ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE
3 - Advanced technology development	**0603004A - Weapons and Munitions Advanced Technology**

	COST (In Thousands)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate
	Total Program Element (PE) Cost	56230	35381	66514	36959	62123	55440	58670
232	ADVANCED MUNITIONS DEM	20612	31907	66401	36821	61908	40154	42356
43A	ADV WEAPONRY TECH DEMO	35618	3474	113	138	136	154	150
L94	ELECTRIC GUN SYS DEMO	0	0	0	0	79	15132	16164

A. Mission Description and Budget Item Justification: This Program Element (PE) matures and demonstrates affordable, smaller and/or lighter advanced weapons and munitions technologies to increase battlefield lethality and survivability for the Future Combat Systems (FCS) for the Objective Force. Specific efforts include: FCS Multi-Role Armament and Ammunition System ATD; Direct Fire Lethality (DFL) Program; Multi-Purpose Extended Range Munition (MP-ERM); Precision Guided Mortar Munition (PGMM); Area Denial Systems; and Responsive Accurate Mission Module (RAMM). The FCS Multi-Role Armament utilizes Electrothermal-Chemical (ETC) propulsion and provides single armament module configurations to support both maneuver and fire support missions. The corresponding FCS Multi-Role Ammunition, consisting of a three-cartridge suite, provides overwhelming lethality at ranges up to 50 km with greater precision and accuracy, and with reduced logistics footprint. The MP-ERM cartridge will provide combat overmatch against the full target spectrum by using advanced explosively formed penetrator (EFP) warheads that exploit energetics, liner materials and modeling/simulation technologies. The project demonstrates the increase in armor penetration for these new EFP warheads. This program adheres to Tri-Service Reliance Agreements on conventional air-surface weaponry, with oversight provided by the Joint Directors of Laboratories. Work in this PE is related to, and fully coordinated with, efforts in PE 0602624A (Weapons and Munitions Technology), PE 0602618A (Ballistics Tech) and PE 0604802A (Weapons and Munitions - Engineering Development). The cited work is consistent with the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan and Project Reliance. The program element contains no duplication with any effort within the Military Departments. Work is performed by the U.S. Army Armament Research, Development and Engineering Center (ARDEC), Picatinny Arsenal, New Jersey. This system supports the Objective Force transition path of the Transformation Campaign Plan (TCP).

B. Program Change Summary	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2002 PB)	55227	29684	33284
Appropriated Value	55738	35684	0
Adjustments to Appropriated Value	0	0	0
a. Congressional General Reductions	0	-303	0
b. SBIR/STTR	-1597	0	0
c. Omnibus or Other Above Threshold Reductions	0	0	0
d. Below Threshold Reprogramming	2600	0	0
e. Rescissions	-511	0	0
Adjustments to Budget Years Since FY2002 PB	0	0	33230
Current Budget Submit (FY 2003 PB)	56230	35381	66514

Change Summary Explanation:

Significant Changes:

FY03 - (+$33230) - Project 232 (+$33117) and Project 43A (+$113) increased to FCS: perform projectile modeling and simulation; conduct validation and verification tests for models, develop MRM airframe (includes design, modeling and simulation, hardware fabrication and demonstration); develop guidance and control (G&C)seeker/sensor subsystems; design, fabricate test samples/fixtures and conduct high-G tests of the G&C subsystem; develop seeker/sensor models, simulations and algorithms.

FY02 - Congressional adds were made for Low Cost Course Correction Technology, Project 43A (+$3500); and SMAW Shoulder- Launched Multipurpose Assault Weapon and Munitions Engineering Development, Project 232 (+$2500).

Projects With No R-2A:
Project 43A (FY02 funding = $3474) - This project will demonstrate and complete Low Cost Course Correction Technology. No additional funding is required to complete this project.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603004A - Weapons and Munitions Advanced Technology**	**232**

COST (In Thousands)		FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate
232	ADVANCED MUNITIONS DEM	20612	31907	66401	36821	61908	40154	42356

