

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration		PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev							
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
Total Program Element (PE) Cost	40325	47317	44508	37892	36692	33969	34481	Continuing	Continuing
L67 SOLDIER NIGHT VISION DEVICES	19246	16199	27313	25167	24572	25030	19874	Continuing	Continuing
L70 NIGHT VISION DEV ED	16577	12354	8983	12725	12120	8939	14607	Continuing	Continuing
L76 Dismounted Fire Support Laser Targeting Systems	4502	18764	8212						31478

A. Mission Description and Budget Item Justification: This program element provides night vision/reconnaissance, surveillance and target acquisition technologies required for U. S. defense forces to engage enemy forces twenty-four hours a day under conditions of degraded visibility due to darkness, adverse weather, battlefield obscurants, foliage and man-made structures. These developments and improvements to high performance night vision electro-optics, radar, laser, and thermal systems and integration of related multi-sensor suites will enable near to long range target acquisition, identification and engagement to include significant fratricide reduction, which will improve battlefield command and control in "around-the-clock" combat operations. Project L67 focuses on night vision electro-optical, laser, and other target identification and location equipment for a variety of Future Combat System of Systems (FCS) Units of Action/Employment and Future Force soldiers. This project includes the enhanced night vision goggle, modular HTI multi-function laser activities, and thermal upgrades to include an uncooled medium thermal weapon sight. Project L70 focuses on night vision, reconnaissance, surveillance and target acquisition (RSTA) sensors and suites of sensors to provide well-defined surveillance and targeting capabilities for a variety of Current, Modular, Future Combat System of Systems (FCS) and Future Force platforms. This project includes night vision sensor acquisition support of FCS core systems, Risk Reduction Demonstration (RRD) of standard uncooled thermal sensor packages, Sense Through The Wall programs, Unattended Ground Sensor systems, common sensor message set management for FCS and other applications, upgrades to existing ground surveillance radars, provides Persistent Surveillance and Dissemination System-of-Systems (PSDS2) enhancements and capability improvements, transitions the 3rd Generation Forward Looking Infrared from an Advanced Technology Objective (ATO), and develops the Driver's Vision Device (DVD). Project DL76 focuses on the engineering development of technologies for insertion into Laser Target Locators and Laser Designators to improve overall performance of those systems and reduce weight. Technologies developed under this project will benefit the Lightweight Laser Designator Rangefinder (LLDR, AN/PED-1), the Mark VII-E Laser Target Locator, and future programs based on emerging Army requirements. Advanced, cooled, InSb, infrared imaging focal plane arrays are now available in 1000 x 1000 pixel (mega-pixel) resolution which, when applied to LLDR, will provide much greater range performance in a package of similar size. With an associated optical redesign, greater LLDR imaging performance can be achieved with an overall reduction in weight. This project will also integrate the next generation uncooled, 17 micron pixel-pitch FLIRs being developed for the Thermal Weapon Sight program into the Mark VII-E, improving its imaging performance with no impact on its weight. New laser designator technology has been developed which will reduce laser designator weight by close to 50% and cut battery usage by a factor of 10. Further reductions can be gained by reducing laser designator output energy levels below currently accepted standards, which initial modeling and testing indicate will not compromise performance of laser guided munitions. A primary focus of this project will be to perform sufficient live-fire and captive-carry range tests over a wide variety of environmental conditions with all current and future laser guided munitions to build the necessary confidence that reduced designator energy levels will not adversely impact the mission. In addition, this line will support improved accuracy (reduced target location error) in support of coordinate seeking weapons, such as JDAM and Excalibur.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2008

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604710A - Night Vision Systems - Eng Dev

<u>B. Program Change Summary</u>	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2008/2009)	41161	44619	28795
Current BES/President's Budget (FY 2009)	40325	47317	44508
Total Adjustments	-836	2698	15713
Congressional Program Reductions		-302	
Congressional Rescissions			
Congressional Increases		3000	
Reprogrammings	302		
SBIR/STTR Transfer	-1138		
Adjustments to Budget Years			15713

Change Summary Explanation: Funding - FY 2009: increase in Project L67 focuses on the integration of related multi-sensors suites to enable immediate improvements in near to long-range target acquisition and engagement as well as improved battlefield command and control in "around-the-clock" combat operations.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration	PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev						PROJECT L67		
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
L67 SOLDIER NIGHT VISION DEVICES	19246	16199	27313	25167	24572	25030	19874	Continuing	Continuing

