Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification									DATE: May 2009	
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)					R-1 ITEM NOMENCLATURE PE 0603710A NIGHT VISION ADVANCED TECHNOLOGY					
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	62.618	70.682	40.329						Continuing	Continuing
C65: DC65	.393	.000	.000						Continuing	Continuing
K70: NIGHT VISION ADV TECH	22.354	23.478	24.672						Continuing	Continuing
K73: NIGHT VISION SENSOR DEMONSTRATIONS (CA)	27.797	30.898	.000						Continuing	Continuing
K86: NIGHT VISION, ABN SYS	12.074	16.306	15.657						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates sensor technology that increases Warfighter survivability and lethality by providing sensor capabilities to acquire and engage targets at longer ranges in complex environments and conditions (e.g. day/night, obscured, smoke, adverse weather). This PE focuses on assessing the military utility and maturing concepts of operation to address counter ambush operations (project 590). This PE will mature and demonstrate technologies that: improve the Soldier's ability to see at night; and provide rapid wide area search, multispectral aided target detection (AiTD) and passive long range target identification (ID beyond threat detection) in both an air and ground test-beds (project K70). This PE matures and demonstrates sensors and algorithms designed: to detect targets (vehicles, personnel) in camouflage, concealment, and deception from airborne platforms; and provides pilotage and situational awareness imagery to multiple pilots/crew members independently for enhanced crew/aircraft operations in day/night/adverse weather conditions (project K86). Project K73 funds congressional special interest items. Project C65 supports classified activities. Properly accessed individuals can obtain further information from the ASA(ALT) Special Programs Office.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is related to and fully coordinated with efforts in PE 0602709A (Night Vision and Electro-Optics Technology), PE 0602270A (Electronic Warfare Technology), PE 0603774A (Night Vision Systems Advanced Development), and PE 0604710A (Night Vision Systems Engineering Development), PE 0603005A (Combat Vehicle and Automotive Advanced Technology).

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification	DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603710A NIGHT VISION ADVANCED TECHNOLOGY

Work in this PE is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Belvoir, VA.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	53.910	39.916	40.595	
Current BES/President's Budget	62.618	70.682	40.329	
Total Adjustments	8.708	30.766	-.266	
Congressional Program Reductions	.000	-.234		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	31.000		
Total Reprogrammings	10.037	.000		
SBIR/STTR Transfer	-1.329	.000		

Change Summary Explanation

FY08 funding increase was due to transfer of Congressional interest items.
FY09 funding increase is due to Congressional adds

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603710A NIGHT VISION ADVANCED TECHNOLOGY					PROJECT NUMBER K70	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
K70: NIGHT VISION ADV TECH	22.354	23.478	24.672						Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project mature and demonstrate high-performance integrated sensor/multi-sensor technologies to increase target detection range, extend target identification range, and reduce target acquisition (TA) timelines for dismounted Soldiers and tactical vehicles against threats that are beyond today's detection ranges or are partially obscured by terrain features.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Belvoir, VA.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Miniature Target Acquisition, Far Target Locator System: This effort matures and demonstrates with a miniature light weight, low powered, hand held far target locator system, to include real-time adaptive Visible Near Infrared/Short Wave Infrared/Long Wave Infrared (VNIR/ SWIR/LWIR) sensor fusion, a laser rangefinder/marker/illuminator, embedded gaps, target position determination, image and video transmission/reception/display, and electronic zoom with super-resolution capabilities. In FY08, leveraged the DARPA Multispectral Adaptive Networked Tactical Imaging System (MANTIS) Phase III program technologies of short wave infrared (SWIR), sensor fusion, and power management; began to integrate those technologies into the next generation of handheld multispectral (TV, near infrared (NIR), longwave infrared (LWIR)) target locator that uses a digital magnetic compass and global positioning system (gaps) to pinpoint and relay target coordinates; and demonstrated day/night SWIR and improve laser capabilities. In FY09, conduct series of field tests/data collections to demonstrate the required SWIR and laser phenomenology necessary for target detection capability of those hard to find targets; and develop and demonstrate an interface with existing/developmental dismounted Soldier communication systems for real time video/image transmission.	3.000	3.430	.000	
Weapon Sight Technology:	.000	.000	6.046	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603710A NIGHT VISION ADVANCED TECHNOLOGY	PROJECT NUMBER K70

