

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration		PE NUMBER AND TITLE 0604646A - Non-Line of Sight Launch System					PROJECT F72			
COST (In Thousands)	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	
F72 NON LINE OF SIGHT LAUNCH SYSTEM	313981	253075	200099	40043	5957				813155	

A. Mission Description and Budget Item Justification: This project 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. NLOS-LS provides enabling lethality for the FCS BCT. 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 project 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.

In January 2006, the NLOS-LS Project Office entered into a Memorandum of Agreement with the Navy to pursue NLOS-LS as the Navy's material solution for small boat threat on its Littoral Combat Ships.

<u>Accomplishments/Planned Program:</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
PAM Accomplishments FY 07 - Critical Design Review; Detailed Design; Software Engineering; PAM sub-system intermediate CDR; CFT 11; and air drop test. --FY 07 ACTIVITY-- PAM detailed system design; software engineering; radio integration; Integration and Verification (IV1) simulations; prototype manufacturing; component detailed design; component procurement; and qualification testing (engines, warheads, Electric Safe Arm Device (ESAD), etc.); CFT and wind tunnel tests. PAM IFS; support Live Fire activities with lethality analyses; and PAM Component Testing and Qualification; pilot line setup.	136300		
CLU Completed FY 07 - Critical Design Review; Detailed Design; Radio integration; perform health hazard analysis; Complete CLU pilot line set up; Interim Airdrop Certification; prototype manufacturing; and CLU support to FCS exp 1.1.--FY 07 ACTIVITY-- Planned are CLU detailed system design; software engineering; radio integration; current force interoperability; IV1 emulator; Procure components/build hardware and deliver AETF CLUs; health hazard assessment; CLU component level qualification testing; and subsystem hardware builds; pilot line setup; safety testing; establish PBL; support for the AETF hardware.	104590		
System Accomplishments FY 07 - Developed interface for Current Force integration; Supported/participated in simulation exercises; Hardware in the Loop development; Verification/validation of training support packages; System Engineering and Program Management support; participated in Experiment 1.1 Phase 3; updated Verification & Validation Plan to include countermeasures; FMTV modifications for AETF. --FY 07 ACTIVITY-- Finalize Simulation Support Plan; Planned System of System Common Operating Environment (SOSCOE) integration; develop interfaces for current force integration; support IV1 simulation exercises; common component detailed design; system level engineering and test and evaluation; CLU/Advanced Field Artillery Tactical Data System (AFATDS)/SOSCOE interoperability testing; safety/hazard assessment testing; integration of hardware/software (HW/SW) into HWIL facility; HWIL;	73091		

