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Exhibit R-2, PB 2011 Army RDT&E Budget Item Justification									DATE: February 2010		
APPROPRIATION/BUDGET ACTIVITY 2040: Research, Development, Test & Evaluation, Army BA 2: Applied Research				R-1 ITEM NOMENCLATURE PE 0602712A: Countermines Systems							
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	27.827	23.621	19.118	0.000	19.118	20.480	20.878	21.257	21.621	0	173.920
H24: COUNTERMINE TECH	18.471	16.000	16.242	0.000	16.242	17.548	17.888	18.213	18.525	Continuing	Continuing
H35: CAMOUFLAGE & COUNTER-RECON TECH	2.778	2.846	2.876	0.000	2.876	2.932	2.990	3.044	3.096	Continuing	Continuing
HB2: COUNTERMINE COMPONENT TECHNOLOGY (CA)	6.578	4.775	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
A. Mission Description and Budget Item Justification											
<p>This program element (PE) investigates and develops applied technologies to improve countermines, signature management, and counter-sensors capabilities. The focus is on sensor technologies to improve detection of mines and directed energy; ballistic methods to defeat mines; and signature management technologies to reduce reconnaissance capabilities of the enemies. This PE also supports DoD's Center of Excellence for Unexploded Ordnance which coordinates and standardizes land mine signature models; maintains a catalogue of mine signatures; supports the evaluation of mine detection sensors and algorithms; and working in conjunction with the US Army Engineering, Research and Development Center (ERDC), examines countermines phenomenology of surface and buried mines, and booby traps. This PE advances the state of the art in Countermines Technologies (project H24) and Camouflage and Counter Reconnaissance Technologies (project H35). Countermines Component Technology (project HB2) funds congressional special interest items. Work in this PE is related to and is fully coordinated with PE 0602120A, (Sensors and Electronic Survivability), PE 0602624A, (Weapons and Munitions Technology), PE 0602709A, (Night Vision Technology), PE 0602784A (Military Engineering Technology), PE 0603606A, (Landmine Warfare and Barrier Advanced 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; the US Army Corps of Engineers Research and Development Center (ERDC), Vicksburg, MS; and the Armaments Research, Development, and Engineering Center (ARDEC), Picatinny, NJ.</p>											

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APPROPRIATION/BUDGET ACTIVITY 2040: Research, Development, Test & Evaluation, Army BA 2: Applied Research		R-1 ITEM NOMENCLATURE PE 0602712A: Countermine Systems			
B. Program Change Summary (\$ in Millions)					
	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	32.308	18.945	19.071	0.000	19.071
Current President's Budget	27.827	23.621	19.118	0.000	19.118
Total Adjustments	-4.481	4.676	0.047	0.000	0.047
• Congressional General Reductions		-0.124			
• Congressional Directed Reductions					
• Congressional Rescissions		0.000			
• Congressional Adds		4.800			
• Congressional Directed Transfers					
• Reprogrammings	-3.691	0.000			
• SBIR/STTR Transfer	-0.790	0.000			
• Adjustments to Budget Years	0.000	0.000	0.047	0.000	0.047
Change Summary Explanation					
FY09 funding decrease due to reprogramming of congressional special interest item for proper execution. FY10 Congressionally directed increases.					

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Exhibit R-2A, PB 2011 Army RDT&E Project Justification								DATE: February 2010			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 2: <i>Applied Research</i>				R-1 ITEM NOMENCLATURE PE 0602712A: <i>Countermines Systems</i>				PROJECT H24: <i>COUNTERMINE TECH</i>			
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
H24: <i>COUNTERMINE TECH</i>	18.471	16.000	16.242	0.000	16.242	17.548	17.888	18.213	18.525	Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project investigate and develop new countermines technologies that use man-portable, ground-vehicular, and airborne platforms for detection, discrimination, and neutralization of individual mines, minefields, and other improvised threats. The goal of this project is to accurately detect threats with a high probability, reduce false alarms, and enable an increased operational tempo. 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; the US Army Corps of Engineers Research and Development Center (ERDC), Vicksburg, MS; the Armaments Research, Development, and Engineering Center (ARDEC), Picatinny, NJ; and the CERDEC Intelligence and Information Warfare Directorate, Fort Monmouth, NJ, and Night Vision and Electronic Sensors Directorate, Fort Belvoir, VA.

