ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2007

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Advanced Component Development and Prototypes	**0603639A - Tank and Medium Caliber Ammunition**

	COST (In Thousands)	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	8050	2572	44578	45733	71961	56698	107077	51079		387848
656	Mounted Combat System (MCS) Ammunition	8050	1286	44578	45733	71961	56698	107077	51079		386462
694	MEDIUM CALIBER AMMUNITION		1286								1386

A. Mission Description and Budget Item Justification: The Tank and Medium-caliber Ammunition (TMA) Program Element (PE) encompasses a comprehensive program to develop, rapidly transition to production, and field advanced tank, medium caliber, and other munitions. These programs will ensure continued battlefield overmatch and lethality of U.S. maneuver forces despite worldwide development and proliferation of enhanced armored vehicle protection technologies. To achieve this, TMA will identify and develop promising technologies through competitive development and streamlined acquisition procedures. All ammunition development funds within this PE are managed to facilitate transitions between phases, avoid administrative delays, and focus resources on the most promising areas.

FY 2008 supports the initiation of System Development and Demonstration (SDD) for the Mid Range Munition (MRM) for the FCS MCS. The MRM program has matured its technology and capability during Science and Technology phase, and has successfully completed the autonomous (April 2004) and designate (August 2006) guide-to-hit demonstrations in preparation for SDD. MRM is a significant contributor to the lethality and survivability of the MCS and Future Force. MRM will provide lethality capability at Beyond Line of Sight (BLOS) ranges (2-12km), which will expand the Maneuver Task Force Commander's battle space. MRM is the only Gun-Launched, Beyond Line of Sight (BLOS) solution that supports the FCS Brigade Combat Team (BCT). Initiation of MRM SDD in FY 2008 is critical to force effectiveness reinforcing the BLOS capability by increasing FCS Lethality and Survivability. MRM supports and allows the FCS to meet KPP#3, Networked Lethality.

Starting in FY 2012, funding supports MRM and SDD initiation of the Advanced Kinetic Energy (AKE) cartridge. The AKE will provide the MCS with a unguided direct fire Line of Sight (LOS), fast response lethality to rapidly destroy threat targets in the close in fight from 0km to 2km. AKE will allow the MCS to defeat current and future threat Main Battle Tanks (MBT) with Explosive Reactive Armor (ERA) and meet the FCS LOS requirement as specified in the FCS ORD.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2007

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Advanced Component Development and Prototypes	**0603639A - Tank and Medium Caliber Ammunition**

B. Program Change Summary	FY 2006	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2007)	8281			
Current BES/President's Budget (FY 2008/2009)	8050	2572	44578	45733
Total Adjustments	-231	2572	44578	45733
Congressional Program Reductions		-10		
Congressional Rescissions				
Congressional Increases		2600		
Reprogrammings	-231	-18		
SBIR/STTR Transfer				
Adjustments to Budget Years			44578	45733

Change Summary Explanation: Funding:

FY 2007: Congressional increases for Mid-Range Munition - CE - +$1.3M (Project 656) and High Burst Air Munition - +$1.3M (Project 694).

FY 2008: Funds increased (+$44.6M) for Mid-Range Munition.

FY 2009: Funds increased (+$45.7M) for Mid-Range Munition.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2007

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Advanced Component Development and Prototypes	**0603639A - Tank and Medium Caliber Ammunition**	**656**

COST (In Thousands)		FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total Cost
656	Mounted Combat System (MCS) Ammunition	8050	1286	44578	45733	71961	56698	107077	51079		386462

A. Mission Description and Budget Item Justification: The Army's Future Combat System (Brigade Combat Team) (FCS (BCT)) is a joint system of systems consisting of a network and a combination of manned and unmanned systems that use an advanced network architecture to enable levels of joint connectivity, situational awareness and understanding, and synchronized operations previously unachievable. It is designed to interact with and enhance the Army's most valuable weapon - the Soldier. When fully operational, FCS will provide the Army and the joint force unprecedented capability to see the enemy, engage him on our terms, and defeat him on the 21st Century battlefield. The Army's first modernization effort in nearly four decades; FCS is the embodiment of the modular force, a modular system designed for "full spectrum" operations. It will network existing systems, systems already under development and future systems to be developed to meet the requirements of the Army's Future Force. It is adaptable to traditional warfare as well as complex, irregular warfare in various rural and urban terrains. It can also be adapted to civil support, such as disaster relief. FCS is the #1 priority acquisition program for the Army.