A. Mission Description and Budget Item Justification: This project develops, improves and miniaturizes high performance night vision electro-optics, thermal and laser systems. It also provides for systems integration of related multi-sensor suites to enable near to long-range target acquisition and engagement as well as improved battlefield command and control in around-the-clock combat operations. It focuses on technology that can bring improvements to the dismounted Soldiers' equipment. This project develops or enhances equipment that provides the individual Soldier day/night situational awareness and individual targeting capability, sniper fire detection and location capability, and integrates improved target location and self-location capability to eliminate friendly fire incidents. Enhanced Night Vision Goggle (Digital) ENVG(D) will be a head/helmet mounted night vision system for the individual Soldier. The system will use both image intensifier and uncooled thermal technology to provide a multi-spectral image to the Soldier. Other efforts include a Soldier-borne gunfire detection system and the development of Sense Through The Wall (STTW) technology giving Soldiers the ability to detect threats through walls during Military Operations on Urban Terrain (MOUT), developing a Future Weapon Sight (FWS) with fused electro-optical performance, and developing focal plane technology increasing product resolution and range.

<u>Accomplishments/Planned Program:</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
Continue development of next generation Enhanced Night Vision Goggles (Digital) ENVG(D). The Digital ENVG will provide Soldiers the ability to use both image intensifier and uncooled thermal technologies during day, night, and obscured battlefield conditions.	5985	4600	5813
Develop lightweight multi-purpose laser.		3000	2000
Continue development of Sense Through The Wall (STTW), which provides dismounted Soldiers with the capability to detect and locate threats through walls during Military Operations on Urban Terrain (MOUT).	2621	2395	3500
Initiate the development of the Future Weapon Sight (FWS), which is a passive fused electro-optical sight.		958	5500
Continue the development, testing and evaluation of 17 Micron technology, Focal Plane Arrays (FPA), with improved sensitivity, clarity and range.	5551	3834	4500
Completed the development of high accuracy Azimuth Vertical Angle Measurement (AVAM) devices for handheld, man-portable target location devices. This effort will transition to DL76.	2627		
Continue the development of sniper fire detection and location systems, using portable sensors on Soldiers to locate gunfire.	1676	958	4000
Develop laser defense capability for laser detection/laser warning system with the ability to "see" lasers in order to disrupt, deny, and intercept enemy laser weapons.			2000
Completed the development of DARPA's MANTIS program developing a helmet-borne vision system and hand-held targeting system for the individual Soldier that combine imagery from multiple sensors using image fusion.	786		
Small Business Innovative Research/Small Business Technology Transfer Programs.		454	
Total	19246	16199	27313

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604710A - Night Vision Systems - Eng Dev

PROJECT
L67

<u>B. Other Program Funding Summary</u>	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Compl	Total Cost
Helmet Mounted Enhanced Vision Devices (K36400) OPA2	280550	214957	418087	449928	320852	177862	107903	Continuing	Continuing
Thermal Weapon Sight (TWS) (K22900) OPA2	311956	316941	416866	364420	402621	346973	69411	Continuing	Continuing
Sniper Night Sight (K41500)	24884	22194	11729	15107	13743	15625	7421	Continuing	Continuing
Multi-Function Aiming Light (MFAL) (K35000)	46234	44661	25961	28223	22870	23018	6941	Continuing	Continuing
Sense Throught The Wall (STTW) (KA2300)				27390	26610	67597	12891	Continuing	Continuing

Comment:

C. Acquisition Strategy The various developmental programs in this project will continue to exercise competitively awarded contracts using best value source selection procedures.

ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration			PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev							PROJECT L67		
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
Enhanced Night Vision Goggles (Digital) ENVG(D)	MIPR		12562	1471	1-2Q	4150	1-2Q			Cont.	18183	
Enhanced Night Vision Goggles (Digital) ENVG (D)	C/FP	Various						5813	1-2Q	Cont.	Cont.	
Enhanced Night Vision Goggles (Digital) ENVG(D)	C/FP	EOIR, Fredericksburg, VA		269	2Q						269	
Enhanced Night Vision Goggles (Digital) ENVG(D)	C/FP	BAE Systems, Lexington, MA		2761	2Q						2761	
Enhanced Night Vision Goggles (Digital) ENVG(D)	C/FP	CACI Technologies, Chantilly, VA		333	2Q						333	
Multi-purpose Laser	MIPR	TBD				3000	2Q	2000	1-2Q	Cont.	Cont.	
Focal Plane Arrays (FPA)	MIPR	DOI - Ft Huachuca, AZ	6746	5551	1Q	4002	1-2Q	4500	1-2Q	Cont.	Cont.	
Sense Through The Wall (STTW)	MIPR	CERDEC - Fort Monmouth, NJ	103	2238	1Q	1880	1-2Q	1221	1Q	Cont.	Cont.	
Sense Through The Wall (STTW)		CACI Technologies		383	1Q						383	
Future Weapon Sight (FWS)	MIPR	TBD				250	2Q			Cont.	250	
Future Weapon Sight (FWS)	C/FP	TBD						5500	1-2Q	Cont.	Cont.	
Azimuth Vertical Angle Measurement (AVAM)	MIPR	NAVSEA, Washington Navy Yard, DC	412	280	1Q						280	
Azimuth Vertical Angle Measurement (AVAM)	C/FP	EOIR, Fredericksburg, VA		1457	2Q						1457	
Azimuth Vertical Angle Measurement (AVAM)	C/FP	Litton Systems, Orlando, FL		890	2Q						890	
Sniper Fire Detection and Location Technology Development	MIPR	ARDEC, Picatinny Arsenal, NJ	2950	1676	2Q	280	1Q	3000	1-2Q	Cont.	Cont.	
MANTIS Development Activities	MIPR	DOI, Ft. Huachuca, AZ		786	1Q						786	
Laser Detection/Combat Identification (CID)/Laser Warning Device	MIPR	TBD						2000	1-2Q		2000	

ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT			
5 - System Development and Demonstration				0604710A - Night Vision Systems - Eng Dev						L67			
Subtotal:				22773	18095		13562		24034		Cont.	Cont.	
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	
Matrix Support	MIPR	NVESD, Ft Belvoir, VA	435	113	1Q	120	1Q	120	1Q	Cont.	Cont.		
Subtotal:			435	113		120		120		Cont.	Cont.		
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	
Government Test Support Activity	MIPR	Various	8175	1038	1-2Q	2517	1-2Q	3159	1-2Q	Cont.	Cont.		
Subtotal:			8175	1038		2517		3159		Cont.	Cont.		
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	
Subtotal:													
Project Total Cost:			31383	19246		16199		27313		Cont.	Cont.		

Schedule Profile (R4 Exhibit)

February 2008

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604710A - Night Vision Systems - Eng Dev

PROJECT
L67

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
Enhanced Night Vision Goggles (Digital) ENVG(D)	Hardware Evaluation																											
ENVG (D) - Incremental Development																												
(1) ENVG (D) - MS C																												
ENVG (D) - LRIP																												
ENVG (D) - P3I																												
Multi-Functional Aiming Light - P3I																												
Sense Through The Wall (STTW) - Analysis of Alternatives (AoA)																												
(2) STTW - MS B																												
STTW - SDD																												
(3) STTW - MS C																												
STTW - P3I																												
(4) Future Weapon Sight (FWS) - MS B																												
Future Weapon Sight (FWS) - SDD																												
(5) Future Weapon Sight (FWS) - MS C																												

Focal Plane Array (FPA) 17micro Development **Evaluation and Development & Decrease Pitch**

Schedule Profile (R4 Exhibit)

February 2008

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604710A - Night Vision Systems - Eng Dev

PROJECT
L67

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				
AVAM - System Development & Technology Insertion (SD&TI)	SD&TI																															
Gun/Sniper Fire Detection System (GFDS) - ATO	ATO																															
(6) GFDS - MS B																																
GFDS - SDD / P3I																	SDD / P3I															
(7) GFDS - MS C																					7											
Laser Warning Devices Development																									System Development and Demonstration							
Enhance AIM Development																													System Development and Demonstration			
High Resolution Micro Display																													System Development and Demonstration			

Schedule Detail (R4a Exhibit)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration		PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev					PROJECT L67	
<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>	
Enhanced Night Vision Goggles (Digital) ENVG(D)	1Q - 4Q	1Q - 4Q						
ENVG (D) - Incremental Development			2Q - 4Q	1Q - 4Q				
ENVG (D) - MS C				2Q				
ENVG (D) - LRIP				3Q - 4Q	1Q - 4Q			
ENVG (D) - P3I					1Q - 4Q	1Q - 4Q	1Q - 4Q	
Multi-Functional Aiming Light - P3I		2Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	
Sense Through The Wall (STTW) - Analysis of Alternatives (AoA)	1Q - 4Q							
STTW - MS B		4Q						
STTW - SDD		3Q - 4Q	1Q - 4Q	1Q - 3Q				
STTW - MS C				1Q				
STTW - P3I					1Q - 4Q	1Q - 4Q	1Q - 4Q	
Future Weapon Sight (FWS) - MS B			1Q					
Future Weapon Sight (FWS) - SDD			2Q - 4Q	1Q - 4Q				
Future Weapon Sight (FWS) - MS C				2Q				
Focal Plane Array (FPA) 17micro Development	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	
AVAM - System Development & Technology Insertion (SD&TI)	1Q - 4Q							
Gun/Sniper Fire Detection System (GFDS) - ATO	2Q - 4Q							
GFDS - MS B				1Q				
GFDS - SDD / P3I				1Q - 4Q	1Q - 4Q	1Q - 2Q		
GFDS - MS C					1Q			
Laser Warning Devices Development			1Q - 4Q					
Enhance AIM Development					1Q - 4Q	1Q - 4Q	1Q - 4Q	

