

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Army** **Date:** March 2014

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 6: RDT&amp;E Management Support</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>
--	--

COST (\$ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
Total Program Element	-	50.838	58.309	49.052	-	49.052	45.484	44.384	43.352	44.289	-	-
296: <i>Close Combat Technology</i>	-	6.228	4.217	4.719	-	4.719	2.742	2.806	2.858	2.922	-	-
297: <i>Mun Survivability &amp; Log</i>	-	9.899	14.455	13.811	-	13.811	9.921	7.548	7.911	10.753	-	-
857: <i>DoD Explosives Safety Standards</i>	-	2.030	4.094	1.836	-	1.836	1.811	1.769	1.771	1.807	-	-
858: <i>Army Explosives Safety Management Program</i>	-	0.528	0.556	0.547	-	0.547	0.547	0.549	0.547	0.647	-	-
859: <i>Life Cycle Pilot Process</i>	-	3.345	9.556	4.610	-	4.610	5.047	5.004	5.387	5.486	-	-
862: <i>Indirect Fire And Fuze Technology</i>	-	3.959	8.620	7.898	-	7.898	8.690	8.349	6.432	5.255	-	-
F21: <i>Direct Fire Technology and NATO Ammo Eval</i>	-	10.449	7.028	6.867	-	6.867	6.204	5.407	4.336	3.802	-	-
F24: <i>Conventional Munitions Demil</i>	-	14.400	9.783	8.764	-	8.764	10.522	12.952	14.110	13.617	-	-

# The FY 2015 OCO Request will be submitted at a later date.

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

This Program Element supports continuing technology investigations. It provides a coordinated tri-service mechanism for the collection and free exchange of technical data on the performance and effectiveness of all non-nuclear conventional munitions and weapons systems in a realistic operational environment. It provides for NATO interchangeability testing (F21); Joint munition effectiveness manuals used by all services; development of standardization agreements (STANAGS) and associated Manuals of Proof and Inspection (MOPI); operation of the North American Regional Test Center (NARTC); evaluation of demilitarization methods for existing conventional ammunition (F24); evaluation of useful shelf life, safety, reliability and producibility of pyrotechnic munitions; and improvement of explosives safety criteria for DOD munitions via the DOD Explosives Safety Board (857). Pyrotechnic Reliability and Safety (296) supports pyrotechnic research, development and testing to identify, characterize and resolve reliability, safety, storage and manufacturing issues that impact production availability and field use of pyrotechnics. Project 296 will result in the development and demonstration of new, safe, reliable and environmentally acceptable munitions. Munitions Survivability and Logistics (297) will make Army units more survivable by applying technologies to reduce the sensitivity of munitions to unplanned stimuli (e.g. bullet impacts, fragment impacts, fast cook off, slow cook off, sympathetic detonation, shaped charge jets) and by testing and demonstrating munitions logistics system solutions that prevent or minimize catastrophic explosive events and accelerate ammunition resupply. Project 297 also supports the Army Insensitive Munitions (IM) Board's reviews. The Army Explosives Safety Management Program (858) was established in FY01. The U.S. Army Technical Center for Explosives Safety uses the funds in this project to evaluate current explosives safety standards and develop new, scientific and risk-based standards to meet U. S. Army explosives requirements. The Life Cycle Pilot Program (LCPP) (859) will assess

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification:** PB 2015 Army **Date:** March 2014

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 6: RDT&amp;E Management Support</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>
--	--

production base capabilities and needs over the acquisition life cycle of various munitions and will address the producibility of ammunition including the transition to type classification and production, and the ability of the production base to cost effectively produce quality products on schedule. The Fuze Technology Integration program (862) will improve performance and lower the costs of existing proximity fuzes and enable new applications in submunitions and medium caliber fuzes, addressing advanced proximity fuze sensor technology, Micro-electromechanical Systems (MEMS), Safety and Arming (S&A) technology, and Electronic S&A (ESA) technology for smart munitions.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015 Base</b>	<b>FY 2015 OCO</b>	<b>FY 2015 Total</b>
Previous President's Budget	46.763	53.340	59.215	-	59.215
Current President's Budget	50.838	58.309	49.052	-	49.052
Total Adjustments	4.075	4.969	-10.163	-	-10.163
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-10.163	-	-10.163
• Other Adjustments 1	4.075	4.969	-	-	-

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 859: *Life Cycle Pilot Process*

Congressional Add: *Project Change Summary*

	<b>FY 2013</b>	<b>FY 2014</b>
	-	5.000
Congressional Add Subtotals for Project: 859	-	5.000
Congressional Add Totals for all Projects	-	5.000

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army										<b>Date:</b> March 2014																		
<b>Appropriation/Budget Activity</b> 2040 / 6					<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>				<b>Project (Number/Name)</b> 296 / <i>Close Combat Technology</i>																			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015 Base</b>	<b>FY 2015 OCO #</b>	<b>FY 2015 Total</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>Cost To Complete</b>	<b>Total Cost</b>																
296: <i>Close Combat Technology</i>	-	6.228	4.217	4.719	-	4.719	2.742	2.806	2.858	2.922	-	-																
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-																		
<p># The FY 2015 OCO Request will be submitted at a later date.</p> <p><b>A. Mission Description and Budget Item Justification</b>                  This project will support research, development and testing to identify, characterize and resolve reliability, safety, storage and manufacturing issues that impact production availability and field use of demolitions, grenades, shoulder launched munitions, mines and mine clearing charges and pyrotechnics, including training realism. Project will result in the development and demonstration of new, safe, reliable and environmentally acceptable munitions.</p> <p><b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b></p> <table border="1"> <thead> <tr> <th></th> <th>FY 2013</th> <th>FY 2014</th> <th>FY 2015</th> </tr> </thead> <tbody> <tr> <td> <b>Title:</b> Environmentally Benign Smoke HHS (Hand Held Signals)  <b>Articles:</b>  <b>Description:</b> This program will address the health concerns in the smoke HHS (Hand Held Signals) by leveraging smoke technology developed through Engineering Qualification Test (EQT) funding for the Battlefield Effect System (BES) and M18 smoke grenade.  <b>FY 2014 Plans:</b>                      Address health concerns in the HHS                 </td> <td align="center">-</td> <td align="right">0.401</td> <td align="center">-</td> </tr> <tr> <td> <b>Title:</b> Grenade Fuze Synchronization Effort  <b>Articles:</b>  <b>Description:</b> Program effort to adapt a M201 Fuze body with an interchangeable Pyrotechnic delay cartridge that can be utilized as an M228, M208 or M213 Fuze. Program is a product efficiency which would significantly reduce manufacturing cost of fuzes, logistic burden, and engineering support cost while reducing critical inspections and pull force requirements across all grenades.  <b>FY 2014 Plans:</b>                      Continue Grenade Fuze Synchronization Effort  <b>FY 2015 Plans:</b>                      One Fuze across multiple grenades at a much lower cost. Preliminary design and drawings are available from the FTI (Fuze Technology Integration) and this would be a follow on effort to verify the production readiness and grenade integration impacts across multiple programs.                 </td> <td align="center">-</td> <td align="right">0.450</td> <td align="right">0.150</td> </tr> <tr> <td> <b>Title:</b> Discriminating Passive Infrared Sensor (PIR) for the M4A1 Selectable Lightweight Attack Munition (SLAM)                 </td> <td align="center">-</td> <td align="right">0.600</td> <td align="center">-</td> </tr> </tbody> </table>														FY 2013	FY 2014	FY 2015	<b>Title:</b> Environmentally Benign Smoke HHS (Hand Held Signals) <b>Articles:</b> <b>Description:</b> This program will address the health concerns in the smoke HHS (Hand Held Signals) by leveraging smoke technology developed through Engineering Qualification Test (EQT) funding for the Battlefield Effect System (BES) and M18 smoke grenade. <b>FY 2014 Plans:</b> Address health concerns in the HHS	-	0.401	-	<b>Title:</b> Grenade Fuze Synchronization Effort <b>Articles:</b> <b>Description:</b> Program effort to adapt a M201 Fuze body with an interchangeable Pyrotechnic delay cartridge that can be utilized as an M228, M208 or M213 Fuze. Program is a product efficiency which would significantly reduce manufacturing cost of fuzes, logistic burden, and engineering support cost while reducing critical inspections and pull force requirements across all grenades. <b>FY 2014 Plans:</b> Continue Grenade Fuze Synchronization Effort <b>FY 2015 Plans:</b> One Fuze across multiple grenades at a much lower cost. Preliminary design and drawings are available from the FTI (Fuze Technology Integration) and this would be a follow on effort to verify the production readiness and grenade integration impacts across multiple programs.	-	0.450	0.150	<b>Title:</b> Discriminating Passive Infrared Sensor (PIR) for the M4A1 Selectable Lightweight Attack Munition (SLAM)	-	0.600	-
	FY 2013	FY 2014	FY 2015																									
<b>Title:</b> Environmentally Benign Smoke HHS (Hand Held Signals) <b>Articles:</b> <b>Description:</b> This program will address the health concerns in the smoke HHS (Hand Held Signals) by leveraging smoke technology developed through Engineering Qualification Test (EQT) funding for the Battlefield Effect System (BES) and M18 smoke grenade. <b>FY 2014 Plans:</b> Address health concerns in the HHS	-	0.401	-																									
<b>Title:</b> Grenade Fuze Synchronization Effort <b>Articles:</b> <b>Description:</b> Program effort to adapt a M201 Fuze body with an interchangeable Pyrotechnic delay cartridge that can be utilized as an M228, M208 or M213 Fuze. Program is a product efficiency which would significantly reduce manufacturing cost of fuzes, logistic burden, and engineering support cost while reducing critical inspections and pull force requirements across all grenades. <b>FY 2014 Plans:</b> Continue Grenade Fuze Synchronization Effort <b>FY 2015 Plans:</b> One Fuze across multiple grenades at a much lower cost. Preliminary design and drawings are available from the FTI (Fuze Technology Integration) and this would be a follow on effort to verify the production readiness and grenade integration impacts across multiple programs.	-	0.450	0.150																									
<b>Title:</b> Discriminating Passive Infrared Sensor (PIR) for the M4A1 Selectable Lightweight Attack Munition (SLAM)	-	0.600	-																									