This project supports the development of ammunition for the Future Combat System (FCS) Mounted Combat System (MCS). The Mid Range Munition (MRM) is critical to FCS force effectiveness, reinforcing the Beyond Line of Sight (BLOS) capability, and allows FCS to meet Key Performance Parameter #3, Networked Lethality.

The MRM round is a precision-guided munition that provides the capability for the FCS BCT commander to both shape and set conditions in his battlespace to conduct decisive operations and destroy enemy forces by engaging moving and stationary targets throughout his area of operations. The MRM round will incorporate a seeker(s) that enables the munition to attack targets designated by the MCS or another remote (manned/unmanned) sensor, or autonomously attack targets if designation is lost or not available.

MRM is a first generation fire and forget gun-launched munition that is being developed to provide the Future Combat System (FCS) Mounted Combat System (MCS) with a BLOS capability. MRM is a precision-guided munition that provides a moving or stationary MCS the capability to engage and destroy moving and stationary enemy targets throughout his area of operations (2-12km (T) or 2-16km (O)) in a BLOS mode. MRM will have a seeker to enable it to engage designated targets or autonomously guide itself to and attack targets if designation is lost or not present.

There are three modes of operation when employing the MRM round: autonomous, designate, and designate only. The sensor/observer must decide which mode to use based on the factors of mission, enemy, troops, terrain, time, and civil considerations (METT-TC) and the commander's intent, in the Attack Guidance (AG) matrix. Autonomous shall be utilized when a sensor/observer does not want to give away his position, if a designator is not available or inoperative, or if intervisibility terrain lines prevent illumination of the target.

Prior to firing, integration of battlefield command and control information (range to target, laser designation code, etc) will be transmitted to the munition through a data link connecting the MRM to the MCS fire control system. Once fired, no further command and control from the MCS is required. The round will guide itself to the target using on board sensors or possibly a laser reflection with a properly encoded pulse rate. The munition will employ state-of-the-art kill mechanisms to achieve the highest probability of kill possible against a variety of armored targets. The technologies that provide both guidance and lethality shall be all weather and countermeasure resistant. Sensors for the Autonomous mode will also be enabled at a range that will reduce the probability of collateral damage.

FY 2008 supports the initiation of SDD for the MRM. The MRM will provide FCS MCS with a precision munition capable of hitting and killing all battlefield targets at BLOS ranges between 2-12km, increasing platform survivability and lethality, and expanding the Maneuver Task Force Commander's battle space. MRM supports FCS objectives of expanded battle space and multi-mission direct and indirect fire capability. MRM leverages state of the art sensor technologies to provide immediate, responsive fires to support Family of Vehicles or other scouts. MRM is the only demonstrated Gun-Launched precision, smart munition capable of meeting the BLOS requirements specified in the FCS Operational Requirements Document. MRM will allow the MCS to fire and kill with precision on the move, at high value moving or stationary armor targets.

Starting in FY 2012, funding supports MRM and SDD initiation of the Advanced Kinetic Energy (AKE) cartridge. The AKE will provide the MCS with a unguided direct fire Line of Sight (LOS), fast response lethality to rapidly destroy threat targets in the close in fight from 0km to 2km. AKE will allow the MCS to defeat current and future threat Main Battle Tanks (MBT) with Explosive Reactive Armor (ERA) and meet the FCS LOS requirement as specified in the FCS ORD.

