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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 0602622A: Chemical, Smoke and Equipment Defeating 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	8.873	13.622	5.324	0.000	5.324	4.877	5.434	6.476	7.535	0	57.465
552: SMOKE/NOVEL EFFECT MUN	2.256	5.266	5.324	0.000	5.324	4.877	5.434	6.476	7.535	Continuing	Continuing
BA1: Protection Technologies (CA)	6.617	8.356	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
A. Mission Description and Budget Item Justification											
The objective of this program element (PE) is to investigate and evaluate obscurant technologies to increase personnel and platform survivability and develop and validate forensic analysis methods for military and homemade explosive devices, including their precursors and residue. This PE pursues research in materials science and dissemination methodologies and mechanisms and technologies and techniques to enable forensic analysis of explosive signatures (project 552). Work in this PE is related to, and fully coordinated with, PE 0603004A/project L97 (Smoke and Obscurants Advanced Technology) and PE 0603606A/project 608 (Countermines & Barrier Development). 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. This work is performed by the Army Research, Development, and Engineering Command (RDECOM), Edgewood Chemical Biological Center (ECBC), Edgewood, MD.											
B. Program Change Summary (\$ in Millions)											
			FY 2009	FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total	
Previous President's Budget			8.906	5.293		5.311		0.000		5.311	
Current President's Budget			8.873	13.622		5.324		0.000		5.324	
Total Adjustments			-0.033	8.329		0.013		0.000		0.013	
• Congressional General Reductions				-0.071							
• Congressional Directed Reductions											
• Congressional Rescissions				0.000							
• Congressional Adds				8.400							
• Congressional Directed Transfers											
• Reprogrammings			0.185	0.000							
• SBIR/STTR Transfer			-0.218	0.000							
• Adjustments to Budget Years			0.000	0.000		0.013		0.000		0.013	
Change Summary Explanation											
FY10 Congressionally directed increases.											

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<b>APPROPRIATION/BUDGET ACTIVITY</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army</i> BA 2: <i>Applied Research</i>				<b>R-1 ITEM NOMENCLATURE</b> PE 0602622A: <i>Chemical, Smoke and Equipment Defeating Technology</i>				<b>PROJECT</b> 552: <i>SMOKE/NOVEL EFFECT MUN</i>			
<b>COST (\$ in Millions)</b>	<b>FY 2009 Actual</b>	<b>FY 2010 Estimate</b>	<b>Base FY 2011 Estimate</b>	<b>OCO FY 2011 Estimate</b>	<b>Total FY 2011 Estimate</b>	<b>FY 2012 Estimate</b>	<b>FY 2013 Estimate</b>	<b>FY 2014 Estimate</b>	<b>FY 2015 Estimate</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
552: <i>SMOKE/NOVEL EFFECT MUN</i>	2.256	5.266	5.324	0.000	5.324	4.877	5.434	6.476	7.535	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

The project investigates and evaluates obscurant technologies that degrade threat force surveillance sensors and defeat the enemy's target acquisition devices, missile guidance, and directed energy weapons. This project investigates advanced infra-red (IR) and multi-spectral obscurant materials that provide effective, affordable, and efficient screening of deployed forces, while being safe and environmentally acceptable. Additionally, it researches and investigates forensic analysis technology in explosives and explosives-related chemical signatures, and develops and validates field sampling and forensics methods for use in a forward-deployed laboratory. 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), Edgewood Chemical Biological Center (ECBC), Edgewood, MD.

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

	<b>FY 2009</b>	<b>FY 2010</b>	<b>Base FY 2011</b>	<b>OCO FY 2011</b>	<b>Total FY 2011</b>
<b>Program #1</b>  Advanced Obscurants: This effort investigates technologies which enable safe, effective screening of personnel and equipment. In FY09, expanded existing theory for advanced obscurants across the entire spectrum of interest (visual, IR and microwave regions); examined alternate theoretical approaches; determined particle characteristics based upon theory; and initiated investigation of new high performing, low toxicity visual obscurants. Conducted studies of bi-spectral (visual thru Far IR) obscurant concepts. In FY10, investigate, through chamber and field evaluation, bi-spectral packaging and dissemination concepts to improve overall obscuration performance. In FY11, will develop, refine and optimize bi-spectral packaging and dissemination concepts through testing and modifications to make them suitable for weaponization.  <i>FY 2009 Accomplishments:</i> FY 2009	1.381	1.424	1.400	0.000	1.400