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 296 / <i>Close Combat Technology</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p align="right"><b>Articles:</b></p> <p><b>Description:</b> The M4A1 SLAM has four modes of operational engagement of its vehicle targets. One of the modes is a Side-Attack Mode which utilizes the SLAM's built-in passive infrared (PIR) sensor to detect the thermal signatures of passing vehicles to trigger and fire its explosively formed penetrator (EFP) warhead to defeat the target. If the current US Landmine Policy were to exceed to the Ottawa Convention Treaty, then the existing M4A1 SLAM's PIR feature will render the SLAM non-compliant to the Ottawa restrictions. The current PIR design does not have the ability to discriminate between vehicle and personnel when a potential target is detected. Without a replacement PIR design, the SLAM will lose one of its four operation modes to engage vehicle targets and unable to meet all of its intended missions.</p> <p><b>FY 2014 Plans:</b> Continue Side Attack Mode development</p>	-	-	-
<p><b>Title:</b> Nano Technology for Small HHS (Hand Held Signals)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Leverage nano technology to reduce the ammunition logistical burden (reduce size and weight of current HHS (Hand Held Signals) while maintaining current performance). Reduce size and weight that soldier has to carry while maintaining capability.</p> <p><b>FY 2014 Plans:</b> To reduce the ammunition logistical burden.</p>	-	0.532	-
<p><b>Title:</b> Aircraft Countermeasure Improvements (LA14, LA15, MG62, L410)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This program covers the upgrade of Army aircraft countermeasures to maintain effectiveness against the ever evolving threat. It covers the M206, M211/M212 series of flares, the M839 chaff cartridge, and the M796/BBU-35 impulse cartridge. Goals are to increase overall decoy effectiveness, decrease observability, and optimize performance for the various rotary and fixed wing Army aircraft.</p> <p><b>FY 2013 Accomplishments:</b> FY13 efforts is to increase overall decoy effectiveness, decrease observability, and optimize performance for the various rotary and fixed wing Army aircraft.</p>	0.483	-	-
<p><b>Title:</b> Dual Payload (M206)</p> <p align="right"><b>Articles:</b></p>	-	1.012	1.012

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 296 / <i>Close Combat Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p><b>Description:</b> Add an extended source (Infrared Cloud) material to the M206 Flare. Justification: Test data has shown single flare effectiveness can be increased with the addition of an extended IR (Infrared) source. Impact: increased number of countermeasure dispenses and reduce logistical burden.</p> <p><b>FY 2014 Plans:</b> Add an extended source (Infrared Cloud) material to the M206 Flare</p> <p><b>FY 2015 Plans:</b> M206 countermeasure flare effectiveness will be improved by adding Special Material. Performance - Increased effectiveness by doubling the countermeasure engagements that can respond to missile threat. Performance &amp; Efficiency - Increases mission flight profiles.</p>				
<p><b>Title:</b> Degradable Chaff &amp; Low Frequency Chaff (M1/M839)</p> <p><b>Description:</b> Develop chaff that will: 1) After dispense, lose its RF (Radio Frequency) component. 2) Disperse and bloom rapidly with minimal clumping and birdnesting even when used at low speeds from a hovering helicopter. 3) Enhance coverage in the low frequency range. 4) Type classify RR170 Chaff for Army use. Justification: the long persistence of Chaff causes interference with fire control and air traffic control radar. Impact: chaff will continue to interfere with control and tracking radar, limiting its use in the field and training.</p> <p><b>FY 2014 Plans:</b> Degradable Chaff &amp; Low Frequency Chaff</p> <p><b>FY 2015 Plans:</b> The operationally degradable chaff will address operational and training issues with chaff persistence. Performance - Increase frequency coverage where current Chaff lacks. Performance - Reduction of clumping and birdnesting will make the chaff more effective. Safety - Reduce interference with Traffic Control radars and aircraft radar systems. Environmental - Mitigates impact to farm animals that eat active dipoles after chaff deployment.</p>		<b>Articles:</b>	- 0.817 -	- 0.817 -
<p><b>Title:</b> Demolition Initiator Packaging - Skin Pack (MDI DODICS)</p> <p><b>Description:</b> Current spool design is bulky, hard to conceal in urban environments and has potential for tangling. This project will develop a lighter, easily deployable and more reliable deployment method. It will have the added advantage of being compatible with Explosive Ordnance Disposal robotics.</p>		<b>Articles:</b>	0.055 -	0.055 -

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 296 / <i>Close Combat Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<b><i>FY 2013 Accomplishments:</i></b> Develop a lighter, easily deployable and more reliable deployment method				
<b><i>FY 2014 Plans:</i></b> Develop a lighter, easily deployable and more reliable deployment method				
<b><i>Title:</i></b> Environmentally Benign Smoke Hand Held Signals (L306, L307, L311, L312, L314)		0.432	-	-
<b><i>Articles:</i></b>		-	-	-
<b><i>Description:</i></b> This program will address the health concerns in the smoke HHS (Hand Held Signals) by leveraging smoke technology developed through Environmental Quality Testing and M18 smoke grenade. Current configuration has hazardous components in the smoke composition and cannot be procured.				
<b><i>FY 2013 Accomplishments:</i></b> FY13 efforts are to leverage smoke technology developed through Environmental Quality Testing and M18 smoke grenade. Current configuration has hazardous components in the smoke composition and cannot be procured.				
<b><i>Title:</i></b> Environmentally Benign Colored Smoke Formulations - M18 Red/Violet Smoke Grenades (G950/G955)		0.241	-	-
<b><i>Articles:</i></b>		-	-	-
<b><i>Description:</i></b> The project addresses Army Environmental Requirements and Technology Assessments requirement (AERTA) PP-3-02-4 and Environmentally Sustainable Energetics Workshop List of Concerns PGP-09-02 for the removal of sulfur and hazardous dyes from current formulations. New formulations will replace the sulfur based red and violet M18 formulations for all future production. Justification: AERTA requirement Impact: Without change to the formulation, User will continue to be exposed to potentiation inhalation hazard.				
<b><i>FY 2013 Accomplishments:</i></b> FY13 efforts addresses AERTA requirement AERTA PP-3-02-4 and Environmentally Sustainable Energetics Workshop List of Concerns PGP-09-02 for the removal of sulfur and hazardous dyes from current formulations. New formulations will replace the sulfur based red and violet M18 formulations for all future production.				
<b><i>Title:</i></b> MK3A2 Replacement, Concussion Grenade Optimization Effort		0.316	0.350	1.500
<b><i>Articles:</i></b>		-	-	-
<b><i>Description:</i></b> This effort incorporates modern materials and insensitive explosives to provide a safer, producible concussion grenade. Use of the MK3A2 Offensive grenade has been suspended due to age and safety issues. The current MK3A2 can				