Accomplishments/Planned Program:	FY 2006	FY 2007	FY 2008	FY 2009
GPS and Anti-Jam Development	2033			
SAL Testing MRM Chemical Energy(CE)	1000			
Captive Flight Test MRM Chemical Energy	100			
Dual mode seeker integration (ARDEC, PM, Test Sites Contractor) MRM Chemical Energy	4917	1250		
MRM SDD Engineering Activities. Down-select to 1 Contractor scheduled for 4QTR-FY07. SDD startup in October 2007 (FY2008).			17841	17022
Software-Seeker Integration			9347	10091
Prototype Manufacture (various components, subsystems, systems and assemblies, inspections			7559	7597
Producibility			2019	3099
Initial Cartridge Integration Test			7812	
Follow-on Cartridge Integration Test				7924
Small Business Innovative Research/Small Business Technology Transfer Programs		36		
Total	8050	1286	44578	45733

B. Other Program Funding Summary	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Compl	Total Cost
SSN: E88103 - Cartridge, MCS, Mid Range Munition (MRM)						24634	47624	61762	2013223	2147243
0604660A FCS Manned Grd Vehicles & Common Grd Vehicle Components			696333	772458	791186	361201	215665	103885	Continuing	Continuing
0604661A FCS System of Systems Engr & Program			1589466	1407410	1888349	1929853	1299062	1034307	Continuing	Continuing

Management										
0604662A FCS Reconnaissance (UAV) Platforms			41164	34220	14398	9301	4587	1344	Continuing	Continuing
0604663A FCS Unmanned Ground Vehicles			90667	96666	65206	43912	27038	3603	Continuing	Continuing
0604664A FCS Unattended Ground Sensors			10999	12942	19103	16874			Continuing	Continuing
0604665A FCS Network Hardware & Software			678781	536387	336471	367894	292770	170602	Continuing	Continuing
0604646A Non Line of Sight - Launch System	216668	320650	253410	199064	40329	6000			Continuing	Continuing
0604647A Non Line of Sight - Cannon	132223	110998	137802	98189	71906	43531	28971		Continuing	Continuing
0604666A FCS Spin Outs			64796	32442	65000	50000	50000	10000	Continuing	Continuing
0603639A FCS MRM			44578	45733	71961	56698	107077	51079	Continuing	Continuing
0604715A STRICOM/NAWCTSD Support			381	391	401	409	418	429	Continuing	Continuing
WTCV G86100 FCS Core Program			79483	155838	149367	683788	2194625	5795292	Continuing	Continuing
WTCV G86200 FCS Spin Out Program			20123	172746	373790	557060	779742	958060	Continuing	Continuing
0604645 F52 UAV Recon & Sensors	50692	26360							Continuing	Continuing
0604645 F53 UGV	121528	106516							Continuing	Continuing
0604645 F54 UGS	31242	10612							Continuing	Continuing
0604645 F55 SUSTAINMENT	139389	106517							Continuing	Continuing
0604645 F57 MANNED GROUND VEHICLES	499469	563946							Continuing	Continuing
0604645 F61 SoS Engineering and Program Management	2027766	2142970							Continuing	Continuing

Comment:

C. Acquisition Strategy The Mid Range Munition (MRM) Program is currently in the Technology Development phase. MRM has achieved Technology Readiness Level 6 in both autonomous and designated firing modes, and will transition (Milestone B) to Systems Development and Demonstration (SDD) at the end of FY 2007. There are currently two competing technical concepts by Raytheon Inc. and Alliant Tech Systems. The down select from 2 competing companies to 1, is scheduled to occur by the end of the 4th QTR FY07. The SDD contract will contain priced production options. The MRM schedule coincides with the Mounted Combat System's (MCS) development schedule, supporting the Future Combat System (FCS) Initial Operational Capability (IOC) milestone. The SDD effort will integrate MRM into both the MCS and Evaluation Brigade Team. The recommended two phase acquisition strategy builds on the functionality of the previous phase. This two phase approach will reduce program risk for both the MCS and MRM by addressing integration issues and optimizing testing during the programs' SDD efforts. Phase I develops a Dual Mode capability cartridge that will be utilized to support MCS System level qualification testing for a Beyond Line of Sight mission with Spin Out enablers, and allows for Tactics, Techniques and Procedures (TTP) development and testing in support of FCS fielding. Phase I will be completed by FY 2011 (MS-C) and the exercising of the LRIP option will support MCS qualification, Limited

User Test and Live Fire Requirements. Phase II will leverage lessons learned during Phase I testing and continue to mature the Dual mode design by addressing integration, operational, and performance issues. Phase II will be completed by FY 2012 to allow production of a second generation MRM to support the fielding of the FCS.

