

# ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

**May 2009**

<b>BUDGET ACTIVITY</b> <b>5 - System Development and Demonstration</b>		<b>PE NUMBER AND TITLE</b> <b>0604646A - Non-Line of Sight Launch System</b>			
COST (In Thousands)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	Cost to Complete	Total Cost
F72 NON LINE OF SIGHT LAUNCH SYSTEM	246071	208009	88660	Continuing	Continuing

**A. Mission Description and Budget Item Justification:** This program funds the System Development and Demonstration (SDD) for the Non-Line of Sight Launch System (NLOS-LS), which is a core system of the FCS. In FCS Spin Out 1, NLOS-LS has been called upon to deliver its enabling lethality capabilities to the Early Infantry Brigade Combat Teams (E-IBCTs). Later NLOS-LS will provide these capabilities to the Threshold IBCT (T-IBCT). NLOS-LS consists of the Precision Attack Missile (PAM) and a highly deployable, platform-independent Container Launch Unit (CLU) with self-contained technical fire control, electronics, communications and software for remote, unmanned operations.

This program focuses on the development of a materiel solution to meet the NLOS-LS operational need as delineated in the FCS Operational Requirements Document (ORD). The PAM will be vertically launched directly from the CLU based on fire missions received via the FCS network and will be capable of being updated in-flight via on-board radios by the network. The vertical launch capability permits a system that is highly deployable as well as the ability to engage a wide spectrum of targets in diverse environments and terrain. The PAM will have Automatic Target Acquisition (ATA) capability which can be upgraded in future versions.

NLOS-LS, delivered during the Spin Out timeframe, will equip Current Forces with an AFATDS command based unmanned precision attack missile system. Additional threshold requirements planned for FCS core fieldings include Interoperability with Battle Command, level 5 Interactive Electronic Technical Manual System, In-Flight Target Updates, disenable in flight, 72 hour on-board power, functioning Platform Soldier Mission Readiness System/Logistics Decision Support System.

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**5 - System Development and Demonstration**

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<u><b>B. Program Change Summary</b></u>	FY 2008	FY 2009	FY 2010
Previous President's Budget (FY 2009)	253075	200099	40043
Current BES/President's Budget (FY 2010)	246071	208009	88660
Total Adjustments	-7004	7910	48617
Congressional program reductions		-690	
Congressional rescissions			
Congressional increases		8600	
Reprogrammings	77		
SBIR/STTR Transfer	-7081		
Adjustments to Budget Years			48617

Change Summary Explanation: Increased funding in FY 2010 finances FCS Network integration and support NSA Information Assurance.

# ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

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<b>BUDGET ACTIVITY</b> <b>5 - System Development and Demonstration</b>	<b>PE NUMBER AND TITLE</b> <b>0604646A - Non-Line of Sight Launch System</b>			<b>PROJECT</b> <b>F72</b>	
COST (In Thousands)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	Cost to Complete	Total Cost
F72 NON LINE OF SIGHT LAUNCH SYSTEM	246071	208009	88660	Continuing	Continuing