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 296 / <i>Close Combat Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p>expose the Soldier to toxic levels of asbestos. War fighters cannot safely employ the offensive grenade. Alternate munitions such as the M84 do not satisfy User needs for incapacitation of the enemy.</p> <p><b>FY 2013 Accomplishments:</b> Finalize the redesign of the MK3A2 grenade;perform residual tests to justify the ECPs required to update the TDPL (Technical Data Package List); update associated documents (SDZ (Surface Danger Zone), FHC (Final Hazard Classification) etc.); Justification: There is current funding to remove the existing safety hazard (asbestos) in the MK3A2. In addition, the User has stated this capability is still required. Impact: If not funded, the MK3A2 redesign would not occur and the safety Hazard would still exist. In addition, no new MK3A2s would be allowed to be manufactured to the old TDP (Technical Data Package).</p> <p><b>FY 2014 Plans:</b> Finalize the redesign of the MK3A2 grenade;perform residual tests to justify the ECPs required to update the TDPL (Technical Data Package List); update associated documents (SDZ (Surface Danger Zone), FHC (Final Hazard Classification) etc.); Justification: There is current funding to remove the existing safety hazard (asbestos) in the MK3A2. In addition, the User has stated this capability is still required. Impact: If not funded, the MK3A2 redesign would not occur and the safety Hazard would still exist. In addition, no new MK3A2s would be allowed to be manufactured to the old TDP (Technical Data Package).</p> <p><b>FY 2015 Plans:</b> 1) Fabrication of Multi Cavity Die and proveout. 2) Fuze and Packaging procurement. 3) Injection molding of 250 grenades. 4) LAP and Marking of grenades. 5) Engineering level testing.</p>				
<p><b>Title:</b> Dual Payload M206 Aircraft Countermeasure Flare/ Pyro (L410)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> M206 countermeasure flare effectiveness will be improved by adding extended source (Infrared Cloud) material. Benefit include increased effectiveness and doubling the countermeasure engagements that can respond to missile threat.</p> <p><b>FY 2013 Accomplishments:</b> Add a extended source (Infrared Cloud) material to the M206 Flare. Justification: Test data has shown single flare effectiveness can be increased with the addition of an extended IR source. Impact: contunued reduced number of countermeasure solutions.</p>		0.776 -	- -	- -
<p><b>Title:</b> Radio Frequency (RF) Remote Activation Munitions (RAM)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Reduce unit costs and address parts obsolescence</p> <p><b>FY 2013 Accomplishments:</b></p>		0.675 -	- -	0.722 -

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 296 / <i>Close Combat Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p>A low cost RF-RAMs receiver (MK16) will be re-designed, prototyped, tested and made available for production and fielding</p> <p><b>FY 2015 Plans:</b> A low cost reusable RF-RAMS MK16 receiver will be re-designed with state of the art controller and safety circuitry to reduce its size, cost and enhance safety. The current RF-RAMS receiver contract cost is approximately \$3,000 in quantities above 930. The goal of this effort is to update the existing receiver design and implement improved manufacturing processes to reduce the cost. The low cost MK16 receiver will integrate several manufacturing and producibility improvements to reduce production costs from approximately \$3,000 to a production unit cost goal of less than \$1,000.</p>				
<p><b>Title:</b> Dial-a-color Smk Grenade/G911 Design</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Develop a multi-color, selectable smoke grenade capable of providing obscuration/signaling similar to M18 colored smoke grenades. Revise design of G911.</p> <p><b>FY 2013 Accomplishments:</b> 1. Less Weight to Carry (1 grenade vs up to 5). 2. Multi-Purpose (Multiple colors). 3. Environmentally Benign. 4. Consolidates M18 Production. 5. Reduces Logistic Burden.</p>		3.150 -	- -	- -
<p><b>Title:</b> Claymore Force-on-Force TADSS Trainer</p> <p><b>Description:</b> Claymore Force-on-Force TADSS Trainer</p> <p><b>FY 2015 Plans:</b> Develop an improved Claymore Force-on-Force Trainer. While the Claymore is one of the most popular items used by the soldier, the system does not have a TADSS trainer with sight, sound &amp; MILES capability. Development of an improved Claymore trainer will allow Claymore to be trained at CTCs and will provide more realistic and effective training for the user when they are training Claymore as an end item and when training Claymore as initiated by Spider.</p>		-	-	0.518
<p><b>Title:</b> Indramic Wax SPF</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Supplier is discontinuing grade of wax primarily used by Army in the production of explosives. An alternate wax is available, but the goal is to qualify an additional wax as a risk mitigator.</p> <p><b>FY 2013 Accomplishments:</b></p>		0.100 -	- -	- -

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army	<b>Date:</b> March 2014
--	-------------------------

<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 296 / <i>Close Combat Technology</i>
--	--	--

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Supplier is discontinuing grade of wax primarily used by Army in the production of explosives. An alternate wax is available, but the goal is to qualify an additional wax as a risk mitigator.			
<b>Accomplishments/Planned Programs Subtotals</b>	6.228	4.217	4.719

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2015 Army **Date:** March 2014

<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 297 / <i>Mun Survivability &amp; Log</i>
--	--	--

COST (\$ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
297: <i>Mun Survivability &amp; Log</i>	-	9.899	14.455	13.811	-	13.811	9.921	7.548	7.911	10.753	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

# The FY 2015 OCO Request will be submitted at a later date.

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

This project supports the future force by making Army units more survivable through the investigation, testing and demonstration of munitions logistics system improvements that prevent or minimize catastrophic explosive events and accelerate ammunition resupply. Key thrusts are munitions storage area survivability, Insensitive Munitions (IM) technology integration and compliance, ammunition management and asset visibility, weapon system rearm, munitions configured load enablers and advanced packaging and distribution system enhancements. Within each thrust, a broad array of solutions will be identified, tested, and evaluated against developed system measures of effectiveness. Optimum, cost effective and efficient solutions that enable the rapid projection of lethal and survivable forces will be demonstrated. The early stages of force deployment are especially critical. Theater ammunition storage areas are vulnerable and present the enemy with lucrative targets. These areas and distribution nodes contain the only available munitions stocks in theater. Loss of these munitions could cripple the force, jeopardize the mission, and result in high loss of life. This project mitigates vulnerabilities and ensures a survivable fighting force.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2013	FY 2014	FY 2015
<b>Title:</b> Munitions Predictive Life	1.081	1.996	1.537
<b>Articles:</b>	-	-	-
<p><b>Description:</b> This program will demonstrate technologies and algorithms that can help assess munitions serviceability based upon aggregate environmental exposures, system cycling and munition degradation models. The program will provide life cycle management tools for risk mitigation strategies, while reducing testing, inspection &amp; surveillance required and improving weapon system reliability &amp; and warfighter effectiveness.</p> <p><b>FY 2013 Accomplishments:</b> Collected environmental data and developed algorithmic models that will relate temperature conditions seen at the container and ammunition item level to those seen at the pallet level for improved reliability forecasting and more cost effective sensor placement. Demonstrated a shock/vibration sensor reliability device powered by vibration induced energy. Conducted analysis of reliability documentation for an initial two ammunition families in databases and identify reliability and risk threshold levels. Conducted validation testing of passive credit card sized temperature sensors. Down-selected embedded propellant reliability sensor candidate and calibrated it to enable real-time monitoring of the effects of environmental exposure on ammunition propellant stability/reliability.</p> <p><b>FY 2014 Plans:</b></p>			

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 297 / <i>Mun Survivability &amp; Log</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p>Complete environmental data collection and validate algorithmic models that can accurately estimate the temperature exposure of munitions based on location, storage area type, and munition type. Based on reliability and risk threshold levels developed from ammunition database analysis, develop algorithmic procedures that can be applied periodically to evaluate reliability and risk and determine functionality inspection requirements for two ammunition families. Conduct accelerated aging of propellant and calibrate and verify the embedded propellant reliability sensor.</p> <p><b>FY 2015 Plans:</b> Incorporate temperature exposure algorithmic models of munitions based on location, storage area type, and munition type into the Munitions History Program software tool. Conduct validation testing of the reliability and risk evaluation algorithmic procedures for initial two ammunition families. Integrate propellant sensor device with propellant packaging and conduct demonstration. Conduct market survey of passive Radio Frequency Identification and low cost active environmental sensors for munitions, select viable candidates, and test.</p>				
<p><b>Title:</b> Munitions Containerization Program</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This program will demonstrate next generation packaging, with standardized dimensions/interfaces, that considers unit of issue, permits easy reconfiguration and that is reusable, nestable, automation friendly, and survivable. This new packaging (Ammoblocks) will permit the safe packing and shipping of more and different types of ammo together in user tailored loads; facilitate rapid, less labor intensive reconfiguration and resupply; and facilitate automation upgrades of load/assemble/pack and battlefield resupply operations.</p> <p><b>FY 2013 Accomplishments:</b> Developed concepts and designs for flexible ammunition palletized load unitization techniques.</p> <p><b>FY 2014 Plans:</b> Fabricate hardware and test designs for flexible ammunition palletized load unitization techniques/</p>		0.585 -	0.500 -	- -
<p><b>Title:</b> Improved Munitions Packaging</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This program will demonstrate upgrades to existing packaging components and materials to improve legacy ammunition survivability. These upgrades will enhance ammunition survivability and reliability, improve field ammunition operations, and improve packaging producibility.</p> <p><b>FY 2013 Accomplishments:</b> Completed verification of modeling analysis of HDPE cylindrical containers as replacements for current 120mm tank and 120mm/81mm mortar packaging. Completed design and fabricate prototypes of low cost ammunition bandoleers. Completed</p>		1.289 -	1.610 -	2.362 -

