Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602622A / *Chemical, Smoke and Equipment Defeating Technology*

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	3.713	3.923	4.004	-	4.004	5.032	5.612	4.195	4.281	-	-
552: *Smoke/Novel Effect Mun*	-	3.713	3.923	4.004	-	4.004	5.032	5.612	4.195	4.281	-	-

A. Mission Description and Budget Item Justification

This Program Element (PE) investigates and evaluates 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. Project 552 pursues research in materials science as well as dissemination methodologies, mechanisms, technologies, and techniques to enable forensic analysis of explosive signatures.

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 (Countermine & Barrier Development).

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 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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	3.866	3.923	3.994	-	3.994
Current President's Budget	3.713	3.923	4.004	-	4.004
Total Adjustments	-0.153	0.000	0.010	-	0.010
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.153	-			
• Civ Pay Adjustments	0.000	0.000	0.010	-	0.010

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602622A / *Chemical, Smoke and Equipment Defeating Technology*	Project (Number/Name) 552 / *Smoke/Novel Effect Mun*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
552: *Smoke/Novel Effect Mun*	-	3.713	3.923	4.004	-	4.004	5.032	5.612	4.195	4.281	-	-

A. Mission Description and Budget Item Justification

This 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 focuses on 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.

This Project sustains Army science and technology efforts supporting the Ground Maneuver Portfolio.

Work in this Project is related to, and fully coordinated with, PE 0603004A. Project L97 (Smoke and Obscurants Advanced Technology) and PE 0603606A, Project 608 (Countermine & Barrier Development).

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 Project is performed by the Army Research, Development, and Engineering Command (RDECOM), Edgewood Chemical Biological Center (ECBC), Edgewood, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Advanced Obscurants	1.370	1.468	1.518
Description: This effort investigates new materials and compounds to enable safe, effective screening of personnel and equipment.			
FY 2016 Accomplishments: Investigated spectrally selective materials and new microwave materials. Investigated materials for advanced bispectral obscurants.			
FY 2017 Plans: Will further investigate three advanced bispectral materials concepts. Will examine three promising spectrally selective materials mechanisms. Will investigate process scale up of new promising microwave obscurants in order to conduct future field trial experiments.			
FY 2018 Plans:			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602622A / *Chemical, Smoke and Equipment Defeating Technology*	**Project (Number/Name)** 552 / *Smoke/Novel Effect Mun*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Will measure screening performance of top candidate bispectral materials. Will design and build a chamber to measure microwave obscurant performance.			
Title: Obscurant Enabling Technology ***Description:*** This effort investigates distribution technologies for various obscurants. This effort will support Modular Active Protection System (MAPS) in 0602601/C05 and 0603005/221. ***FY 2016 Accomplishments:*** Continued to study explosive dissemination variables to understand key factors such as obscurant dispersal. Continued to conduct vulnerability studies of various technologies to obscurant/target defeat effects. ***FY 2017 Plans:*** Will continue to investigate explosive dissemination factors and assess modeling and experimental concepts. Will initiate efforts on pneumatic dissemination of particulate obscurant materials. Will continue to conduct vulnerability studies of various technologies to obscurant/target defeat effects. ***FY 2018 Plans:*** Will evaluate performance of pneumatic dissemination against the performance of other distribution technologies. Will continue to conduct vulnerability studies of various technologies to obscurant/target defeat effects.	0.960	1.000	1.002
Title: Forensic Analysis of Explosives ***Description:*** This effort investigates forensics analytical methods for military explosives, homemade explosives (HME), HME precursors, and residue analysis for attribution. ***FY 2016 Accomplishments:*** Investigated the combination of microfluidics and surface enhance Raman spectroscopy (SERS) for the detection of explosives, drugs, and other molecules of interest for forensic analysis in biological fluids such as saliva, sweat and urine. ***FY 2017 Plans:*** Will investigate a proof of concept device based on microfluidics and SERS for the detection of explosives, drugs, and other molecules of interest for forensic analysis in biological fluids such as saliva, sweat and urine. Will investigate the potential of sensing explosives and other toxic chemicals using dielectric materials as part of a rudimentary circuit or system. ***FY 2018 Plans:***	1.383	1.455	1.484

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Will investigate integrated photonics chips as a proof of concept device for the detection of explosives, drugs, and other molecules of interest for forensic analysis and wearable detectors; investigate a proof of concept device for the sensing explosives and precursor chemicals based on impedance using novel dielectric materials.			
Accomplishments/Planned Programs Subtotals	3.713	3.923	4.004

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A