**A. Mission Description and Budget Item Justification:** Please see Exhibit R-2.

<u>Accomplishments/Planned Program:</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>
FY08 Accomplishments - PAM Systems Engineering & Program Mgt: Continued common component detail design; system detailed design; system and program management support engineering; and radio integration. Performed modeling and threat analyses. Completed PAM pilot line setup. NLOS-LS Certification & Accreditation on PAM build 3 for Authority to Operate (ATO). Supported/maintained Container Launch Unit (CLU) prototypes fielded to AETF; continued CLU detailed system design; radio integration; and current force interoperability based on feedback from AETF. Successfully conducted and completed AETF NLOS-LS NET training at Ft. Bliss, TX. Secured approval for Verification, Validation & Accreditation activities. Supported/maintained system NLOS-LS hardware fielded with the AETF and support logistic validation effort. Completed system Production Readiness Assessment (PRA). Continued developing NLOS-LS Instrumentation Data Acquisition System (NIDAS).	89040		
FY09 Planned Accomplishments - PAM Systems Engineering & Program Mgt: Continue system detailed design and Single Channel Radio System (SCRS) radio integration. NLOS-LS Certification & Accreditation PAM Build 4 for Authority to Operate (ATO).		86075	
FY10 Planned Accomplishments - PAM Systems Engineering & Program Mgt: Continue design efforts to meet threshold requirements such as in-flight target updates and disable in-flight capabilities. Support requirements development and system integration of missile improvements with simulations and operational analysis. Collect PAM data/design NLOS-LS Interactive Electronic Technical Manual System.			20578
FY08 Accomplishments - PAM PROTOTYPE: Built and delivered 55 PAM prototypes for developmental testing.	35983		
FY09 Accomplishments - PAM PROTOTYPE: Build and deliver 23 PAM prototypes for developmental testing.		14049	
FY08 Accomplishments - PAM SOFTWARE: Successfully completed PAM SW Build 2 to support Captive Flight Test 12 and Control Test Vehicle 2. Continued supporting IV1 simulations. Continued software design code testing and integration.	10011		
FY09 Planned Accomplishments - PAM SOFTWARE: Continue software design code testing and integration of incremental Flight SW builds (PAM Build 6 ) to incorporate Radio Version (RV)4 and RV5 radios.		9182	
FY10 Planned Accomplishments - PAM SOFTWARE: Continue PAM software design, code, testing, and integration to support new build for SOSCOE Insertion and FCS BC communication Army SW Block upgrade. Update PAM Interface Software.			12716
FY08 Accomplishments - CLU Systems Engineering & Program Mgt: Conducted Performance Based Logistics evaluations. Supported/maintained Container Launch Unit (CLU) prototypes fielded to AETF; continued CLU detailed system design; radio integration; and current force interoperability based on feedback from AETF. Successfully conducted and completed AETF NLOS-LS NET training at Ft. Bliss, TX. Secured approval for Verification, Validation & Accreditation activities. Supported/maintained system NLOS-LS hardware fielded with the AETF and support logistic validation effort. Completed system Production Readiness Assessment	59113		

# ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

**May 2009**

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
<b>5 - System Development and Demonstration</b>	<b>0604646A - Non-Line of Sight Launch System</b>	<b>F72</b>	
<i>(PRO). Continued developing NLOS-LS Instrumentation DATA Acquisition System (NIDAS).</i>			
FY09 Planned Accomplishments - CLU Systems Engineering & Program Mgt. System engineering analysis of test results. Finalize Training Support Packages/Level III IETM; continue to evaluate UID/IUID marking. Continue developing NLOS-LS Independent Data Acquisition System (NIDAS).		48105	
FY10 Planned Accomplishments - CLU Systems Engineering & Program Mgt: Update Safety Release. CLU integration and software development. Update CLU Interface Specifications for B2F Software. Perform IV&V of updated tech data package. Continue integration of the JTRS SFF-J radio into the CLU.			24167
FY08 Accomplishments - CLU PROTOTYPE: Completed delivery of 7 AETF CLUs and additional 11 CLU prototypes for developmental testing.	9665		
FY09 Planned Accomplishments - CLU PROTOTYPE: Build and deliver 7 CLU prototypes for developmental testing.		3773	
FY08 Accomplishments - CLU SOFTWARE: Continued supporting IV1 simulations. Continued software design testing. Continued CLU/AFATDS/SOSCOE interoperability testing. Continued to investigate use of congressionally funded Enforce-It anti-tamper software	6724		
FY09 Planned Accomplishments - CLU SOFTWARE: NLOS-LS Certification and Accreditation SOSCOE RTE 2.0 for ATO and continue software design testing.		4835	
FY10 Planned Accomplishments - SOFTWARE: NLOS-LS Certification & Accreditation for Block 6+ for ATO for FCS Battle Command upgrades. Continue CLU software design, code, testing, and integration. Continue SOSCOE RE 3.5 integration and testing. Update CLU Interface Software.			10231
FY08, FY09, FY10 Accomplishments - Government Systems Engineering & Prog Mgt: Continued Gov't management of NLOS-LS acquisition program to include: program management, contract management, system and subsystem level engineering analysis, budget planning and execution, cost analysis, milestone documentation preparation, test program management, PAM and CLU products management, production planning, system software management, AETF support, logistics planning, engineering and logistics subject management expert support, and management of NLOS-LS efforts performed by other government agencies.	18517	14415	9098
FY08 Accomplishments - GOVERNMENT TEST: Continued Gov't Developmental Test Program; qualification testing (engines, warheads, ESAD, etc.). Supported Live Fire Activities with lethality analyses. Continued supporting IV1 simulations. Validated Integrated Flight Simulation (IFS) Design. Continued developmental testing; conducted Spin Out preliminary Limited User Testing and technical field test; conducted CLU First Article Testing (FAT); updated NLOS-LS Certification and Accreditation CLU iteration for ATO; continued health hazard assessment and CLU component level qualifications testing. Successfully conducted and completed AETF LOG DEMO. Continued subsystem qualification; continue hardware testing; pursue NLOS-LS Certification and Accreditation of SOSCOE Real Time Edition (RTE) 1.8 for ATO; participated in FCS IMT1 and support JEFX08 (Experiment 2.1); continued CLU/AFATDS/SOSCOE interoperability testing; integrate hardware/software into HWIL facility.	17018		
FY09 Planned Accomplishments - GOVERNMENT TEST: Continue Gov't validation of the IFS in support of Army Technical Evaluation Command (ATEC) accreditation package for the Guided Test Vehicle (GTV). Continue support for developmental test. IFS and HWIL pre-test predictions and post-test analysis to support GTV flight test. Conduct 10 PAM GTV flight tests (3 of the 10 will be in Ft. Greely, AK). Flight Limited User Test (LUT) (6 total PAM GTVs), CFT (WSMR), Electronic Warfare (EW) Test; and Nuclear Test; and Electromagnetic Environmental Effects (E3) Tests. Conduct PAM FAT. Complete AETF evaluations; prepare for Operational Test (OT); update NLOS-LS Certification and Accreditation of CLU iteration 12 software for ATO. Prepare for and conduct Flight LUT and continue		21750	

# ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

**May 2009**

<b>BUDGET ACTIVITY</b> <b>5 - System Development and Demonstration</b>	<b>PE NUMBER AND TITLE</b> <b>0604646A - Non-Line of Sight Launch System</b>	<b>PROJECT</b> <b>F72</b>	
support for Live Fire Test and Evaluation with tests, models, and simulations; model and simulation (IFS and HWIL) support for LUT (pre-test and post-test analysis) and associated evaluations; Electronic Warfare Susceptibility tests; Nuclear Effects testing; complete system qualification; ground LUT; post LUT updates to HW/SW based on tests and prepare for initial Operational Test and Evaluation (IOT&E).			
FY10 Planned Accomplishment - GOVERNMENT TEST: Modeling and simulation support for FCS Integrated Mission Test 2 and Experiment 3 execution. Support SO1 Technical Test and Operational Assessment of hardware in a classified environment using JTRS Radios. JTRS Ground Mobile Radio (GMR) radio integration into control cell. Test updated software. Conduct associated training and provide logistics in support of soldier test events. Conduct flight LUT.			
Small Business Innovative Research/Small Business Technology Transfer Programs		5825	
<b>Total</b>		246071	208009
			88660