This strategy will deliver a proven, fully capable multi-mode munition with validated TTPs that will fully meet the FCS MCS requirements and support the FCS IOC milestone.

ARMY RDT&E COST ANALYSIS (R3)

February 2007

BUDGET ACTIVITY
4 - Advanced Component Development and Prototypes

PE NUMBER AND TITLE
0603639A - Tank and Medium Caliber Ammunition

PROJECT
656

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2006 Cost	FY 2006 Award Date	FY 2007 Cost	FY 2007 Award Date	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	Cost To Complete	Total Cost	Target Value of Contract
MRM System Contractor	CPIF/AF	TBS						36350	2Q	37350	2Q	171830	245530	245530
Raytheon	SS-CPFF	Tucson, AZ	3709	5000	3Q	700	2Q						9409	9409
Electro-Radiation, Inc	SS-CPFF	Fairfield, NJ	2800	2033	3Q								4833	4833
PM-MAS	MIPR	Picatinny Arsenal, NJ				200	2-4Q	1266	1-4Q	1293	1Q	2929	5688	5688
Miscellaneous	MIPR	Multiple	1100	20	3Q			138	1Q	123	3Q		1381	1381
Alliant Tech Systems	SSCPFF	Clearwater, FL	3708										3708	3708
Subtotal:			11317	7053		900		37754		38766		174759	270549	270549

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2006 Cost	FY 2006 Award Date	FY 2007 Cost	FY 2007 Award Date	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	Cost To Complete	Total Cost	Target Value of Contract
TACOM-ARDEC/Benet Labs	MIPR	Picatinny Arsenal, NJ	3100	695	2Q			4402	1Q	4495	1Q	10068	22760	22760
Subtotal:			3100	695				4402		4495		10068	22760	22760

Remarks: Not Applicable

III. Test And Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2006 Cost	FY 2006 Award Date	FY 2007 Cost	FY 2007 Award Date	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	Cost To Complete	Total Cost	Target Value of Contract
YPG, ATC	MIPR	Yuma AZ/APG, MD	1430		1Q			1101	1Q	1124	1Q	9226	12881	12881
Army Research Lab	MIPR	Aberdeen PG, MD	1750	30	1Q	59	1Q	821	1Q	848	1Q	2400	5908	5908
Army Research Lab	MIPR	White Sands, NM						250	1Q	250	1Q	750	1250	1250
Redstone Arsenal	MIPR	Huntsville, AL	3400					250	1Q	250	1Q	750	4650	4650
Miscellaneous	MIPR	Multiple	1000	42	1-4Q								1042	1042
Subtotal:			7580	72		59		2422		2472		13126	25731	25731

ARMY RDT&E COST ANALYSIS (R3)