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verification/validation of training support package (Operator, Instructor & Key Personnel, AFATDS Operator, Staff, and FMTV training); Sys Eng, Prog Mgmt, Test Support, and documentation preparation. Start Type Classification, Basis of Issue Plan (BOIP), QQPRI process and develop and secure approval for Verification, Validation & Accreditation activities; investigating use of Congressionally funded "Enforce-It" anti-tamper software and procuring and integrating AETF control cells.			
FY08 Planned Accomplishments - DESIGN and ENGINEERING: Continue common component detail design; system detailed design; system and program management support engineering; and radio integration. Perform modeling and threat analyses. Complete PAM pilot line setup. Conduct Performance Based Logistics (PBL) evaluations; NLOS-LS Certification & Accreditation on PAM build 3 for Authority to Operate (ATO). Begin component procurement. Support/maintain Container Launch Unit (CLU) prototypes fielded to AETF; continue 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. Secure approval for Verification, Validation & Accreditation activities. Support/maintain system NLOS-LS hardware fielded with the AETF and support logistic validation effort. Complete system Production Readiness Assessment (PRA). Continue developing NLOS-LS Instrumentation Data Acquisition System (NIDAS).		148153	
FY09 Planned Accomplishments - DESIGN and ENGINEERING: Continue system detailed design and radio integration. NLOS-LS Certification & Accreditation PAM Build 4 for ATO. Participate in Spin Out 1 Milestone Review. System engineering analysis of test results. Finalize Training Support Packages/Level III IETM; continue to evaluate UID/TUID marking. Continue developing NIDAS.			134180
FY08 Planned Accomplishments - PROTOTYPE: Completed delivery of 4 AETF CLUs. Build and deliver 3 remaining AETF CLUs and additional 11 CLU prototypes for developmental testing (e.g. transportation, environmental, hazard assessment, electromagnetic environment effects, electronic warfare, nuclear effects, etc). Build and deliver 55 PAM prototypes for developmental testing (e.g. Flight testing, qualification testing, hazardous assessment and insensitive munition testing).		45648	
FY09 Planned Accomplishments - PROTOTYPE: Build and deliver 7 CLU prototypes for developmental testing (e.g. transportation, environmental, hazard assessment, electromagnetic environment effects, electronic warfare, nuclear effects, flight, etc). Build and deliver 23 PAM prototypes for developmental testing (e.g. Flight testing, qualification testing, hazardous assessment and insensitive munition testing).			17822
FY08 Planned Accomplishments-TEST: Continue developmental test program; qualification testing (engines, warheads, ESAD, etc.). Support Live Fire Activities with lethality analyses. Continue supporting IV1 simulations. Validate Integrated Flight Simulation (IFS) Design. Continue developmental testing; conduct Limited User Testing and technical field test; conduct CLU First Article Testing (FAT); update NLOS-LS Certification and Accreditation CLU iteration for ATO; continue health hazard assessment and CLU component level qualifications testing. Successfully conducted and completed AETF LOG DEMO. Complete subsystem qualification; continue hardware testing; pursue NLOS-LS Certification and Accreditation of SOSCOE Real Time Edition (RTE) 1.8 for ATO; participate in FCS IMT1 and support JEFX08 (Experiment 2.1); continue CLU/AFATDS/SOSCOE interoperability testing; integrate hardware/software into HWIL facility.		17018	
FY09 Planned Accomplishments-TEST: Continue 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 Flight LUT and continue support for Live Fire Test			21750

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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).			
FY08 Planned Accomplishments - SOFTWARE: Continue supporting IV1 simulations. Continue software design testing. Continue CLU/AFATDS/SOSCOE interoperability testing. Continue to investigate use of congressionally funded Enforce-It anti-tamper software.		16658	
FY09 Planned Accomplishments - SOFTWARE: NLOS-LS Certification and Accreditation SOSCOE RTE 2.0 for ATO and continue software design testing.			14017
FY08 Planned Accomplishments - PROGRAM MANAGEMENT: Continued 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	
FY09 Planned Accomplishments - PROGRAM MANAGEMENT: Continued 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			12330
Small Business Innovative Research/Small Business Technology Transfer Programs		7081	
Total		313981	253075
			200099

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BUDGET ACTIVITY 5 - System Development and Demonstration	PE NUMBER AND TITLE 0604646A - Non-Line of Sight Launch System			PROJECT F72
<u>B. Program Change Summary</u>	FY 2007	FY 2008	FY 2009	
Previous President's Budget (FY 2008/2009)	320650	253410	199064	
Current BES/President's Budget (FY 2009)	313981	253075	200099	
Total Adjustments	-6669	-335	1035	
Congressional program reductions				
Congressional rescissions		-1619		
Congressional increases		1284		
Reprogrammings	2355			
SBIR/STTR Transfer	-9024			
Adjustments to Budget Years			1035	

<u>C. Other Program Funding Summary</u>	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Compl	Total Cost
PE 0603581N NAVY	14012	9959	24400	15200	56300	29100	25400	Continuing	Continuing
PE 0603313 A263 MSL & ROCKET ADV TECH	14277	11900	5900					Continuing	Continuing
0604650 FCS MANNED GRD VEHICLES & COMMON GRD VEHICLE		592254	774257	785575	358641	214207	103230		2828164
0604651 FCS SYSTEM OF SYSTEMS ENGR & PROGRAM MGMT		1497321	1413945	1874987	1916207	1290308	1027816		9020584
0604662 FCS RECONNAISSANCE (UAV) PLATFORMS		43388	34379	14296	9235	4556	1336		107190
0604653 FCS UNMANNED GROUND VEHICLES		90091	96918	64744	43601	26855	3580		325789
0604654 FCS UNATTENDED GROUND SENSORS		10929	12967	18968	16754				59618
0604665 FCS Network Hardware & Software		647649	539145	334085	365287	290790	169526		2346482
0604647 NON LINE OF SIGHT - CANNON	108689	136929	89841	71396	43222	28775			478852
0604666A FCS Spin Out Technology/Capability Integration	27900	64385	64900	67021	51026	56287	14637		346156
0603639A FCS MRM	1259	44294	45866	71451	56296	106353	50757		376276
0604715A STRICOM/NAWCTSD SUPPORT		378	388	398	406	415	426		2411
WTCV G86100 FCS CORE PROGRAM		80932	154583	148028	677820	2175327	5744649		8981339