<u><b>B. Other Program Funding Summary</b></u>	FY 2008	FY 2009	FY 2010	To Compl	Total Cost
PE 0603639A 656 Mounted Combat System (MCS) Ammunition	43068	40731		Continuing	Continuing
PE 0604647A F58 Non Line of Sight - Cannon	133139	89545	58216	Continuing	Continuing
PE 0604660A FCI Manned Grd Veh & Common Grd Veh Components	635846	782664	368557	Continuing	Continuing
PE 0604661A FC2 FCS System of Systems Engr & Prog Mgmt	1292514	1414756	1067191	Continuing	Continuing
PE 0604662A FCS RECONNAISSANCE (UAV) PLATFORMS	42772	57190	68701	Continuing	Continuing
PE 0604663A FCS UNMANNED GROUND VEHICLES	78826	102976	125616	Continuing	Continuing
PE 0604664A FCS UNATTENDED GROUND SENSORS	22007	17011	26919	Continuing	Continuing
PE 0604665A FCS Network Hardware & Software	724397	556301	749182	Continuing	Continuing
PE 0604666A FCS Spin Out Technology/Capability Integration	84111	111032		Continuing	Continuing
WTCV G86100 FCS CORE PROGRAM	78932	154127		Continuing	Continuing
WTCV G86200 FCS SPIN OUT PROGRAM	1370	67268	327921	Continuing	Continuing
0605625A - Manned Ground Vehicles			100000	Continuing	Continuing

Comment: NLOS-LS system is being developed for both Army and Navy requirements. The NLOS-LS Project Office and PMS 420 are the designated action offices for the respected services.

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BUDGET ACTIVITY

**5 - System Development and Demonstration**

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PROJECT

**F72**

FY10 increased funds is to perform NSA certification test.

Comp Programs:

JTRS-HMS, JTRS-AMF,DCGS-A, FBCB2, OneTESS, OneSAF

**C. Acquisition Strategy** The Army awarded the NLOS-LS SDD contract, on 19 March 2004, to Netfires Limited Liability Company (LLC), consisting of Lockheed Martin Corporation, doing business through its Missiles and Fire control and operating entity in Grand Prairie, TX; and the Raytheon Corporation, doing business through its Missile Systems Business Unit in Tuscon, AZ. The NLOS-LS SDD contract was definitized 20 August 2004. The NLOS-LS was technological mature enough to be included as a desired capability into Current Force Early-Infantry Brigade Combat Teams (E-IBCTs) Spin Out.

# ARMY RDT&E COST ANALYSIS (R3)

May 2009

BUDGET ACTIVITY <b>5 - System Development and Demonstration</b>			PE NUMBER AND TITLE <b>0604646A - Non-Line of Sight Launch System</b>							PROJECT <b>F72</b>		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Design	Various	See remarks	210174	148153	1-4Q	140005	1-4Q				498332	
Prototype	Various	See remarks	46189	45648	1-3Q	17822	1-4Q				109659	
Software	Various	See remarks	26418	16658	1-4Q	14017	1-4Q				57093	
PAM Software	Various	See remarks						12716		21765	48321	
CLU Design	Various	See remarks						24167	2Q	19704	65078	
PAM Prototype	Various	See remarks									2920	
CLU Prototype	Various	See remarks									1900	
PAM Design	Various	See remarks						20578		14546	52804	
CLU Software	Various	See remarks						10231		16860	36051	
Subtotal:			282781	210459		171844		67692		72875	872158	

Remarks: Prime contractors:  
 #1 Lockheed, Dallas, Texas  
 #2 Raytheon, Tuscon, Arizona  
 Sub Contractors:  
 #3 Lockheed, Baltimore, MD  
 #4 ATK, Rocket City, WV  
 #5 Raytheon, Fullerton, CA  
 #6 IGS, Minneapolis, MN  
 #7 IEC, Anaheim, CA  
 #8 KDI, Cincinatti, OH  
 #9 Raytheon, Louisville, KY  
 #10 Sparta, San Diego, CA  
 #11 General Dynamics, Niceville, FL  
 #12 BrenTronics, Commack, NY  
 #13 MOOG, Salt Lake City, UT

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Various	Various	MULTI	2793	2271		2492		2167		1905	11628	