B. Accomplishments/Planned Program (\$ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1 Department of Defense Unexploded Ordnance (UXO) Center of Excellence (UXOCOE): The Army serves as executive agent of the UXOCOE, which provides for the coordination of UXO across the Department of Defense (DoD) and serves as the focal point for research, development, testing and evaluation (RDT&E) UXO detection and clearance. In FY09, reviewed requirements and technologies to identify opportunities for Services/Components to leverage common requirements and/or technologies. In FY10, analyze catalogued detection and clearance requirements, and technologies to determine RDT&E shortfalls and leveraging opportunities. In FY11, will continue the coordination, with the Joint services, for the UXO detection and clearance research, demonstration, test and evaluation program. <i>FY 2009 Accomplishments:</i> FY 2009	0.484	0.492	0.495	0.000	0.495

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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 #2		7.561	7.570	7.612	0.000	7.612
Standoff Mine/Defeat Neutralization Technology: This effort investigates and evaluates the ability to pre-detonate and neutralize mines, and emerging threats at tactically relevant standoff ranges. In FY09, improved standoff capability for threat neutralization by investigating and developing advanced directed energy techniques and explosively formed munitions to achieve increased accuracy with reduced collateral damage and logistics burden. In FY10, develop and evaluate a brassboard for laser drilling technologies and a brassboard for munitions against buried and obscured threats. In FY11, will conduct laboratory tests with the brassboards for laser drilling and for munitions in an environment that simulates theater operations (e.g. threat, weather, and environmental conditions) to assess the relative performance against a spectrum of buried and obscured threats.						
FY 2009 Accomplishments: FY 2009						
FY 2010 Plans: FY 2010						
Base FY 2011 Plans: FY 2011 Base						

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #3 Anti-personnel/Anti-Tank Mine False Alarm Reduction: This effort investigates new sensor and signal processing component technology for ground based and airborne systems that provide the Warfighter solutions to standoff mine/emerging threat detection while reducing false alarm rates. In FY09, investigated and evaluated low cost sensor products and phenomenologies including multispectral electro-optical sensors/detectors, scalar and vector magnetometers, and ground penetrating radars; selected the best candidates for reducing false alarm rates and improving rate of advance. In FY10, perform a comprehensive evaluation of the candidate sensors to assess the threat detection performance using the processor in a variety of operational conditions; complete the phenomenology study and signal processing algorithm development. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	4.459	4.486	0.000	0.000	0.000
Program #4 Standoff Explosive Compound Detection Technology: This effort investigates ground based detection and confirmation technologies of explosives compounds from tactically relevant standoff distances. In FY09,	4.004	3.104	3.307	0.000	3.307

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
expanded studies in the areas of chemical, nuclear, and biosensors applied to the explosive detection problems; investigated standoff explosive compound detection technologies to selectively detect multiple explosives (RDX, TNT, C4, etc.) in both vehicle- borne and stationary environments; investigated non-contact sensing techniques to extend standoff range. In FY10, perform an explosive compound behavioral study on different surfaces under various environmental conditions; and determine phenomenology of ground based detection systems for spectrum of threats. In FY11, will perform a comprehensive evaluation of the candidate brassboard (such as laser induced breakdown spectroscopy and ultra-violet spectroscopy) for standoff demonstration (standoff range/distance of greater than 30m) and will continue to refine the phenomenology of the ground based and airborne detection systems. Will conduct field evaluations of selected technologies.						
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 #5 Phenomenology Sensors: This effort investigates and evaluates the key geo-environmental parameters such as weather conditions, soil composition, soil moisture, soil electromagnetic properties, and ground cover that affect mine/minelfield detection and false alarm rates. In FY09, extended synthetic aperture radar (SAR) and the electromagnetic models to full minefield-size images; validated large scale model that includes ground penetrating		1.963	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
radar (GPR), SAR, and electro optic infrared (EO/IR) for countermine system performance predictions in a variety of real world environments. 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 #6 Advanced Electro-Magnetic and Electro Optic (EO) Sensors for Detection Emerging Threats Devices: This effort investigates all-terrain standoff detection using multiple modalities in order to locate mine and emerging threats with minimal false alarms. In FY11, will begin efforts to investigate advanced electromagnetic induction technologies and EO sensors; will incorporate the advances made in forward looking ground penetrating radar and electromagnetic induction and EO sensors for detection of metallic mines and explosive threats buried in-road and in urban areas. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010		0.000	0.000	4.828	0.000	4.828

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<u>B. Accomplishments/Planned Program (\$ in Millions)</u>						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
<i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO						
Program #7 Small Business Innovative Research/Small Business Technology Transfer Programs <i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO		0.000	0.348	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals		18.471	16.000	16.242	0.000	16.242
<u>C. Other Program Funding Summary (\$ in Millions)</u> N/A						
<u>D. Acquisition Strategy</u> N/A						

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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.