February 2007

BUDGET ACTIVITY
4 - Advanced Component Development and Prototypes

PE NUMBER AND TITLE
0603639A - Tank and Medium Caliber Ammunition

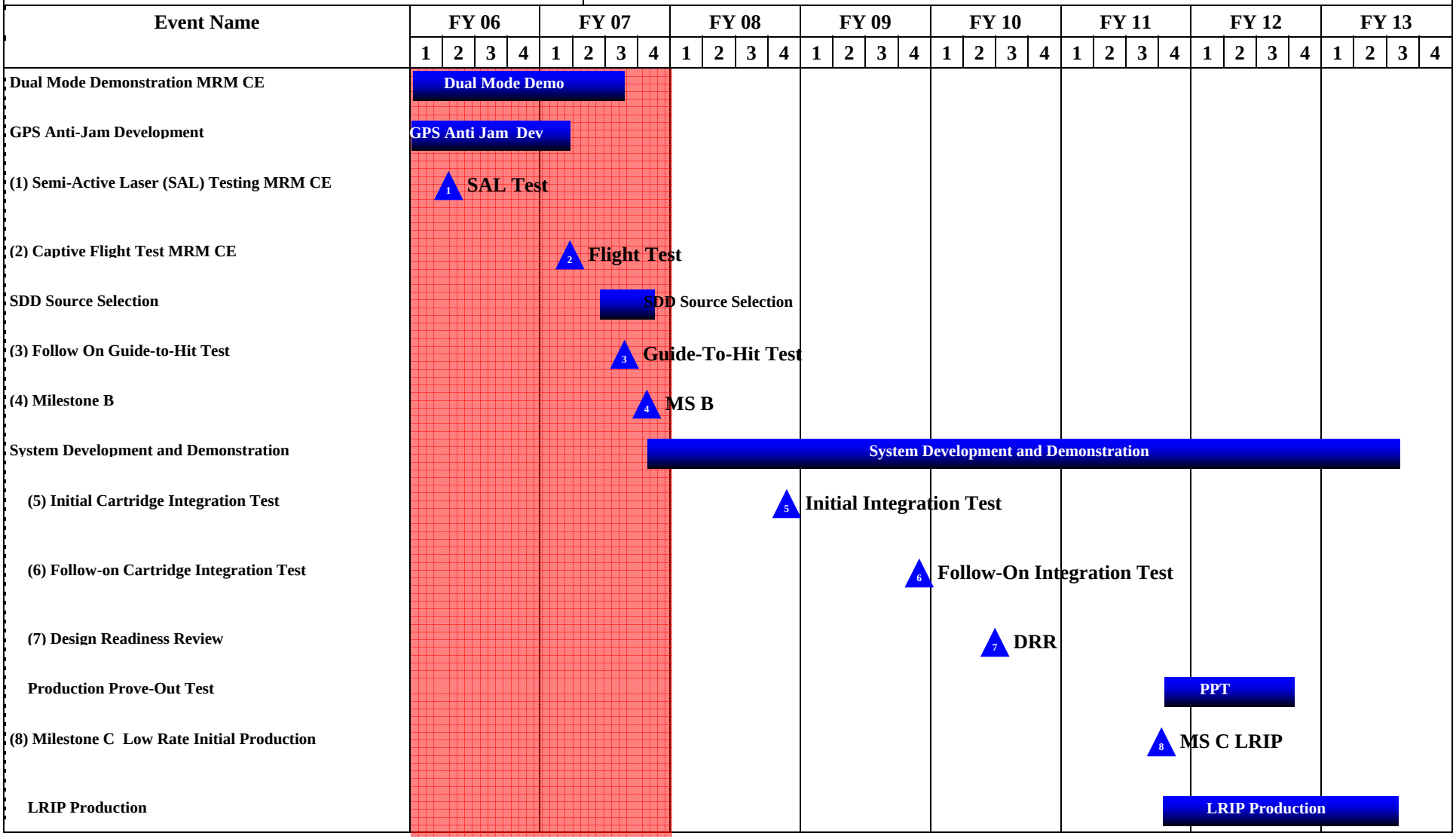
PROJECT
656

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2006 Cost	FY 2006 Award Date	FY 2007 Cost	FY 2007 Award Date	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	Cost To Complete	Total Cost	Target Value of Contract
MISCELLANEOUS	MIPR	Multiple	435	230	1Q	291	3Q						956	956
SBIR/STTR						36							36	36
Subtotal:			435	230		327							992	992
Project Total Cost:			**22432**	**8050**		**1286**		**44578**		**45733**		**197953**	**320032**	**320032**

Schedule Profile (R4 Exhibit)

February 2007

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Advanced Component Development and Prototypes	**0603639A - Tank and Medium Caliber Ammunition**	**656**