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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		0.875	0.845	0.904	0.000	0.904
Obscurant Enabling Technology: This effort investigates distribution technologies for various obscurants. In FY09, conducted studies of dissemination techniques for low toxicity bi-spectral obscurants and new bi-spectral obscurants. In FY10, conduct modeling and chamber evaluation studies to examine performance improvements possible for low hazard visual obscurants. In FY11, will conduct studies of dissemination techniques for low hazard visual obscurants to increase their obscuration performance and to make them suitable for weaponization.						
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 #3		0.000	2.882	3.020	0.000	3.020

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Forensic Analysis of Explosive Signatures: This effort investigates the detection and chemical analysis of explosive material signatures. In FY10, will conduct experiments to determine the surface/vapor characterization of military high explosives (HEs); and common materials used in homemade explosives (HMEs); will determine the signatures required to provide improved point, proximity, and stand-off detection of explosives and precursor materials; will investigate the environmental persistence, fate and transport of explosives relevant to counter HE and HME sensing operations; will conduct experiments to develop novel forensic methods that determine the components in HMEs. In FY11, will establish and validate forensic sampling protocols for sensing explosives on surfaces; will identify the differences in instrumentation used in theater and within continental United States (CONUS) based laboratories; will continue fate and transport studies of trace energetics and chemical components focusing on surface residues; will evaluate and determine decomposition patterns and pathways to provide additional signature markers; will identify chemical signatures for sensing, leveraging data from DARPA Portable Open Source Security Elements (POSSE) Program; will investigate the ability to combine chemical and explosive hazard detection; and will utilize findings to help guide detector/detection specifications. Will transition technologies to PE (0603004A/Project L97 (Smoke and Obscurants Advanced Technology).					
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 #4	0.000	0.115	0.000	0.000	0.000

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<b><u>B. Accomplishments/Planned Program (\$ in Millions)</u></b>					
	<b>FY 2009</b>	<b>FY 2010</b>	<b>Base FY 2011</b>	<b>OCO FY 2011</b>	<b>Total FY 2011</b>
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					
Accomplishments/Planned Programs Subtotals	2.256	5.266	5.324	0.000	5.324
<b><u>C. Other Program Funding Summary (\$ in Millions)</u></b> N/A					
<b><u>D. Acquisition Strategy</u></b> N/A					
<b><u>E. Performance Metrics</u></b> 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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2040: Research, Development, Test & Evaluation, Army BA 2: Applied Research				PE 0602622A: Chemical, Smoke and Equipment Defeating Technology				BA1: Protection Technologies (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
BA1: Protection Technologies (CA)	6.617	8.356	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
<b><u>A. Mission Description and Budget Item Justification</u></b> Congressional Interest Item funding for Protection Technologies applied research.											
<b><u>B. Accomplishments/Planned Program (\$ in Millions)</u></b>											
							FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1  Systems Biology Biomarker Molecular Toxicology Initiative: This Congressional Interest Item investigated specific diagnostic markers necessary to quickly indicate diseased states in the event of a chemical or biological terrorist attack or exposure to such agents.  FY 2009 Accomplishments: FY 2009  FY 2010 Plans: FY 2010  Base FY 2011 Plans: FY 2011 Base  OCO FY 2011 Plans: FY 2011 OCO							2.631	0.000	0.000	0.000	0.000
Program #2							1.594	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
Rapid and Accurate Pathogen Identification/Detection (RAPID) Program: This Congressional Interest Item developed a sensitive and specific detection platform for biological agents that employed micropatterned arrays of unique chemotactic signaling compounds specific for each target threat.  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 #3  Enhanced Vapor Aeration Capabilities (EVAC): This Congressional Interest Item investigated the utilization of thermal enhancement of gaseous decontamination systems to lift chemical and biological agents from a surface in order to decontaminate more quickly and effectively than current capabilities.  FY 2009 Accomplishments: FY 2009  FY 2010 Plans: FY 2010	2.392	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
Base FY 2011 Plans: FY 2011 Base						
OCO FY 2011 Plans: FY 2011 OCO						
Program #4  Highlander Electro-Optical Sensors. This is a Congressional Interest Item.		0.000	1.591	0.000	0.000	0.000
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  Missouri Multi-Threat Detection Initiative (M2TDI). This is a Congressional Interest Item.		0.000	1.990	0.000	0.000	0.000
FY 2009 Accomplishments: FY 2009						

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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 #6  Locating and Tracking Explosive Threats with Wireless Sensors and Networks. This is a Congressional Interest Item.  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	4.775	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals		6.617	8.356	0.000	0.000	0.000

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<b><u>C. Other Program Funding Summary (\$ in Millions)</u></b> N/A		
<b><u>D. Acquisition Strategy</u></b> N/A		
<b><u>E. Performance Metrics</u></b> 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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