A. Mission Description and Budget Item Justification: This project matures and demonstrates munitions enhancement for the FCS Multi-Role Armament and Ammunition Systems (MRAAS) and matures emerging technologies in lightweight structures, smart materials and in-flight update architectures. The DFL program focuses on enhancing kinetic energy (KE) penetrator lethality against explosive reactive armor (ERA) appliqué arrays (now available on fielded threat systems), exploiting novel defeat mechanisms. The MP-ERM program evaluates warhead designs against various range targets. RAMM will be developed under this project. A Mid-Range Munition (MRM) and the MRAAS Cargo Round provide additional lethality options for FCS. A Congressionally funded effort to mature and demonstrate Shoulder-Launched Multipurpose Assault Weapon (SMAW) and asssociated munitions for use in confined spaces will be completed 4QFY02. In-house efforts are accomplished by ARDEC, Picatinny Arsenal, New Jersey and the Army Research Laboratory, Aberdeen Proving Ground, MD. Major contractors include: Alliant Tech Systems, Minneapolis, MN; Science Applications International Corp., McLean, VA; LTV Aerospace, Dallas, TX; Textron Defense Systems, Wilmington, MA; Talley Defense, Mesa, AZ; Parker Kinetics Design, Austin, TX; Nomura Enterprise, Rock Island, IL; Loral, Dallas, TX; General Dynamics - Ordnance Tactical Systems, Red Lion, PA; Alliant Tech Systems -Allegheny Ballistics Laboratory, Rocket City, MD and Raytheon/TI Systems, Tucson, AZ. This program supports the Objective Force transition path of the Transformation Campaign Plan (TCP).

FY 2001 Accomplishments:

- 6500 - Demonstrated advanced KE munition novel penetrator defeat against ERA with an increase in penetration of at least 50% over the M829A2 at extended range; demonstrated feasibility of minimum 30% increase in system accuracy (probability of hit) with radial thruster technology on KE penetrators.
- 6705 - Completed TERM warhead design and analysis; conducted warhead testing versus range targets; performed ballistic test firings of the TERM propulsion system over the temperature ranges; updated tactical seeker design; transfered design and technology to MP-ERM for FCS.
- 7407 - This one year Congressional add funded a feasibility study adapting SMAW-CS to Bunker Defeat Munition; conducted modeling and simulation and limited test and evaluation of prototype hardware. No additional funding is required to complete this effort.

Total 20612

FY 2002 Planned Program

- 5924 - Conduct airframe and lethality demonstrations of the MP-ERM.
- 1760 - Complete design and initiate fabrication of medium caliber air bursting projectile; conduct medium caliber novel kinetic energy penetrator testing against advanced armors.
- 17000 - Complete the following for the FCS Multi-Role Armament:fabricate and conduct functional test of lightweight, low impulse multi-role cannon for FCS; fabricate automated ammunition handling system and conduct load/unload function testing with multi-role cannon; demonstrate best technical approaches for ETC propellant with increased energy and lower sensitivity; complete fire control software development, hardware integration, and conduct preliminary System Integration Laboratory prove-out.
- 4723 - Complete Multi-Role Smart Cargo projectile design to include guidance and control; demonstrate best technical approaches for dynamic retargeting to locate and defeat time critical targets; use modeling and simulation to demonstrate maximized payload volume enabled by application of smart materials, structures and metal matrix composites for airframe.
- 2500 - This one year Congressional add (SMAW, Shoulder-Launched Multipurpose Assault Weapon and Munitions Engineering Development) matures and demonstrates (and completes) technology to launch SMAW in confined spaces. No additional funding is required to complete this project.

Total 31907

FY 2003 Planned Program

- 3052 - Fabricate preliminary subsystem hardware of the RAMM mortar module.
- 6932 - For the FCS Multi-Role Ammunition: demonstrate defeat of advanced threat armor at extended ranges with integrated novel penetrator and composite sabot; demonstrate critical Guidance and Control and high-G components for MP-ERM; complete airframe design for Smart Cargo round to achieve deliveries of lethal payloads to 50 km.
- 2500 - Demonstrate integrated medium caliber air bursting projectile lethality of four-fold increase in lethal area over traditional point-detonating warhead against personnel targets.
- 20917 - For the FCS Multi-Role Armament: demonstrate firing of multi-role cannon with integrated cartridge; demonstrate, at subscale, feasibility of achieving 25% increase in energy (while retaining equal sensitivity to current tank ammunition) using Generation II ETC propellant; demonstrate fire control software and hardware in a System Integration Laboratory; conduct secondary armament turreted system slew and firing demonstration; conduct testing of automated ammunition handling system load/unload sequence reliability; complete turret design; initiate fabrication of turret structure.

FY 2003 Planned Program (Continued)

- 33000 - For the Mid Range Munition (MRM)for FCS: perform projectile modeling and simulation; conduct validation and verification tests for models, develop MRM airframe (includes design, modeling and simulation, hardware fabrication and demonstration); develop guidance and control (G&C)seeker/sensor subsystems; design, fabricate test samples/fixtures and conduct high-G tests of the G&C subsystem; develop seeker/sensor models, simulations and algorithms.

Total 66401