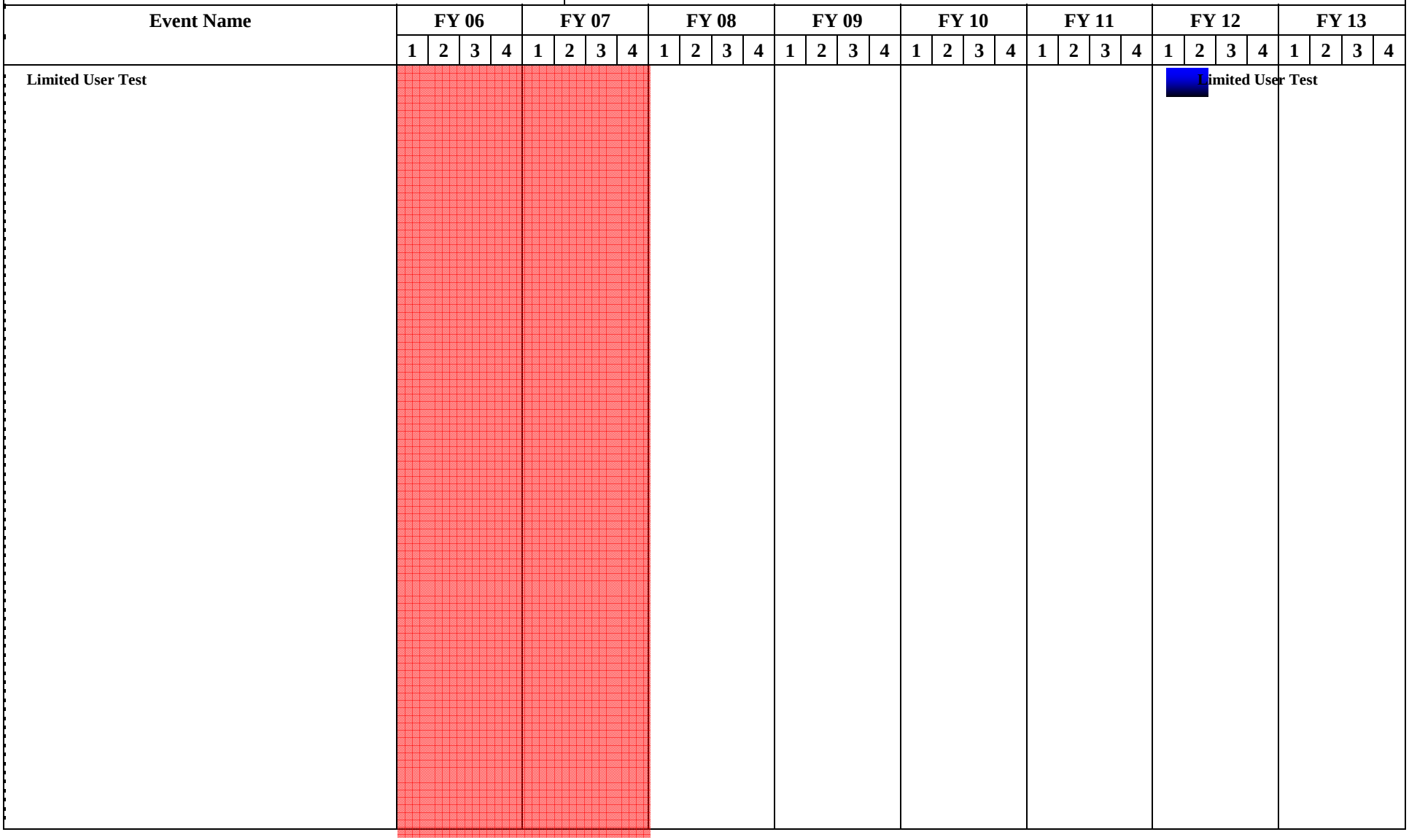
Schedule Profile (R4 Exhibit)

February 2007

BUDGET ACTIVITY
4 - Advanced Component Development and Prototypes

PE NUMBER AND TITLE
0603639A - Tank and Medium Caliber Ammunition

PROJECT
656



Schedule Detail (R4a Exhibit)

February 2007

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Advanced Component Development and Prototypes	**0603639A - Tank and Medium Caliber Ammunition**	**656**

Schedule Detail	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Dual Mode Demonstration MRM CE	1Q - 4Q	1Q - 3Q						
GPS Anti-Jam Development	1Q - 4Q	1Q						
Semi-Active Laser (SAL) Testing MRM CE	2Q							
Captive Flight Test MRM CE		1Q						
SDD Source Selection		2Q - 4Q						
Release Request for Proposal		2Q						
Follow On Guide-to-Hit Test		3Q						
Milestone B		4Q						
System Development and Demonstration		4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 3Q
Initial Cartridge Integration Test			4Q					
Follow-on Cartridge Integration Test				4Q				
Design Readiness Review					2Q			
Production Prove-Out Test						4Q	1Q - 4Q	
Milestone C Low Rate Initial Production						3Q		
LRIP Production						4Q	1Q - 4Q	1Q - 3Q
Limited User Test							1Q - 2Q	