High Resolution Micro Display					1Q - 4Q	1Q - 4Q	1Q - 4Q

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration		PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev						PROJECT L70	
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
L70 NIGHT VISION DEV ED	16577	12354	8983	12725	12120	8939	14607	Continuing	Continuing

A. Mission Description and Budget Item Justification: This project performs System Development and Demonstration (SDD) on high performance night vision, Reconnaissance, Surveillance, and Target Acquisition (RSTA) systems and other related systems that allow forces to locate and track enemy units in day, night, and all battlefield conditions, and through natural and man-made structures and obscurants. It also develops and integrates suites of these sensors to provide well-defined surveillance and targeting capabilities, as well as architectures for these sensors to communicate automatically. The focus is on meeting the requisite night vision and RSTA capabilities required for evolving Current Force, Modular Force, and Future Force systems. Efforts will continue to refine a standard architecture among sensors with the Sensor Link Protocol (evolving to a joint message set called Sensor Data Link) to allow these sensors to communicate in a plug and play manner for improved force level sensor data fusion, aided target recognition and target hand-off.

This project will also demonstrate the producibility of interchangeable uncooled thermal focal plane arrays, and develop an uncooled infrared imaging B-Kit sensor family that will result in standardized sensor modules for a variety of applications. By eliminating the requirement for cryogenic coolers, uncooled thermal imagers are inherently smaller, lighter, more reliable, use less power, and are less expensive. Uncooled B-Kits can be used for a variety of Current Force, Modular Force, Future Combat System (FCS), and Future Force systems such as weapon sights, driver's viewers/situational awareness aids, missile seeker sensors, unattended ground sensors/security sensors, and unmanned ground and aerial vehicle payloads.

This project transitions 3rd Gen Forward Looking Infrared (3rd Gen FLIR) technology from the 3rd Gen Infrared Advanced Technology Objective (ATO) to the development of a 3rd Gen FLIR Engine for use in Current Force and Future Force systems. 3rd Gen FLIR provides Mid Wave Infrared and Long Wave Infrared digitized corrected video. 3rd Gen FLIR technology enhances the war-fighters' survivability and lethality through increased ID range performance when used in current sensor packages, while enabling detection of difficult and obscured targets as well as faster threat detection through automated processes. 3rd Gen FLIR technology can also be used to enhance mobility by maintaining current range performance in significantly smaller and lighter sensor packages.

This project continues Unattended Ground Sensors (UGS) hardware development, demonstration and test for a family of UGS systems for Intelligence, Surveillance and Reconnaissance (ISR). This will provide FCS and the Army a remotely employable Unattended Ground Sensor capability for ISR and physical security.

This project further developed the Persistent Surveillance and Dissemination System-of-Systems (PSDS2), a system-of-systems which linked numerous sensors (currently in theater) together, providing theater commanders with a single coordinated picture of the battlefield and the capability to quickly disseminate this "actionable information" to responders.

This project develops, integrates, and tests an upgrade to the long Range Advanced Scout Surveillance System (LRAS3) system, making it capable of digitizing, compressing and transmitting target information and imagery across the battlefield Network using Standard Army Radios. This enables the Current Force and Modular Force with the ability to cross-cue sensors that are linked to the network as well as share/exploit imagery and data from networked sensors on the battlefield.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - System Development and Demonstration

0604710A - Night Vision Systems - Eng Dev

L70

This project develops the Driver's Vision Device (DVD) - leveraging Commercial Off-The-Shelf (COTS) available hardware to demonstrate and qualify a "Low Cost, lower Performance" configuration of the Driver's Vision Enhancer (DVE).

FY 2009 funding supports continuation of efforts for: Third Generation FLIR, Unattended Ground Sensor and Unmanned Air Vehicle (UAV) Electro-Optical/Infrared/Laser Designator (EO/IR/LD) Payloads developments; spirals in RSTA technologies from FCS into the Current Force; and continues evolution of Sensor Link Protocol.