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 297 / <i>Mun Survivability &amp; Log</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p>user evaluation of improved security seals for rectangular ammunition containers. Designed and tested plastic sealed pouches for 5.56mm ammunition that will reduce production costs and improve container volume usage efficiency. Conducted a market survey of and developed a test plan for non-copper based Environmental Protection Agency registered preservatives for wood packaging materials that if validated will increase the quantity and types of preservative available and reduce ammunition life-cycle costs. Designed a testing process review tool to aid test working groups in streamlining ammunition packaging test plans and procedures and eliminating redundancies while reducing time and resources. Developed preliminary formulations of solar reflective matte finish paint to reduce the impact of solar heating on ammunition and ammunition packaging.</p> <p><b>FY 2014 Plans:</b> Fabricate prototypes, conduct engineering testing, and finalize design of HDPE cylindrical containers as replacements for current 120mm tank and 120mm/81mm mortar packaging. Complete engineering testing and conduct an operational demonstration of improved prototype low cost ammunition bandoleers and transition. Conduct user evaluation of plastic sealed pouches for 5.56mm ammunition that will reduce production costs and improve container volume usage efficiency. Conduct testing of non-copper based Environmental Protection Agency registered preservatives for wood packaging materials and determine best candidates for use with ammunition packaging. Complete evaluation of packaging test requirements and develop recommendations for any potential changes identified. Complete engineering testing of solar reflective matte finish paint and develop a performance specification.</p> <p><b>FY 2015 Plans:</b> Conduct field demonstration and verification tests of HDPE cylindrical containers as replacements for current 120mm tank and 120mm/81mm mortar packaging and transition. Complete life cycle testing and conduct a system demonstration and a producibility analysis of ammunition containers coated with solar reflective matte finish paint. Develop the design of a plastic polymer container for 5.56mm ammunition containers to be used in conjunction with plastic sealed ammunition pouches to reduce packaging weight and production costs. Develop requirements and complete design concept for unit of issue packaging that provides continuous environmental protection at the ammunition level instead of the container level.</p>				
<p><b>Title:</b> Insensitive Munitions (IM) Integration Program</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Demonstrate multiple IM technologies and integrate into end item(s) to improve munitions survivability and warfighter safety. IM Technologies, using State-of-the-Art materials, will be developed in the areas of warhead, propulsion and propellants, explosives, packaging, and barriers. In addition, modeling and simulation will be used to reduce development and testing costs. Efforts will increase the number of IM compliant ammunition items fielded to mitigate munitions reaction to unplanned stimuli such as fire, fragments, cook-off, bullets, adjacent munitions reaction (sympathetic detonation), and shape charge jet attacks.</p>		5.216	8.708	8.300
		-	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014	
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 297 / <i>Mun Survivability &amp; Log</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>
<p><b><i>FY 2013 Accomplishments:</i></b>                      Optimized the insensitive explosive IMX-104, for M795 155MM Artillery round IM Precision Guidance Kit (PGK) compatible projectiles, produced pre-fabricated pressed IMX-104, and performed static initiation tests in M795 Insensitive Munitions (IM) projectile. Pressed IMX-104 explosive transfer charges to appropriate length and fit into the deep well drilled M795 IM PGK configuration. Performed engineering and Insensitive Munitions (IM) tests to down select an explosive replacement for the H6 explosive, which is the main fill in the M039 Demo Charge. Performed a series of engineering tests to replace Comp B and Comp A3 explosives in the M3A1 40-lb Shaped Charge with the insensitive explosives IMX-104 and PAX-46. Fabricated multiple IM enhanced packaging containers to allow the M3A1 40-lb Shaped Charge to pass IM tests. Produced small scale quantities of IM explosives to replace Comp B in the M67 Grenade and conduct individual grenade lethality and insensitivity tests. Formulated the first iteration set of explosives to replace the N5 explosive in the 30mm M789. Fabricated, for Hand Held Signals, a packaging container Catch Cage enclosure and conducted IM testing. Manufactured Modular Artillery Charge System (MACS) Containers with Sealed Seam Technology (SST) and completed IM and sequential rough handling tests. Fabricated and tested for the 105mm M1 Artillery round, a Cartridge Case Adapter kit, IM enhanced dunnage, packaging container integrated with lonomer Vent Windows, plastic projectile plug, and pallet level impact barriers. Proved out the Ventrex 2 propulsion system technology on the 120mm Mortar.</p> <p><b><i>FY 2014 Plans:</i></b>                      Finalize all engineering and IM tests in order to transition to Project Manager (PM) Combat Ammunition Systems (CAS) a pressed IMX-104 transfer and supplemental charge explosives for the M795 IM PGK compatible projectiles. Transfer to PM CAS an IM enhanced MACS container integrated with the Sealed Seam venting technology. For the IM enhanced 105mm M1 Artillery round with multiple IM technologies, complete the following: all IM tests, small scale lethality tests, and sequential rough handling. After finalizing all PM required testing, transition to PM Close Combat Systems (CCS): (1) the Aluminized IMX-104 explosive to replace H6 in the M039 Cratering Charge; (2) an IM enhanced M3A1 40-lb Shaped Charge containing two IM explosives and an IM enhanced packaging container; (3) an IM melt cast explosive formulation to replace Comp B in the M67 Grenade; (4) Optimized IM-enhanced Catch Cage Dunnage enclosure for the Hand Held Signals. Perform engineering and IM tests to optimize the multiple IM technologies being developed for the 30mm M789 cartridge: explosive, warhead and cartridge case venting, packaging, and pallet barriers. Fabricate and perform IM and logistics tests on IM enhanced packaging containers for the M67 Grenade and 30mm M789 ammunition. Perform IM tests on the 30mm M789 to validate the IM enhanced cartridge case and perform initial small scale IM propellant tests. Complete new iteration of multiple integration IM tests for the IM enhanced 40mm M430A1 Cartridge.</p> <p><b><i>FY 2015 Plans:</i></b>                      Conduct IM and performance tests and transition the following technologies to the specified PM. To PM-CAS transition an IM enhanced 105mm Artillery Round with proven IM technologies for cartridge case, packaging, projectile, and barriers. To PM</p>			

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 297 / <i>Mun Survivability &amp; Log</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p>CCS transition an IM enhanced LW30mm M789 and M67 Grenade containing multiple IM technologies. Integrate, test, and transition DNMT and DEMN energetics based explosives for direct and indirect fire munitions. Formulate novel IM propellants and propulsion system venting technologies for medium caliber and artillery munitions. Optimize multiple IM technologies for 40mm Low Velocity Grenade pertaining to cartridge case, warhead, and packaging. Apply novel IM venting mechanisms using smart materials, bi-metallic fastening or eutectic materials for venting of 30mm and 40mm cartridges for energetics and propulsion systems. Demonstrate multiple IM temperature and/or pressure sensitive technologies for cylindrical and rectangular munition containers.</p>				
<p><b>Title:</b> Ammo Provider</p> <p align="right"><b>Articles:</b></p>		1.728	1.641	1.612
<p><b>Description:</b> This program demonstrates technologies that will assure a survivable munitions logistics system by increasing distribution velocity and protecting ammo storage areas. Technology areas to be investigated include ammunition asset visibility (including environmental sensors, marking technologies, and supply chain modeling), ammunition management (including improvements in stockpile surveillance and condition based management), sustainment (including pre-configured loads (soldier to unit size), field ammo reconfiguration capability, robotic handling, and improved load building capability ), and force protection (including site planning software and field storage protection)</p> <p><b>FY 2013 Accomplishments:</b> Demonstrated re-warehousing plan generation and depot receipt planning and optimization capabilities and incorporate them into an ammunition igloo storage optimization software tool. Completed safety testing and user demonstration of a helicopter delivered robust supply speedbag. Completed testing and evaluation of an ammunition packaging dunnage on demand system for improved battlefield retrograde. Conducted operational evaluation with Excalibur and engineering testing of a munitions environmental health monitoring system that tracks temperature, humidity, and shock experienced to provide instant ammunition readiness status to soldiers. Developed test load configurations and evaluation criteria for assessing the propagation potential and degree of violence expected when tactical ammunition configured loads are subjected to various unplanned combat stimuli.</p> <p><b>FY 2014 Plans:</b> Incorporate re-warehousing time and cost planning capability and conduct system testing and demonstration of the ammunition igloo storage optimization software tool. Complete operational testing and warfighter evaluation of the helicopter delivered robust supply speedbag. Complete testing of and technical data package for a munitions environmental health monitoring system and transition. Complete modeling and simulation of the reaction of tactical ammunition configured loads to unplanned stimuli. Complete market survey of commercial airbags for use as a replacement for wood dunnage in ammunition shipping containers and conduct performance testing of leading candidates.</p> <p><b>FY 2015 Plans:</b></p>		-	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 297 / <i>Mun Survivability &amp; Log</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Integrate the results from the modeling and simulation of the reaction of tactical ammunition configured loads to unplanned stimuli into load building software to facilitate the assembly of safer, more survivable loads. Complete user testing and evaluation of commercial airbags for use as a replacement for wood dunnage in ammunition shipping containers and develop business case analysis for implementation. Conduct market survey and characterization testing of advanced barrier materials that can be used to mitigate impact and shock at the container, or pallet level. Determine requirements and design a portable digital environment to automate work assignment, processing, and completion during ammunition field operations.			
<b>Accomplishments/Planned Programs Subtotals</b>	9.899	14.455	13.811