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WTCV G86200 FCS SPIN OUT PROGRAM		19987	176667	367962	550821	766274	944999		2826710
AMMO E88103					24634	47624	61762		134020
0604645 F52 UAV RECON PLATFORM & SENSORS	41813								41813
0604645 F53 UNMANNED GROUND VEHICLES (UGV)	104301								104301
0604645 F54 UNATTENDED SENSORS	10391								10391
0604645 F55 SUSTAINMENT	104302								104302
0604645 F57 MANNED GROUND VEHICLES	516217								516217
0604645 F61 SoS Engineering and Program Management	2150508								2150508

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.

D. 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. A series of Spin Out packages began in FY2008 to insert NLOS-LS capability into Current Force Modular Brigade Combat Teams (M-BCTs).

ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT		
5 - System Development and Demonstration			0604646A - Non-Line of Sight Launch System							F72		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	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
Design	Various	See remarks		210174	1-3Q	155234	1-4Q	134180	1-4Q	17079	516667	
Prototype	Various	See remarks		46189	1-3Q	45648	1-4Q	17822	1-4Q		109659	
Software	Various	See remarks		26418	1-3Q	16658	1-4Q	14017	1-4Q	3600	60693	
Subtotal:				282781		217540		166019		20679	687019	
Remarks: Activity and Location: Prime contractors: Lockheed, Dallas, Texas; Raytheon, Tuscon, Arizona; Sub Contractors: Lockheed, Baltimore, MD; ATK, Rocket City, WV; Raytheon, Fullerton, CA; IGS, Minneapolis, MN; IEC, Anaheim, CA; KDI, Cincinatti, OH; Raytheon, Louisville, KY; Sparta, San Diego, CA; General Dynamics, Niceville, FL; BrenTronics, Commack, NY; MOOG, Salt Lake City, UT												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	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
Various	Various	MULTI		2793		2271		2492		1265	8821	
Subtotal:				2793		2271		2492		1265	8821	
III. Test And Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	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
Various	Various	MULTI		7292		17018		21750		17740	63800	
Subtotal:				7292		17018		21750		17740	63800	
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	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
Various	Various	MULTI		21115		16246		9838		6316	53515	
Subtotal:				21115		16246		9838		6316	53515	

ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY

5 - System Development and Demonstration

PE NUMBER AND TITLE

0604646A - Non-Line of Sight Launch System

PROJECT

F72

Project Total Cost:

313981

253075

200099

46000

813155

Schedule Profile (R4 Exhibit)

February 2008

BUDGET ACTIVITY
5 - System Development and Demonstration

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

PROJECT
F72

Event Name	FY 07				FY 08				FY 09				FY 10				FY 11				FY 12				FY 13			
	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																											
(1) Critical Design Review	▲																											
Spin Out 1 Assessment																												
Tactical Prototype CLUs to AETF	▲				▲																							
(2) SO 1 LLI																									▲			
(3) SO 1 MS C	▲								▲																			
LRIP Award																									LRIP			
Operational Testing	▲																OT											
(4) Initial Operational Capability																									▲			
(5) Full-Rate Decision	▲																				▲							
NLOS-LS S&T Increment I and Objective Systems																									▲			
	S&T for Increment I and Objective Systems																											

Schedule Detail (R4a Exhibit)

February 2008

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 2007</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>
NLOS-LS SDD	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 3Q		
Critical Design Review	1Q						
Spin Out 1 Assessment		4Q	1Q				
Tactical Prototype CLUs to AETF		2Q					
SO 1 LLI		2Q					
SO 1 MS C			2Q				
LRIP Award			3Q - 4Q	1Q - 4Q			
Operational Testing					1Q - 2Q		
Initial Operational Capability					4Q		
Full-Rate Decision					4Q		
NLOS-LS S&T Increment I and Objective Systems	1Q - 4Q						