# ARMY RDT&E COST ANALYSIS (R3)

May 2009

BUDGET ACTIVITY <b>5 - System Development and Demonstration</b>				PE NUMBER AND TITLE <b>0604646A - Non-Line of Sight Launch System</b>						PROJECT <b>F72</b>		
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Subtotal:				2793	2271		2492		2167		1905	11628	
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III. Test And Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Various	Various	MULTI	7292	17018		21750		11870		5200	69830	
Subtotal:			7292	17018		21750		11870		5200	69830	

Remarks: Test Sites: WSMR; Eglin Air Force Base; CRTTC, Ft. Greeley, AK; RTTC, Redstone Arsenal, AL; APG, Aberdeen, Maryland; Ft. Bliss, TX

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Various	Various	MULTI	21115	16323		11923		6931		8988	65280	
Subtotal:			21115	16323		11923		6931		8988	65280	

<b>Project Total Cost:</b>			<b>313981</b>	<b>246071</b>		<b>208009</b>		<b>88660</b>		<b>88968</b>	<b>1018896</b>	
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# Schedule Profile (R4 Exhibit)

May 2009

BUDGET ACTIVITY  
**5 - System Development and Demonstration**

PE NUMBER AND TITLE  
**0604646A - Non-Line of Sight Launch System**

PROJECT  
**F72**

Event Name	FY 08				FY 09				FY 10				FY 11				FY 12				FY 13				FY 14				FY 15			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NLOS-LS SDD	NLOS-LS SDD																															
Spin Out (Early) to IBCT (PLUT)	SO Early PLUT																															
Spin Out (Early) to IBCT (LUT)	SO Early LUT																															
(1) Tactical Prototype CLUs to AETF	1 Tactical Prototype CLUs																															
(2) Spin Out Long Lead Items	2 SO LLI																															
(3) Spin Out MS C	3 SO MS C																															
LRIP	LRIP																															
Tech Test	Tech Test																															
Operational Assessment	OA																															
Operational Testing	TFT/FDTE/IOTE																															
(4) Flight OT	4																															
(5) Initial Operational Capability	5																															
NLOS-LS S&T Increment I and Objective Systems	S&T for Increment I and Objective Systems																															

# Schedule Detail (R4a Exhibit)

May 2009

BUDGET ACTIVITY  
**5 - System Development and Demonstration**

PE NUMBER AND TITLE  
**0604646A - Non-Line of Sight Launch System**

PROJECT  
**F72**

<u>Schedule Detail</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014</u>	<u>FY 2015</u>
NLOS-LS SDD	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 3Q				
Spin Out (Early) to IBCT (PLUT)	4Q							
Spin Out (Early) to IBCT (LUT)		4Q						
Tactical Prototype CLUs to AETF	2Q							
Spin Out Long Lead Items		3Q						
Spin Out MS C			1Q					
LRIP			1Q - 4Q	1Q - 2Q				
Tech Test			2Q - 3Q					
Operational Assessment			4Q					
Operational Testing				1Q - 4Q				
Flight OT				4Q				
Initial Operational Capability				4Q				
NLOS-LS S&T Increment I and Objective Systems	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q				

Termination Liability Funding For Major Defense Acquisition Programs, RDT&E Funding (R5)			May 2009
BUDGET ACTIVITY <b>5 - System Development and Demonstration</b>	PE NUMBER AND TITLE <b>0604646A - Non-Line of Sight Launch System</b>	PROJECT <b>F72</b>	
Funding in \$000			
Program	FY 2008	FY 2009	FY 2010
F72 NLOS Launch System	9874	345	12
<b>Total Termination Liability Funding:</b>	9874	345	12
<p><b>Remarks:</b>            The NLOS-LS prime contract incorporates the "Limitation of Funds" clause, FAR 52.232-22, to limit the Government's liability and FAR 52.249-6, Termination (Cost Reimbursement), for contract termination. (Some efforts in the FY 2010 timeframe represent additional scope of work efforts). Once contract negotiations are complete on these additional efforts, the termination liability will be adjusted accordingly.</p>			