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2015 Army **Date:** March 2014

<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 857 / <i>DoD Explosives Safety Standards</i>
--	--	--

COST (\$ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
<i>857: DoD Explosives Safety Standards</i>	-	2.030	4.094	1.836	-	1.836	1.811	1.769	1.771	1.807	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

# The FY 2015 OCO Request will be submitted at a later date.

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

This program supports the Research, Development, Test, and Evaluation efforts of the DoD Explosive Safety Standards Board. It supports explosive safety effects research and testing to quantify hazards and to develop techniques to mitigate those hazards in all DoD manufacturing, testing, transportation, maintenance, storage, disposal of ammunition and explosives operations, and also to develop risk based explosives safety standards. Results are essential to the development and improvement of quantity-distance standards, hazard classification procedures, cost effective explosion-resistant facility design procedures, and personnel hazard/ protection criteria.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2013	FY 2014	FY 2015
<p><b>Title:</b> Explosive and Munitions Tests</p> <p style="text-align: right;"><b>Articles:</b></p> <p><b>Description:</b> Funding is provided for the following effort</p> <p><b>FY 2013 Accomplishments:</b> Develop improved explosives and munitions tests and characterization data. Specifically, develop improved gap tests for rocket motors.</p> <p><b>FY 2014 Plans:</b> Develop improved explosives and munitions tests and characterization data. Specifically, continue development of improved gap tests for rocket motors.</p> <p><b>FY 2015 Plans:</b> Develop improved explosives and munitions tests and characterization data. Specifically, continue development of improved gap tests for rocket motors</p>	<p>0.125</p> <p>-</p>	<p>0.160</p> <p>-</p>	<p>0.113</p> <p>-</p>
<p><b>Title:</b> Safety Guidelines</p> <p style="text-align: right;"><b>Articles:</b></p> <p><b>Description:</b> Funding is provided for the following effort</p> <p><b>FY 2013 Accomplishments:</b></p>	<p>1.250</p> <p>-</p>	<p>1.485</p> <p>-</p>	<p>1.131</p> <p>-</p>

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 857 / <i>DoD Explosives Safety Standards</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Develop improved DoD and NATO explosives safety guidelines for munitions storage, explosives and field operation facilities. Prepare revised Dod 6055.9-STD and 4145.26M. <b>FY 2014 Plans:</b> Develop improved DoD and NATO explosives safety guidelines for munitions storage, explosives and field operation facilities. Prepare revised Dod 6055.9-STD and 4145.26M. <b>FY 2015 Plans:</b> Develop improved DoD and NATO explosives safety guidelines for munitions storage, explosives and field operation facilities. Prepare revised Dod 6055.9-STD and 4145.26M.				
<b>Title:</b> Explosive Safety Database  <b>Description:</b> Funding is provided for the following effort  <b>FY 2014 Plans:</b> Conduct other hazards analyses and expand/automate explosives safety databases. Develop improved Explosives Safety Mishap Analysis Module with links to accident reports.		<b>Articles:</b>	- - 1.520 -	- - - -
<b>Title:</b> Analysis Tools  <b>Description:</b> Funding is provided for the following effort  <b>FY 2013 Accomplishments:</b> Develop and improve risk based analysis tools for explosives safety. Develop sequence of operations prototype. <b>FY 2014 Plans:</b> Develop and improve risk based analysis tools for explosives safety. Develop sequence of operations prototype <b>FY 2015 Plans:</b> Will develop and improve risk based analysis tools for explosives safety. Will develop sequence of operations prototype.		<b>Articles:</b>	0.655 -	0.929 -
<b>Accomplishments/Planned Programs Subtotals</b>		2.030	4.094	1.836
<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A <b>Remarks</b>				

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 857 / <i>DoD Explosives Safety Standards</i>

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army										<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6					<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>				<b>Project (Number/Name)</b> 858 / <i>Army Explosives Safety Management Program</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015 Base</b>	<b>FY 2015 OCO #</b>	<b>FY 2015 Total</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
858: <i>Army Explosives Safety Management Program</i>	-	0.528	0.556	0.547	-	0.547	0.547	0.549	0.547	0.647	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

# The FY 2015 OCO Request will be submitted at a later date.

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

This project establishes, validates or modifies explosives technical safety requirements per Army Regulation 385-64, Ammunition and Explosives Safety Standards. Project activities promote RDT&E of new and innovative explosives safety technologies that improve the survivability of Army personnel, facilities, and equipment as well as improve the health, safety and welfare of the general public.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p><b>Title:</b> Risk based explosives safety criteria</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Development of risk based explosives safety criteria that will aid commanders and safety personnel in the transition from regulation to risk management.</p> <p><b>FY 2013 Accomplishments:</b> Continued explosives testing and support of hazard research and exposure consequences.</p> <p><b>FY 2014 Plans:</b> Continue explosives testing and support of hazard research and exposure consequences.</p> <p><b>FY 2015 Plans:</b> Continue explosives testing and support of hazard research and exposure consequences.</p>	0.115	0.141	0.135
	-	-	-
<p><b>Title:</b> Development of enhanced protective structure designs</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Develop enhanced protective structure designs that improve the survivability of Army personnel, facilities and equipment.</p> <p><b>FY 2013 Accomplishments:</b> Continued explosives testing and support for improving protective construction designs.</p> <p><b>FY 2014 Plans:</b></p>	0.195	0.200	0.200
	-	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 858 / <i>Army Explosives Safety Management Program</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Continue explosives testing and support for improving protective construction designs.				
<b>FY 2015 Plans:</b> Continue explosives testing and support for improving protective construction designs.				
<b>Title:</b> Development of explosive safety tools		0.218	0.215	0.212
<b>Articles:</b>		-	-	-
<b>Description:</b> Develop explosive safety tools for use by Army personnel. Explosive safety tools allow commanders and safety personnel to make explosive safety decisions using risk management methodologies.				
<b>FY 2013 Accomplishments:</b> Continued development of new methods and tools for risk assessment to improve explosive safety risk management decisions.				
<b>FY 2014 Plans:</b> Continue development of new methods and tools for risk assessment to improve explosive safety risk management decisions.				
<b>FY 2015 Plans:</b> Continue development of new methods and tools for risk assessment to improve explosive safety risk management decisions.				
<b>Accomplishments/Planned Programs Subtotals</b>		0.528	0.556	0.547
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
N/A				
<b>E. Performance Metrics</b>				
N/A				

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2015 Army **Date:** March 2014

<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 859 / <i>Life Cycle Pilot Process</i>
--	--	---

COST (\$ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
859: <i>Life Cycle Pilot Process</i>	-	3.345	9.556	4.610	-	4.610	5.047	5.004	5.387	5.486	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

# The FY 2015 OCO Request will be submitted at a later date.

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

This project supports the implementation of the Single Manager for Conventional Ammunition (SMCA) Industrial Base Strategic Plan through technology investigations, model based process controls, pilot prototyping, and industrial assessments. It will assess life cycle production capabilities required for all ammunition families, address design for manufacturability to facilitate economical production, identify industrial and technology requirements, and address the ability of the production base to rapidly and cost effectively produce quality products. Cost Reduction is an important part of the Life Cycle Pilot Process (LCPD). LCPD provides the resources to prototype critical technologies and develop the knowledge base to establish cost effective, environmentally safe and modern production processes in support of the Munitions Industrial Base transformation.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2013	FY 2014	FY 2015
<b>Title:</b> Product Cost Thrust Area	1.010	1.171	1.258
<b>Articles:</b>	-	-	-
<b>Description:</b> This thrust area seeks out new opportunities to reduce overall manufacturing costs of ammunition and ammunition components. RDTE efforts will review and analyze legacy manufacturing processing for opportunities to integrate new technology and lean manufacturing processes to reduce cost.			
<b>FY 2013 Accomplishments:</b> Continue work on Advanced Cluster Energetics (ACE) Fluid Energy Mill (FEM) on High Melt Explosives (HMX) / Research & Development Explosives (RDX) Formulations and Environmentally Benign Colored Smoke. Complete Insensitive Munitions Explosives (IMX) waste treatment. Start work on Foamed Starter Patch, multi-use ultrasound probe to improve RDX/HMX quality and Nitrocellulose (NC) model verification.			
<b>FY 2014 Plans:</b> Complete Environmentally Benign Colored Smoke. Continue work on ACE FEM on HMX/RDX Formulations, Foamed Starter Patch, multi-use ultrasound probe to improve RDX/HMX quality and NC model verification. Evaluate new technology for legacy processes to reduce overall production costs for the Army.			
<b>FY 2015 Plans:</b>			