Accomplishments/Planned Program:

	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
Continue Sensor Link Protocol (SLP) as part of the DoD Joint Variable Message Format (JVMF) standard while maintaining configuration management and modifying application software tools. Sensor Link Protocol (SLP)/Sensor Architecture - A uniform and standard means of describing and coordinating the collection, preprocessing, communication, and fusion of RSTA functions for the Future Force and FCS. FY07 validated SDL functionality and implemented SDL on Rapid Aerostat Initial Deployment (RAID) in theater. FY08 will extend SDL to other sensors. FY09 will formalize SDL for networks.	513	767	729
Uncooled B-Kit (UBK)- Completed the Risk Reduction Demonstration (RRD) for B-Kit development on the first UBK configuration. FY07 accepted delivery of 27 prototype units to complete the RRD phase and qualify the UBK standards. Completed additional image processing algorithms for extended range (XR) capability as replacement option for 1st Generation FLIR for ground combat vehicles.	2003		
Unattended Ground Sensors (UGS) - Develop ISR, Chemical, Biological, Radiological, Nuclear (CBRN) and Urban UGS for FCS and other Army customers. Funds continue spiral integration efforts to include sensor systems remote employment capabilities. Demonstrate viability and technical feasibility of remotely employing a networked Unattended Ground Sensors (UGS) system from a UAV delivery platform. Supported successful Preliminary Design Review (PDR). Current focus is in support of the FCS Spin-Out 1. For FY07, supported successful program Critical Design Review (CDR), demonstrated and evaluated the deployment of FCS T-UGS from a Class IV UAV surrogate. FY08 will continue support for FCS UGS SDD effort with the execution of system qualification tests, system delivery and conduct of FCS Spin-Out One Limited User Test (LUT). FY09 continues development for Spin Out 1 for testing to verify JTRS network performance.	738	856	910
Third Generation FLIR (3rd Gen FLIR) - System Development and Demonstration (SDD) of 3rd Gen FLIR Engines. FY07 prepared for a MS B for 2Q FY08 to start SDD in FY08. FY08 and FY09 will initiate and continue (respectively) the development and qualification of a 3rd Gen FLIR Engine to meet current requirements for the Next Gen FLIR (AN/ZSQ-2/Q-3) aviation systems and for emerging requirements to include Stryker Mast Mounted Sensor, Future Combat Systems Medium and Long Range Sensors, the Common Sensor for the Armed Reconnaissance Helicopter (ARH), the Long Range Advanced Scout Surveillance System (LRAS3) and LRAS3 Next Generation.	2031	6010	6794
Development of payloads for the Army's UAV in accordance with TRADOC priorities and in support of FCS. This effort provides an EO/IR payload with an integrated laser designator for use in FCS Class III and IV UAVs. This effort is a joint program with PM Close Combat Support (CCS), expanding the capability of the Airborne Surveillance Target Acquisition and Minefield Detection System (ASTAMIDS) by adding the designator. Successfully completed PDR in FY06. In FY07, key components were built, including laser designators; FLIR sensors; multi-spectral imagers; and sensor control group. System build, initial flight testing and delivery of two full-up, integrated turret prototypes planned for FY08, and contractor technical test. In FY09 will take delivery of 5 additional prototypes, conduct Government Development Test.	1746	1150	550

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration	PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev		PROJECT L70
Persistent Surveillance and Dissemination System-of-Systems (PSDS2) is operational in OIF. Efforts entailed integrating improvements: developed interoperability with DCGS and CRAM programs; improved architecture; improved dissemination of video and imagery; acquired Central Technical Support Facility (CTSF) validation; made multiple types of UAV data available to the warfighter; ensured Army Battlefield Command System (ABCS) 6.4 compliance; and, integrated Rapid Aerostat Initial Deployment (RAID) system high definition cameras. In FY07 modified and added Terasite software to PSDS2 capability for better geo-registration and enhanced terrain data display, and continues commonality with joint service efforts.	421		
LRAS3 Netted Sensor - Development, integration, and testing of hardware and software that supports digital compression, transmission and display of imagery and data to/from the battlefield network. This provides the Current Force and Modular Force with the ability to cross-cue sensors that are linked to the network as well as share/exploit imagery and data from networked sensors on the battlefield. FY07/08 completes development and implementation of hardware and software for 8 units as P3I to LRAS3. Current plan implements in production in FY08.	8670	3225	
Driver's Vision Device (DVD) - The effort leverages Commercial Off-The-Shelf (COTS) available hardware to demonstrate a "Low Cost, lower Performance" configuration of the Driver's Vision Enhancer (DVE). FY07 effort completed the specification for DVD to feed Pre-Product Improvement (P3I) for DVE. Completed a Market Survey and took delivery of 6 prototypes for environmental stress and demonstrations.	455		
Small Business Innovative Research / Small Business Technology Transfer Program		346	
Total	16577	12354	8983

