate sensor hardware and integrate algorithms into demonstrators; and will conduct initial laboratory tests in a simulated relevant environment of next generation sensor and discrimination system.					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2 Small Business Innovative Research/Small Business Technology Transfer Programs *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	0.118	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	3.257	4.861	4.931	0.000	4.931

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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*

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.