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 859 / <i>Life Cycle Pilot Process</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Complete ACE FEM on HMX/RDX Formulations, Foamed Starter Patch, multi-use ultrasound probe to improve RDX/HMX quality and NC model verification. Evaluate new technology for legacy processes to reduce overall production costs for the Army.				
<p><b>Title:</b> Single Point Failures (SPFs)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Project thrust area efforts will employ manufacturing technologies to address SPFs. These projects are part of the overall strategy to reduce the number of SPFs in the National Technology Industrial Base (NTIB). Additionally, thrust area efforts address ammunition manufacturing capability shortfalls. This area leverages RDTE accomplishments and product knowledge to satisfy manufacturing requirements.</p> <p><b>FY 2013 Accomplishments:</b> Continue work on Commercial Off-The-Shelf (COTS) primer for grenades. Mitigation of High Frequency (HF-1) Steel single point failure.</p> <p><b>FY 2014 Plans:</b> Complete COTS Primer for grenades. Continue work on mitigation of HF-1 Steel single point failure. Continue development of manufacturing technology and processes for SPFs. Efforts will address source of supply problems within the NTIB.</p> <p><b>FY 2015 Plans:</b> Complete mitigation of HF-1 Steel single point failure. Continue development of manufacturing technology and processes for SPFs. Efforts will address source of supply problems within the NTIB.</p>		1.369 -	1.458 -	1.435 -
<p><b>Title:</b> Manufacturing Technology for Industrial Base Transformation</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Project thrust area identifies and develops technologies that can be utilized at multiple government and private ammunition manufacturing locations to transform the NTIB.</p> <p><b>FY 2013 Accomplishments:</b> Complete work on application of metal casting technology to improve explosive casting quality and flexible cooling ovens. Continue work on use of Ultrasound Analyzer for process control in explosives manufacturing. Start method to mark Insensitive Munitions (IM) filled munitions, IMX Waste Stream Modeling, and Counter Current Ion Exchange for nitrate laden waste treatment.</p> <p><b>FY 2014 Plans:</b> Complete method to mark IM filled munitions and IMX Waste Stream Modeling. Continue Ultrasound Analyzer for process control in explosives manufacturing and Counter Current Ion Exchange projects for nitrate laden waste treatment. Investigate</p>		0.966 -	1.927 -	1.917 -

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 859 / <i>Life Cycle Pilot Process</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
potential technologies to transform key manufacturing processes in the NTIB. Continue investigations, develop and document manufacturing technology for transition to the NTIB.  <b>FY 2015 Plans:</b> Complete Ultrasound Analyzer for process control in explosives manufacturing and Counter Current Ion Exchange for nitrate laden waste treatment. Investigate potential technologies to transform key manufacturing processes in the NTIB. Continue investigations, develop and document manufacturing technology for transition to the NTIB.			
<b>Accomplishments/Planned Programs Subtotals</b>	3.345	4.556	4.610

	<b>FY 2013</b>	<b>FY 2014</b>
<b>Congressional Add:</b> Project Change Summary  <b>FY 2014 Plans:</b> FY 2014	-	5.000
<b>Congressional Adds Subtotals</b>	-	5.000

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army										<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6					<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>				<b>Project (Number/Name)</b> 862 / <i>Indirect Fire And Fuze Technology</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015 Base</b>	<b>FY 2015 OCO #</b>	<b>FY 2015 Total</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
862: <i>Indirect Fire And Fuze Technology</i>	-	3.959	8.620	7.898	-	7.898	8.690	8.349	6.432	5.255	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

# The FY 2015 OCO Request will be submitted at a later date.

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

This program will identify, study, analyze and support enhanced lethality, range extension and standardization to improve target engagement effectiveness; increase reliability, safety, and exportability; and reduce taxpayer costs including elimination of sole source supply of indirect fires ammunition materials as well as studies and analyses of such technology solutions in comparison to current stock pile indirect fire conventional munitions and their associated production processes. Additionally, environmental impacts of legacy propellants, explosives and metal parts will be studied. Replacement of hazardous materials such as Ammonium Perchlorate, Diphenylamine, Lead, etc. and addition of propellant anti-tubewear additives will remain a focus. This program support the standardization and interoperability of legacy and new production ammunition to maximize munitions battlefield interchangeability/compatibility between 52 and 39 caliber guns under the auspices of the international Joint Ballistics Memorandum Of Understanding (JBMOU) as well as rifled and smooth-bore mortars. Maximizing standardization, interchangeability, and exportability will potentially increase FMS sales of US products to maintain domestic production and economies of scale.

This program will also identify, study, analyze and support fuzing and safe and arm devices. This program will implement these technologies into fuzing systems to preclude obsolescence, maximize standardization, enhance performance, and improve the safety and exportability of existing munitions. The program addresses two major areas: (1) analysis and (2) block upgrades. Analysis efforts will identify second sources for fuzing systems that may reduce cost by providing competition, and maintain production when sources or parts are no longer available. It will also allow for the performance enhancement of current ammunition items by conducting studies of major fuze components to detect and identify latent defects. The second major area is block upgrades, which will identify and perform studies on improvements to fuzes; increase commonality of fuze components and requirements. Block upgrades will enable the introduction of the latest technologies into fuzing, keep the fuzing design current to avoid obsolescence issues, and add capabilities.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<b>Title:</b> Indirect Fire & Fuze ARDEC Support.	0.955	1.958	1.809
<b>Articles:</b>	-	-	-
<b>Description:</b> Analysis: Evaluated Micro Electro-mechanical Systems (MEMS) component alternatives to increase sources of supply and lower cost; affects 40mm High Explosive Point Detonating grenade munitions. Conduct engineering test to verify MEMS component alternatives. Study improvements on M734A1/M783 mortar fuze delay primer. Block Upgrades: Determined that Proximity Sensor can physically fit in existing 30mm HEDP M789 round and continued fabrication of fuze components. Integrate new Proximity Sensor components and conduct engineering test to prove-out design. Analyze proximity fuze electronic			

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 862 / <i>Indirect Fire And Fuze Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
upgrades for High Explosive and White Phosphorus mortar rounds. Test packing clip improvement on full range mortar training rounds.				
<b>FY 2013 Accomplishments:</b> Indirect Fire & Fuze ARDEC Support.				
<b>FY 2014 Plans:</b> .Indirect Fire & Fuze ARDEC Support.				
<b>FY 2015 Plans:</b> Indirect Fire & Fuze ARDEC Support.				
<b>Title:</b> Indirect fire & Fuze PM CAS Support				
<b>Description:</b> Indirect Fire: Activities include study, analyze and support of enhanced lethality technology to improve effectiveness and eliminate sole source High Fragmentation -1 steel in indirect fires. Activities include examination of alternative technologies, materials and processes. Study, analyze and support of candidate nonlethal, nontoxic multispectral smoke technologies to eliminate hazardous smoke in indirect fires screening missions. Activities include examination of alternative technologies, materials and processes. Study, retain and validate the effectiveness of M821 mortar cartridge lethality due to use of Insensitive Munitions in lieu of comp B HE fill. Safety improvements to conventional munitions. Joint NATO/Allied Cannon Munitions Interchangeability analysis and support of battlefield interchangeability/compatibility of munitions and associated enabling technologies between 52 and 39 caliber 155mm guns. Activities include ballistic testing including firing tables, safety, reliability and performance.				
<b>FY 2014 Plans:</b> .Indirect fire & Fuze PM CAS Support				
<b>FY 2015 Plans:</b> .Indirect fire & Fuze PM CAS Support				
<b>Title:</b> 155mm Extended Range Base Bleed Sys Analysis and Support				
<b>Description:</b> Indirect Fire: Complete development and validation of engineering baseline of the currently fielded base bleed system, improvements to the base bleed grain formulation and boat tail shape, optimization of the igniter system with the improved grain formulation and the test and validation of completely modern, cost effective and producible base bleed system to				
		<b>Articles:</b>		
		-	6.662	6.089
		-	-	-
		3.004	-	-
		-	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> 862 / <i>Indirect Fire And Fuze Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
validate improvements in reliability, accuracy and overall performance and corresponding integration planning to transition these improvements into 155mm programs of record.				
<b><i>FY 2013 Accomplishments:</i></b> 155mm Extended Range Base Bleed System Analysis and Support				
<b>Accomplishments/Planned Programs Subtotals</b>		3.959	8.620	7.898
<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b> N/A				
<b>E. Performance Metrics</b> N/A				

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2015 Army **Date:** March 2014

<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> F21 / <i>Direct Fire Technology and NATO Ammo Eval</i>
--	--	--

COST (\$ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
<i>F21: Direct Fire Technology and NATO Ammo Eval</i>	-	10.449	7.028	6.867	-	6.867	6.204	5.407	4.336	3.802	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

# The FY 2015 OCO Request will be submitted at a later date.

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

This program funding will be used to support direct fire ammunition from small caliber ammunition, 40mm grenade, medium caliber cannon ammunition and large caliber ammunition enhancements to lethality, effectiveness, survivability, accuracy and general product improvements. In addition, this program assures complete interchangeability of direct fire ammunition and weapons among all the NATO countries with all of the associated logistic, strategic and tactical advantages of the alliance. Project involves development and testing compliance of NATO standardization agreements (STANAGS) and staffing of the North American Regional Test Center (NARTC).