<u>B. Other Program Funding Summary</u>	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Compl	Total Cost
Night Vision Advanced Development PE 0603774A	5168	3432	2588	5644	5767	5959	6062	Continuing	Continuing
Night Vision DVE K31300 OPA2	67284	21993							89277
K38300 Long Range Advanced Scout Surveillance System (LRAS3) OPA2	187558	158411	210766	178255	188047	64923			987960
Future Combat System, G86100 WTCV		80932	154583	148028	677820				1061363
Advanced TUAV Payloads B00302 OPA2	27265	42135	141988	162602	149436	123076	116698	Continuing	Continuing
Next Gen FLIR for Army Special Operations Aviation Fleet - (AN/ZSQ-2/3): RDTE				9138	3818				12956
Next Gen FLIR for Army Special Operations Aviation Fleet - (AN/ZSQ-2/3): PROC						26371	22378	Continuing	Continuing

Comment:

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

BUDGET ACTIVITY

5 - System Development and Demonstration

PE NUMBER AND TITLE

0604710A - Night Vision Systems - Eng Dev

PROJECT

L70

C. Acquisition Strategy The development programs in this project are currently based on competitive awards and under cost reimbursement type contracts.

ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration			PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev								PROJECT L70	
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
DVE Development	C/CPIF	Various	21831								21831	
Modular HTI Multifunction Laser Activities	C/CP	Insight Technologies, Londonderry, NH & DRS Technologies, Torrence, CA	3868								3868	
LLDR RAPT	C/CP	Various	4253								4253	
Light Forward Observer Optics	C/CP	Various	1258								1258	
Thermal Upgrades for DVE (Dual wavelength) and competition	C/CP	Kaiser Electric San Diego, CA, Various	3608								3608	
LLDR Advanced Demonstration System	C/CP	Litton Laser, Apopka, FL	2556								2556	
Sensor Architecture/Digital RSTA/SLP	C/CPIF & C/CP	Various	11622	340	2Q	340	1-2Q	286	1-2Q	Cont.	Cont.	
Various Prototypes and Studies	C/CPIF	Various	2947								2947	
Thermal Upgrades for TWS (target location)	C/CP	Raytheon, El Segundo, CA, Various	5811								5811	
HTI Laser Trade Studies	C/CP	Various	1020								1020	
Enhanced NVG Analysis & Design (TX to DL67)	C/CP	Various	4782								4782	
HTI Laser MFS3 design and prototype activities	C/CPIF	Raytheon, Dallas, TX	565								565	
MANTECH Focal Plane Array and optics	C/CP	Raytheon, Dallas, TX	1500								1500	
Digital MELIOS Design & Fabrication	C/FP	Litton Lasers, Inc.	1000								1000	
AN/TMQ-41 Trade Studies and related activities	C/CP	Various	1232								1232	
Image Fusion for DVE	C/CP	Raytheon, Dallas, TX	1274								1274	
Digital RSTA SDD	C/CP	Booz-Allen Hamilton,	2190								2190	

ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY			PE NUMBER AND TITLE								PROJECT	
5 - System Development and Demonstration			0604710A - Night Vision Systems - Eng Dev								L70	
		Tysons Corner, VA										
CIRISS Efforts	C/CP	Various	1500									1500
LLDR Vehicle applications	C/CP	Litton Laser, Apopka, FL Various	3487									3487
FLIR develop/integrate	Various	Various	1731									1731
Uncooled B-Kit	Various	Various	8418	1936	1Q					Cont.		Cont.
EO/IR/LD UAV Payloads	C/CP	Lockheed Martin	2495	1592	1Q	900	1Q	500	1Q	Cont.		Cont.
LLDR EMD	C/CP	Litton Lasers, Apopka, FL	19873									19873
GMTI Radar	C/FP & CP	General Atomics	2792									2792
UGS	CP/FFP	Various	708									708
FCS UGS / UGS	C/CP	FCS Boeing/Textron/Various /TBD	4397	702	2Q	756	2Q	810	2Q	Cont.		Cont.
PSDS2 Efforts	C/CPFF	Various	11751									11751
LRAS 3	SS/CP	Network Centrics, McKinney Texas	2271	6544	2-3Q	3225	2Q					12040
DVD (DVE Light)	C/CP	CACI	238	334	3Q							572
3rd Gen FLIR	C/CP	Various		1532		4146	3Q	5010	2Q	Cont.		Cont.
Small Business Innovative Research/Small Business Technology Transfer Programs.						346						346
Subtotal:			130978	12980		9713		6606		Cont.		Cont.