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
This effort develops, integrates, and demonstrates critical component for the next generation of weapon sight systems for mounted and dismounted Soldier use. In FY10, will develop and mature optical augmentation (OA) sensor and hardware; will begin Phase I weapon sight (WS) as defined in design studies and configuration definition; will conduct technical evaluation of included technologies; and will down select the optimum technology demonstrator for system integration.				
Third Generation Infrared (IR) Technology: This effort demonstrates compact high performance sensors for air and ground scouts and line of sight shooters, optimized for both rapid wide area search and passive long range target identification. It includes the development of multi-spectral aided target recognition and advanced digital signal processing algorithms to complement 3rd generation IR imagers. In FY08, finalized common air and ground integrated detector/cooler assembly specifications; completed the integration of the dual band focal plane array (FPA), dual F-number dewar, and miniaturized electronics into the common electro optic system (CEOS); and conducted multi-spectral aided target recognition evaluation with dual band FPA, and dual F-number dewar.	9.123	.000	.000	
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.504	.000	
Soldier Mobility Vision System: This effort matures and demonstrates low power prototype system with full field-of-view (40 degree minimum) digitally-fused uncooled long wave IR and image intensified (I2) visible/near IR helmet mounted vision system for mobility, target detection, and situational awareness in complex terrain. In FY08, completed Application Specific Integrated Circuit (ASIC) fabrication and delivered working ASIC to the PEO Soldier digital enhanced night vision goggle (DENVG) program; began system hardware maturation and integration. In FY09, complete the integration of soldier vision technologies; conduct technical testing, and user evaluation; and transition technologies to the DENVG program.	4.446	3.310	.000	
Urban Sensor Suite: This effort develops and integrates 360 degree closed hatch vision capability with threat detection and cueing sensors and algorithms, high resolution interrogation sensors (for slew to cue identification), improved resolution driving sensors, and high bandwidth video capture capabilities in urban operations for improved survivability, lethality, and reduced crew workload.	.000	6.661	9.836	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY09, complete trade off analyses of sensor and system design approaches; define system architecture and interfaces; complete modeling and simulation of human factors and operator cognitive work loading; conduct analysis for threat detection sensors, algorithms, high resolution interrogation sensors, video architectures and capture technologies; begin system design/integration and mature hardware concepts. In FY10, will evaluate threat detection sensor and baseline acoustic cueing, On The Move (OTM) Moving Target Indicator (MTI) and slew to cue algorithm performance; will integrate baseline detection sensors and algorithms to vehicle demonstration platform; will conduct demonstration of integrated detection and slew capabilities; will demonstrate baseline 360 degrees video capture approach for improve situational awareness while OTM; will maturate and integrate the sensor system and algorithm efforts.				
Laser Designator Technology: This effort leverages US Army investments in low power laser designation technology to provide advanced lightweight target detection and call for fire capability. In FY08, completed performance modeling and trade off analyses of a modular, ultra lightweight, man portable, low power, multi-sensor system for individual dismounted Soldiers and vehicular missions that utilizes small pixel, mid wave infrared (MWIR) thermal sensor technology, far target location capability, and clip-on laser designator; and begin the fabrication of the small pixel, large format (1280X720) MWIR thermal imaging sensor. In FY09, continue the fabrication of the small pixel, large format MWIR thermal imaging sensor; conduct trade-off analyses of small pixel MWIR versus small pixel medium format (640X480) uncooled longwave infrared (LW) thermal sensor; begin fabrication of small pixel, medium format MWIR, uncooled LWIR thermal sensors; begin fabrication of lightweight, clip-on common designator module (CDM); begin far target location improvement program development effort; and conduct initial laboratory test (similar to field environment) performance evaluation of the small pixel, large format MWIR thermal sensor. In FY10, will complete fabrication and demonstrate small pixel medium format MWIR and uncooled LWIR thermal sensors for target performance; will demonstrate prototype of lightweight clip-on CDM; will continue the development of the far target location effort, and will assess far target location performance efforts.	5.322	8.117	7.309	
Sensor and Information Fusion for Improved Hostile Fire Situational Awareness : This effort builds on existing distributed aperture system (DAS) architecture and demonstration hardware to demonstrate automated pop up target detection algorithms and a 360 degree by 90 degree digital video recording capability with gunfire detection and audible sensing onto a vehicle platform.	.463	1.456	1.481	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY08, developed user approved vignettes to define requirements, defined sensor capabilities and product transitions. In FY09, conduct trade off analyses of sensor and system design approaches; complete modeling and simulation of human factors and operator cognitive loading of information; demonstrate system architecture and planned interfaces; and begin hardware development efforts to provide improved situational awareness, reconnaissance, surveillance, and targeting information for the vehicle commander and crew in the urban fight. In FY10, will complete hardware development efforts; and mature and demonstrate driving and situational awareness (SA) indirect vision / drive-by-wire / driver assist design concepts, and guidelines with a local SA display for dismounted Soldiers.				
Total	22.354	23.478	24.672	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603710A NIGHT VISION ADVANCED TECHNOLOGY					PROJECT NUMBER K73	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
K73: NIGHT VISION SENSOR DEMONSTRATIONS (CA)	27.797	30.898	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Night Vision advanced technology development.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Administrative Database Error (DFAS 1002 Prior year Actuals Update)	10.026	.000	.000	
Cable Warning and Obstacle Avoidance System	1.159	.000	.000	
Enhanced Digital Electronic Night-Vision (EDEN)	3.090	1.550	.000	
Hyperspectral Sensors for Improved Force Protection (Hyper-IFP)	1.545	1.550	.000	
FCS Short Range Electro Optic (SREO) Sensor for Stryker	3.091	1.550	.000	
Advanced Night Vision Sensors	1.932	.000	.000	
Hand Launched Unmanned Aerial System High Performance Payload (SUAS HPP)	2.318	.000	.000	
UCXR System	3.091	.000	.000	
Next Generation FPA Development	1.545	.000	.000	
Personal Miniature Thermal Viewer	.000	1.550	.000	
Smart Data Project: Real-Time Geospatial Video Sensor Intelligence	.000	.775	.000	
Brownout Situational Awareness Sensor	.000	1.550	.000	
Night Vision Advanced Technology Research	.000	11.625	.000	
InfraRed Goggle Upgrade System (IRGUS)	.000	.775	.000	
Mini-LRAS3 Scout Surveillance System	.000	1.550	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603710A NIGHT VISION ADVANCED TECHNOLOGY	PROJECT NUMBER K73