FY 2015 funds will support small caliber propellant optimization to improve propellant temperature stability, reduce muzzle flash signature and fouling. In addition, lightweight cartridge cases composed of steel, polymer and aluminum will continue to be investigated. A more lethal and safer design for 40mm grenades will be built and tested. An improved 30mm training round for the Apache helicopter will allow pilots to see where the rounds strike. Warhead improvements for the 30mm Apache ammunition are also under development. A number of studies on potential improvements for training ammunition and better primers will be conducted. A study to improve the safety of the fuzes used in the 120mm Abrams tank cannon will also be initiated.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2013	FY 2014	FY 2015
<b>Title:</b> Lead Free Ammo - Propellant Optimization	2.083	0.750	0.780
<b>Articles:</b>	-	-	-
<b>Description:</b> Develop optimized spherical propellant for reduced muzzle signature, fouling and chamber pressure. Cartridges containing alternate flash suppressants and deterrents will be manufactured and tested to determine optimum propellant composition.			
<b>FY 2013 Accomplishments:</b> Initiate 5.56mm optimization study and testing of temperature stability technology to optimize small caliber propellants.			
<b>FY 2014 Plans:</b> Evaluate improvements that reduce hazardous materials in manufacturing, small caliber propellant optimization studies and testing of temperature stability technology.			
<b>FY 2015 Plans:</b>			

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> F21 / <i>Direct Fire Technology and NATO Ammo Eval</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Optimize and evaluate improvements to flash suppression and barrel wear technology for small caliber propellants.				
<p><b>Title:</b> Low Observable Traced Projectiles</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Tracers have a number of drawbacks; largely they give away the position of the shooter during firing. Advancement in technology has improved tracer technology which potentially eliminates, mitigates shortfalls of current tracers and improves safety and soldier survivability. This program has been funded since FY 2011.</p> <p><b>FY 2014 Plans:</b> Continue engineering prototype manufacturing, development, and testing. Downselect to most promising candidates conducting engineering studies to improve manufacturing readiness.</p>		-	1.768	-
		-	-	-
<p><b>Title:</b> Lightweight Ammunition</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Investigate alternate cartridge case materials for cost and weight savings over conventional brass cartridge cases.</p> <p><b>FY 2013 Accomplishments:</b> Down select alternative lightweight cartridge case technology.</p> <p><b>FY 2014 Plans:</b> Continue to develop down selected technology candidates. Work jointly with other services towards common solutions.</p> <p><b>FY 2015 Plans:</b> Perform government testing and continued improvement of candidate designs.</p>		1.083	0.275	1.200
		-	-	-
<p><b>Title:</b> New Ammo Design Qualification &amp; NATO Mission Support</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This program assures complete interchangeability of small caliber and automated cannon-caliber ammunition and weapons among all NATO countries with all of the associated logistic, strategic and tactical advantages.</p> <p><b>FY 2013 Accomplishments:</b> Support NARTC Test operations.</p> <p><b>FY 2014 Plans:</b> Support NARTC Test operations</p> <p><b>FY 2015 Plans:</b></p>		0.483	0.400	0.200
		-	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> F21 / <i>Direct Fire Technology and NATO Ammo Eval</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Support NARTC Test operations				
<p><b>Title:</b> M433 Warhead Improvement</p> <p><b>Description:</b> 40mm: Improve lethality (fragmentation) of the M433 grenade.</p> <p><b>FY 2013 Accomplishments:</b> Developmental test and validation of increased fragmentation warhead design and integrated ballistic testing.</p> <p><b>FY 2014 Plans:</b> Initiate qualification of improved M433 cartridge.</p> <p><b>FY 2015 Plans:</b> Complete component and integration subsystem and system testing. Three hundred cartridges will be built and tested to complete qualifications of the cartridge.</p>		<p>2.775</p> <p>Articles: -</p>	<p>0.600</p> <p>-</p>	<p>2.445</p> <p>-</p>
<p><b>Title:</b> Target Practice Spotter Technology Insertion</p> <p><b>Description:</b> Training Cartridge with impact initiated spotting charge. Goal is visible signature upon impact under all conditions.</p> <p><b>FY 2013 Accomplishments:</b> Qualification testing of preliminary designs.</p> <p><b>FY 2014 Plans:</b> Improve the design to facilitate high volume production and optimize design.</p> <p><b>FY 2015 Plans:</b> Build qualification sample and initiate testing for final qualification in FY 2016.</p>		<p>2.074</p> <p>Articles: -</p>	<p>1.250</p> <p>-</p>	<p>0.850</p> <p>-</p>
<p><b>Title:</b> Improved M789 Lethality, Warhead fragmentation improvement</p> <p><b>Description:</b> Improve M789 warhead fragmentation for lethality by utilizing fragmentation sleeves, scoring or other technologies within the warhead to promote more efficient fragmentation.</p> <p><b>FY 2013 Accomplishments:</b> Integration of improved shear liner, increase in manufacturing readiness, and conduct integrated ballistic test.</p> <p><b>FY 2014 Plans:</b></p>		<p>1.083</p> <p>Articles: -</p>	<p>0.500</p> <p>-</p>	<p>0.500</p> <p>-</p>

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> F21 / <i>Direct Fire Technology and NATO Ammo Eval</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p>Incorporate the best design into the M789 warhead and perform testing to support an air worthiness release. Provide warheads with shear liners for a combined lethality demonstration with the Proximity sensor.</p> <p><b>FY 2015 Plans:</b> Developmental and demonstration testing of the M789 warhead, TDP development and fragmentation liner integration into shaped charge warhead.</p> <p><b>Title:</b> DBX-1 Lead free replacement for Lead Azide</p> <p><b>Description:</b> Integrate environmentally friendly lead free primary explosives into M789. Demonstration in this form factor will enable transition to other munitions of larger size.</p> <p><b>FY 2013 Accomplishments:</b> Integrate environmentally friendly lead free primary explosives into M789.</p> <p><b>FY 2015 Plans:</b> Initiate lead free testing into M789.</p>		0.684	-	0.050
		<b>Articles:</b>	-	-
<p><b>Title:</b> Improved .300 caliber sniper ammunition</p> <p><b>Description:</b> Improve .300 caliber sniper ammunition to provide increased capabilities.</p> <p><b>FY 2013 Accomplishments:</b> Conduct market research, develop concepts and down select.</p> <p><b>FY 2014 Plans:</b> Refine and evaluate cartridge design.</p>		0.184	0.500	-
		<b>Articles:</b>	-	-
<p><b>Title:</b> 120mm Fuze Safety Improvement</p> <p><b>Description:</b> Initiate efforts to incorporate a second independent safety into the fuze for current 120mm high explosive ammunition.</p> <p><b>FY 2014 Plans:</b></p>		-	0.400	-
		<b>Articles:</b>	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> F21 / <i>Direct Fire Technology and NATO Ammo Eval</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Focus will be on modifying fuze to meet current safety standards. Initiate design efforts to incorporate a pressure switch into the current fuze for the M830 and M830A1. Additional efforts will also be required to address obsolescence issues associated with the fuze.				
<b>Title:</b> Extruded Propellant				
<b>Description:</b> Develop and demonstrate a government owned alternate propellant for M855A1 using existing extruded propellant technology.				
<b>FY 2014 Plans:</b> Model interior ballistics and develop new formulations for 5.56mm, focusing on improved performance through lower variability, erosivity, and increased range via higher velocity at acceptable pressures. Develop pilot scale manufacturing process, produce samples, and demonstrate performance in subscale development testing.				
<b>FY 2015 Plans:</b> Extruded Propellant will be closing out Phase I by concluding designs, propellant iterations, initial testing and culminating in a Preliminary Design Review (PDR). At the conclusion of PDR, the program will move into Phase II/III which consists of larger scale testing, production testing, and working actions necessary for TDP finalization and ECP draft.				
<b>Title:</b> Small Caliber Ammunition Training Range Impact Reduction Engineering Study				
<b>Description:</b> Perform an engineering study on the feasibility of reducing the surface danger zone of small caliber training ammunition while maintaining a ballistic match to the combat ammunition out to maximum effective range of the combat ammunition. The results of the study will assist in establishing the baseline requirements for future training ammunition.				
<b>FY 2014 Plans:</b> Conduct literature search, develop and run models and simulations, perform material analysis, conduct market survey, prepare recommended requirements and prepare program proposals.				
<b>FY 2015 Plans:</b> Test samples of potential candidates.				
<b>Title:</b> 40mm Pyrotechnics Cartridges				
<b>Description:</b> Improve reliability and hang time.				
<b>FY 2015 Plans:</b>				
		-	0.510	0.273
	<b>Articles:</b>	-	-	-
		-	0.075	0.050
	<b>Articles:</b>	-	-	-
		-	-	0.400