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
Matrix Support	MIPR	Various	17151	2753	1-2Q	1896	1-2Q	1950	1-2Q	Cont.	Cont.	
Matrix Support	MIPR	NVESD	720								720	
Matrix Support	MIPR	TRADOC	400								400	

ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration				PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev						PROJECT L70	
Matrix Support	MIPR	Various	231							231	
Subtotal:			18502	2753		1896		1950		Cont.	Cont.

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
DT/IOT&E*	MIPR	ATEC	8769								8769	
Other Test Support*	MIPR	Various	5946	405	2Q	325	3Q			Cont.	Cont.	
Subtotal:			14715	405		325				Cont.	Cont.	

Remarks: * Includes PSDS2, UGS, STTW, 3GF and other sensor test and evaluation activities.
Includes PSDS2 and FCS UGS test and evaluation.

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
Project Management	In house support	PM, NV/RSTA, Fort Belvoir, VA & Ft. Monmouth, NJ	5920	439	1-4Q	420	1-4Q	427	1-4Q	Cont.	Cont.	
Subtotal:			5920	439		420		427		Cont.	Cont.	

Project Total Cost:			170115	16577		12354		8983		Cont.	Cont.	572
----------------------------	--	--	---------------	--------------	--	--------------	--	-------------	--	--------------	--------------	------------

Schedule Profile (R4 Exhibit)

February 2008

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604710A - Night Vision Systems - Eng Dev

PROJECT
L70

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
Uncooled B Kit (UBK) Phase II RRD	█																											
UBK RRD Qualification Demo Phase II	█																											
UGS Dispensing/Development	█				█																							
LRAS3 Netted Sensor Development & Demonstration	█				█																							
UAV Payload Development efforts	█				█																							
DVD efforts	█																											
(1) 3GF MS B					▲																							
3GF SDD					█				█				█															
Laser Imaging effort													█															
(2) Foliage Penetration MS B																					▲							
FOPEN SDD																					█							

Schedule Detail (R4a Exhibit)

February 2008

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604710A - Night Vision Systems - Eng Dev

PROJECT
L70

<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>
Uncooled B Kit (UBK) Phase II RRD	1Q - 3Q						
UBK RRD Qualification Demo Phase II	1Q - 4Q						
UGS Dispensing/Development	1Q - 4Q	1Q - 4Q	1Q - 4Q				
LRAS3 Netted Sensor Development & Demonstration	1Q - 4Q	1Q - 4Q					
UAV Payload Development efforts	1Q - 4Q	1Q - 4Q	1Q - 4Q				
DVD efforts	1Q - 4Q						
3GF MS B		2Q					
3GF SDD		3Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q		
Laser Imaging effort				1Q - 4Q	1Q - 3Q		
Foliage Penetration MS B						2Q	
FOPEN SDD						2Q - 4Q	1Q - 4Q

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration		PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev						PROJECT L76	
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
L76 Dismounted Fire Support Laser Targeting Systems	4502	18764	8212						31478

A. Mission Description and Budget Item Justification: This project develops technologies for insertion into Laser Target Locators and Laser Designators to improve overall performance of those systems and reduce weight. Technologies developed under this project will benefit the Lightweight Laser Designator Rangefinder (LLDR, AN/PED-1), the Mark VII-E Laser Target Locator, and future improvements. Targeting System (JETS). This project will integrate the next generation uncooled, 17 micron pixel-pitch Forward Looking Infrared (FLIRs) being developed for the Thermal Weapon Sight program into the Laser Target Locator Module (LTLM), improving its imaging performance with no impact on its weight. New laser designator technology has been developed which will reduce laser designator weight by close to 50% and cut battery usage by a factor of 10. Further reductions can be gained by reducing laser designator output energy levels below currently accepted standards, which modeling and testing indicate may improve performance of laser guided munitions. Live-fire and captive-carry range tests will be performed with a wide variety of environmental conditions and laser guided munitions to build the necessary confidence that reduced designator energy levels will not adversely impact the mission. This project will initiate interface design for a reduced weight common laser designator to the next generation LTLM. In addition, this line will support improved accuracy (reduced target location error) in support of coordinate seeking weapons, such as Joint Direct Attack Munition (JDAM), Small Diameter Bomb, and Excalibur. The primary focus is developing high accuracy azimuth and vertical angle measurement (AVAM) devices to replace currently used digital magnetic compasses in a package that will have the lowest possible impact on cost, weight, and power. Initial integration of these devices will be performed on the LLDR system.