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Passive IR Sensor for Persistent Wide Area Surveillance	.000	1.938	.000	
Smart Sensor Supercomputing Center	.000	5.620	.000	
SBIR/STTR	.000	.865	.000	
Total	27.797	30.898	.000	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603710A NIGHT VISION ADVANCED TECHNOLOGY					PROJECT NUMBER K86	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
K86: NIGHT VISION, ABN SYS	12.074	16.306	15.657						Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project mature and demonstrate intelligence, surveillance, reconnaissance, targeting, and pilotage technologies in support of the Army's aviation and networked systems. This project matures and demonstrates technology efforts that focus on improved reconnaissance, surveillance and target acquisition and night pilotage sensors, high-resolution heads-up displays, sensor fusion, and aided target recognition (AiTR) capabilities for attack, scout, cargo, and utility helicopters and unmanned aerial systems (UASs). UAS payload efforts mature and demonstrate small, lightweight, modular, payloads (electro-optical/infrared, laser radar, designator) to support target detection, identification, location, tracking, and targeting of tactical targets for the Brigade Combat Team.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Belvoir, VA.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Advanced Lasers for Unmanned Aerial System (UAS) Payloads: This effort develops, integrates and demonstrates an advanced target acquisition and designation laser payload to satisfy the reconnaissance, surveillance, and target acquisition (RSTA) mission requirements for the Class I unmanned aircraft system (UAS) customized to a 7 lb payload capacity. In FY08, conducted design studies to investigate promising compact payload concepts, finalized payload performance goals, and established laser component requirements; began development of 7 lb payload compatible with the Class 1 UASs with reconnaissance, surveillance, target acquisition (RSTA), and laser designation (LD) capabilities. In FY09, validate performance of the laser designator/laser range finder components in a relevant environment and demonstrate proof-of-principle RSTA and LD payload breadboard; finalize RSTA and LD payload system design; and conduct initial demonstrations of the laser, detector, and pointing/stabilization subsystems. In FY10, will validate performance of micro-turret payload laser, imaging and stabilization components and integrate them into a unified package; will complete transition and incorporation into the Advanced Demonstrator Payload of the	2.880	8.880	9.410	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
laser designator/laser rangefinder component; and will mature and test compact 2-axis laser/infrared stabilized payload components.				
Third Generation Infrared (IR) Technology: This effort demonstrates the benefits of Third Generation Infrared Technologies, long range target identification (identification beyond threat detection), wide area search, for aviation platforms. In FY08, completed demonstration of wide area search algorithms, and integrate into the airborne control station; performed flight tests of the surrogate AN/ZSQ-2 aviation turrets wide area search capability; recorded third generation imagery to support dual color Aided Target Recognition (AiTR) maturation; and completed the fabrication and testing of the dual color, dual f-number slim-line imagers optics.	4.400	.000	.000	
Airborne Unmanned Persistent Imaging: This effort demonstrates day and night persistent surveillance imaging (PSI) and enhanced reconnaissance, surveillance, and target acquisition (RSTA) capabilities from a single payload on the extended range/multi-purpose (ER/MP) unmanned aerial system (UAS). In FY10, will mature step stare software; and begin intelligent, tiered data processing development and hardware design trade studies.	.000	.000	1.991	
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.401	.000	
Objective Pilotage for Utility and Lift (OPUL): This effort develops, integrates, tests and demonstrates a sensor suite that provides multi-pilot helicopters and crews simultaneous multi-user, wide field of regard imagery of the immediate surroundings. The OPUL system is designed for pilotage and navigation, providing advanced sensors for improved image quality under degraded and brown out conditions. In FY08, down-selected sensor configurations, refined requirements and design specifications, assessed and selected available displays (helmet mounted display, panel mounted display); and matured design and built sensor suite (including sensor pods, processors, displays, and required interface equipment). In FY09, integrate sensor suite onto a helicopter testbed; conduct flight evaluation to perform engineering checkout; assess integration and sensor suite performance; study human factors aspect of multi-sensor, multi-spectral, eye points and their impact on mission performance; and conduct limited user flight assessment.	4.794	7.025	4.256	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10, will complete human factors performance studies; and will conduct extensive flight evaluations and demonstrations with varying mission scenarios and environmental conditions.				
Total	12.074	16.306	15.657	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.