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> F21 / <i>Direct Fire Technology and NATO Ammo Eval</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Initial phase of multiyear effort starting with reliability and hang time improvements.				
<b>Title:</b> Close Combat Mission Capability Kit (CCMCK)		-	-	0.010
<b>Description:</b> CCMCK is a user installed weapons modification system, which allows the Soldier to employ weapons at a short range for force-on-force training using low velocity marking ammunition while precluding the weapon from firing standard service ammunition. The system provides normal environmental/weapon employment cues and immediate target feedback through force-on-force, interactive live fire scenario tasks, and mission execution.				
<b>FY 2015 Plans:</b> Engineering study to analyze unmet user requirements.				
<b>Title:</b> Metastable Intermolecular Composite (MIC) Primer Lead free primer		-	-	0.109
<b>Description:</b> Integrate environmental friendly lead free primary explosives within the primer of the M789 and remove lead Styphnate.				
<b>FY 2015 Plans:</b> Explosive material qualification and primer functionality testing to ensure cartridge and propulsion functionality are ready for integration.				
<b>Accomplishments/Planned Programs Subtotals</b>		10.449	7.028	6.867
<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b> N/A				
<b>E. Performance Metrics</b> N/A				

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army										<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6					<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>				<b>Project (Number/Name)</b> F24 / <i>Conventional Munitions Demil</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015 Base</b>	<b>FY 2015 OCO #</b>	<b>FY 2015 Total</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
F24: <i>Conventional Munitions Demil</i>	-	14.400	9.783	8.764	-	8.764	10.522	12.952	14.110	13.617	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

# The FY 2015 OCO Request will be submitted at a later date.

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

The Conventional Munitions Demilitarization technology program supports the Single Manager for Conventional Ammunition (SMCA) responsibility per Department of Defense Instruction (DoDI) 5160.68 to plan, program, budget and fund a Joint Service research and development (R&D) program for developing capability and capacity, technology and facilities to support the SMCA mission to demil and dispose of conventional ammunition stored in the SMCA Resource, Recovery and Disposition Account (B5A) for all the Military Services. The program goals include SMCA efforts to increase efficiencies and effectiveness to reduce the demil stockpile; reduce processing costs including packaging, handling and crating; and increase capacity through improved demil capabilities and processes. Project F24 includes activities: (1) to support a requirements process to focus investments, assess capabilities, analyze alternatives, and recommend and implement R&D projects; (2) to sustain product and process improvement and support for existing capabilities; (3) to develop or improve demil methods and processes related to advance the primary demilitarization core thrust areas of destruction, disassembly, removal, resource recovery and recycling, and waste stream treatment; (4) to ensure safe and environmentally acceptable demil operations; (5) to transition or transfer activities of technologies/projects from the techbase centers or to United States Army depots or plants performing demil; and (6) to mitigate risk and close-out project activities.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<b>Title:</b> Advanced Destruction	6.499	3.430	1.314
<b>Articles:</b>	-	-	-
<b>Description:</b> This effort focuses on destruction of munitions.			
<b>FY 2013 Accomplishments:</b> Continued the ammonium Perchlorate rocket motor destruction at Letterkenny Munitions Center with rocket motor segmenting design and complete the final facility design. Completed plasma ordnance disposal system layaway. Initiated study on universal closed disposal (UCD) for shaped charges. Completed the preliminary design of cryofracture adaptation to demil of Rockeye munitions. Completed design basis for Rockeye demil at McAlester Army Ammunition Plant (MCAAP). Initiated closure of the mobile plasma treatment system. Continued evaluation of a decineration process for cartridge actuated devices/ propellant actuated devices(CADS/PADS). Initiate the upgrade of the Munitions Cryofracture Demil Facility at MCAAP.			
<b>FY 2014 Plans:</b> Continue the ammonium Perchlorate rocket motor destruction at Letterkenny Munitions Center with long lead item procurement. Install proveout and complete evaluation of a decineration process for CADS/PADS. Design and fabricate subsystems for the			

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> F24 / <i>Conventional Munitions Demil</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<p>upgrade of the Munitions Cryofracture Demilitarization Facility (MCDF) at MCAAP. Closeout the Mobile Plasma Treatment System (MPTS) project at Crane Army Ammunition Activity (CAAA). Initiate testing of munitions at the UCD facility. Complete evaluation of decineration process at Tooele Army Depot (TEAD).</p> <p><b>FY 2015 Plans:</b> Conduct phase I integration testing for ammonium Perchlorate rocket motor destruction and complete rocket motor segmenting. Evaluate results of universal closed disposal testing. Initiate study of double base grain rocket motor demil facility. Integrate MCDF hardware and demonstrate operation at MCAAP.</p>				
<p><b>Title:</b> Resource Recovery and Recycling (R3)</p> <p><b>Description:</b> This effort focuses on enhancing existing methods of munitions R3.</p> <p><b>FY 2013 Accomplishments:</b> Initiate magnesium recovery layaway. Fabricate, install and test upgrades to high pressure water wash out line at Hawthorne Army Depot (HWAD). Complete test, fabrication and facilitization for Improved Conventional Munitions Recycle, Recovery and Reuse (ICM R3) line induction heating.</p> <p><b>FY 2014 Plans:</b> Complete integrated demonstration and validation of the ICM R3. Conduct the ICM R3 LRIP. Conduct the High Pressure Water Washout (HPWWO) Phase II equipment purchase and installation and conduct Low Rate Initial Production (LRIP).</p> <p><b>FY 2015 Plans:</b> Complete installation and proveout of high pressure water washout line at HWAD. Modify filter press for efficiency at the HPWWO. Finalize ICM R3 configuration and transfer equipment to production.</p>		<p>2.943</p> <p><b>Articles:</b> -</p>	<p>1.094</p> <p>-</p>	<p>0.459</p> <p>-</p>
<p><b>Title:</b> Advanced Removal</p> <p><b>Description:</b> This effort develops technology to remove propellant and energetics.</p> <p><b>FY 2013 Accomplishments:</b> Fabricate components for Red Phosphorous (RP) Phase II demil line. Continue Insensitive Munitions Explosives-101 (IMX-101) Autoclave Improvement project; finish final report and evaluate changes on Comp B loaded projectiles.</p> <p><b>FY 2014 Plans:</b></p>		<p>2.164</p> <p><b>Articles:</b> -</p>	<p>0.788</p> <p>-</p>	<p>0.981</p> <p>-</p>

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> F24 / <i>Conventional Munitions Demil</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Design download equipment for RP Phase II line. Complete IMX-101 Autoclave Process Upgrade project. <b>FY 2015 Plans:</b> Fabricate components for RP demil line. Integrate RP demil line into Phosphoric acid recovery plant at CAAA. Initiate IM Bomb Body recovery line. Implement process changes from IMX-101 autoclave project to the MCAAP autoclave process.				
<b>Title:</b> Advanced Waste Stream Treatment  <b>Description:</b> This effort focuses on handling waste streams from munitions items.  <b>FY 2013 Accomplishments:</b> Initiate study for Rotary Kiln Productivity Improvement (RKPI). Continue dual use evaluation of energetics wastes as a feed stream for fuel cells.  <b>FY 2014 Plans:</b> Complete RKPI study and conduct downselect for hardware upgrades.  <b>FY 2015 Plans:</b> Initiate procurement for long lead-time items. Award contract for upgraded Pollution Abatement System for Rotary Kilns from Productivity Improvement program. Apply process efficiency changes to the environment permitting process for the Rotary Kiln Productivity Improvement Project.		0.698 Articles: -	1.422 -	2.200 -
<b>Title:</b> Advanced Munitions Disassembly  <b>Description:</b> Funding is provided for the following efforts:  <b>FY 2013 Accomplishments:</b> Continue prototype detail design and complete subscale testing of Bomb, Live Unit-97 (BLU-97) disassembly process at HWAD. Initiated wash waterline improvements and completed Demilitarization by Induction Heating Meltout System (DIHMES) demonstration and validation. Closeout acid digestion project.  <b>FY 2014 Plans:</b> Conduct Analysis of Alternatives for Family of Scatterable Mines (FASCAM) Demil at CAAA. Initiate project for FASCAM processing facility. Initiate the application of Lean Automation principles in the design and layout of the BLU-97 project at HWAD. Set up process to detank Liquid Rocket-62 (LR-62) Bullpup motors.  <b>FY 2015 Plans:</b>		2.096 Articles: -	3.049 -	3.810 -

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2015 Army		<b>Date:</b> March 2014		
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605805A / <i>Munitions Standardization, Effectiveness and Safety</i>	<b>Project (Number/Name)</b> F24 / <i>Conventional Munitions Demil</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
Continue support of FASCAM demil. Continue fabrication and installation of BLU-97 disassembly process. Detank one LR-62 Bullpup motor. Identify a process to dispose of Inhibited Red Fuming Nitric Acid (IRFNA) and Mass Air Flow(MAF) fuel components for Bullpup rockets.				
<b>Accomplishments/Planned Programs Subtotals</b>		14.400	9.783	8.764
<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b> N/A				
<b>E. Performance Metrics</b> N/A				