<u>Accomplishments/Planned Program:</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
Completed the analysis of alternatives for laser targeting systems and continue to provide LTLM systems engineering and technical assistance (SETA).	1340	320	320
Initiate the development of Azimuth and Vertical Angle Measurement (AVAM) devices. This program transitioned from DL67.		9695	4180
Completed the design and development of cooled, mega-pixel Forward Looking Infra-Red (FLIR) and optics for FLIR.	1322		
Initiate the development of Advanced uncooled FLIR integration for technology insertion into the LTLM.		884	3212
Completed Ultra-lightweight Laser Designator development and testing.	1626		
Initiate development of common laser designator module interfaces for LTLM.		7340	500
Completed the development of DARPA's MANTIS program developing a helmet-borne vision system and hand-held targeting system for the individual Soldier that combine imagery from multiple sensors using image fusion.	214		
Small Business Innovative Research / Small Business Technology Transfer Program.		525	
Total	4502	18764	8212

<u>B. Other Program Funding Summary</u>	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Compl	Total Cost
--	---------	---------	---------	---------	---------	---------	---------	----------	------------

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

BUDGET ACTIVITY 5 - System Development and Demonstration			PE NUMBER AND TITLE 0604710A - Night Vision Systems - Eng Dev					PROJECT L76	
Lightweight Laser Desingator Rangefinder (LLDR) (K31100) OPA2	139654	136457	150094	99060	61562	62886	64303	Continuing	Continuing
Laser Target Locating System (LTLS) (B53800) OPA2	39049	66981	9815					Continuing	Continuing

Comment:

C. Acquisition Strategy The various development programs in this project will continue to exercise competitively awarded contracts using the best value source selection procedures.

ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT		
5 - System Development and Demonstration			0604710A - Night Vision Systems - Eng Dev							L76		
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
Analysis and Technical Evaluation	C/FP	John Hopkins Applied Physics Lab		1340	1Q	320	2Q	320	2Q		1980	
Azimuth and Vertical Angle Measurement (AVAM)	C/FP	Northrop Grumman, Orlando FL		1322	2Q	9695	2Q	3880	1-2Q		14897	
Laser Target Locator Module advanced uncooled FLIR integration	MIPR	Various			1-2Q	884	1-2Q	3012	1-2Q		3896	
Ultra Lightweight Designator	C/FP	Fibertek, Inc. Herndon, VA		1086	2Q		2Q				1086	
Common laser designator interface development	C/FP	Northrop Grumman, Orlando FL			2Q	7340	2Q	300	1-2Q		7640	
MANTIS Development Activities				214							214	
SBIR/STTR					1Q	525	1Q				525	
Subtotal:				3962		18764		7512			30238	
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
Subtotal:												
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
Government Test Support Activity	MIPR	Various		540	2Q		1-4Q	700	1-2Q		1240	
Subtotal:				540				700			1240	

ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604710A - Night Vision Systems - Eng Dev

PROJECT
L76

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
Subtotal:												
Project Total Cost:				4502		18764		8212			31478	

Schedule Profile (R4 Exhibit)

February 2008

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604710A - Night Vision Systems - Eng Dev

PROJECT
L76

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
Analysis of Alternatives for Laser Targeting Systems																												
SETA for Laser Targeting Systems																												
LLDR Mega-pixel FLIR and Optics Development																												
Develop common laser designator module interface																												
Common laser designator module interface testing																												
(1) LTLM MS C																												
LTLM Advanced FLIR Integraton																												
LTLM Advanced FLIR Testing																												
Ultra Lightweight Laser Designator Development																												
AVAM Development																												
AVAM Testing																												

Schedule Detail (R4a Exhibit)

February 2008

BUDGET ACTIVITY		PE NUMBER AND TITLE					PROJECT	
5 - System Development and Demonstration		0604710A - Night Vision Systems - Eng Dev					L76	
<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>	
Analysis of Alternatives for Laser Targeting Systems	2Q - 4Q	1Q - 2Q						
SETA for Laser Targeting Systems	3Q - 4Q	1Q - 4Q	1Q - 4Q					
LLDR Mega-pixel FLIR and Optics Development	2Q - 4Q	1Q						
Develop common laser designator module interface		2Q - 4Q	1Q - 4Q					
Common laser designator module interface testing			2Q - 4Q					
LTLM MS C		3Q						
LTLM Advanced FLIR Integraton		2Q - 4Q	1Q - 3Q					
LTLM Advanced FLIR Testing			1Q - 4Q					
Ultra Lightweight Laser Designator Development	1Q - 4Q							
AVAM Development		2Q - 4Q	1Q - 4Q					
AVAM Testing			1Q - 4Q					