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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
H35: CAMOUFLAGE & COUNTER-RECON TECH	2.778	2.846	2.876	0.000	2.876	2.932	2.990	3.044	3.096	Continuing	Continuing
A. Mission Description and Budget Item Justification											
Efforts in this project evaluate and develop advanced signature management and deception technologies for masking friendly force capabilities and intentions. Technologies pursued under this effort reduce the cross section of sensor systems. Technologies investigated include the decentered field lens, wavefront coding, and spectral filtering and threat sensing algorithms. 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							2.294	0.000	0.000	0.000	0.000
Protection for Third Generation Sensors: The goal of this effort is to design, research, and evaluate advanced signature management and deception technologies for masking friendly force capabilities. In FY09, evaluated and selected an algorithm based upon prior analysis and threat performance. Performed a comprehensive evaluation of the candidates and down selected technologies for investigation and fabrication of a reduced signature third generation Forward Looking Infrared breadboard.											
FY 2009 Accomplishments: FY 2009											
FY 2010 Plans: FY 2010											

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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 #2 Camouflage and Counter-Reconnaissance Technology for Advanced Spectral Sensors: This effort investigates and advances new technologies to reduce susceptibility of sensors and extends camouflage technology. In FY09, generated 3-D camouflage patterns, including visible, near/shortwave infrared, and mid wave /longwave infrared signatures of target; tested in a virtual environment; and continued database development for backgrounds and coatings of 3-D camouflage patterns. In FY10, investigate the advanced signature reduction approaches for uncooled and dual band staring sensors, and other staring sensors; investigate the susceptibility of foreign and friendly systems to hyperspectral detection methods; develop near-term improvements to camouflage paints, coatings, and systems in both the visible and non-visible wavelength regions. In FY11, will continue to develop the optical signature reduction effort; will widen the key sensor waveband coverage and future staring sensors, such as day television and shortwave infrared; will investigate camouflage paints or other systems for hyperspectral signature reduction; and will validate for effectiveness and potential for implementation in operational systems. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base		0.484	2.781	2.876	0.000	2.876

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
<i>OCO FY 2011 Plans:</i> FY 2011 OCO					
Program #3 Small Business Innovative Research/Small Business Technology Transfer Programs <i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO	0.000	0.065	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	2.778	2.846	2.876	0.000	2.876
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.					

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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
HB2: COUNTERMINE COMPONENT TECHNOLOGY (CA)	6.578	4.775	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 Countermines Systems applied research.											
B. Accomplishments/Planned Program (\$ in Millions)											
							FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1 Standoff Improvised Explosive Device Protection Program. In FY09, this Congressional Interest Item pursued ground based detection and confirmation technologies of explosives from standoff distances; investigated reliable solutions for standoff detection of Improvised Explosive Devices (IEDs) /Vehicle-Borne Improvised Explosive Device (VBIEDs) /Explosively Formed Projectiles (EFPs) and bomb-making facilities while on the move. Development focused on emerging non-contact sensing techniques to attain standoff range greater than 30m. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO							4.784	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #2 Spectroscopic Materials Identification Center. In FY09, this Congressional Interest Item detected and identified explosive compounds present in trace quantities around improvised explosive devices (IEDs) and landmines; Development focused on non-contact sensing techniques. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	0.797	1.592	0.000	0.000	0.000
Program #3 Unexploded Ordnance Detection and Classification in Volcanic Soil Using an Integrated Fully Polametic Ground Penetrating Radar (GPR) and Chemical Sensor Technology. In FY09, this Congressional Interest Item performed detection and classification of UXO in a densely forested area in highly volcanic soils on Oahu with the use of GRP. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010	0.997	0.000	0.000	0.000	0.000

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<u>B. Accomplishments/Planned Program (\$ in Millions)</u>						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
<i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO						
Program #4 Standoff Detection of Explosives and Explosive Devices (IEDs). This is a Congressional Interest Item <i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO		0.000	3.183	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals		6.578	4.775	0.000	0.000	0.000
<u>C. Other Program Funding Summary (\$ in Millions)</u> N/A						
<u>D. Acquisition Strategy</u> N/A						

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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.		

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