Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research					R-1 ITEM NOMENCLATURE PE 0602270A Electronic Warfare 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	25.564	21.739	16.119						Continuing	Continuing
442: TACTICAL EW TECHNOLOGY	11.655	9.475	.000						Continuing	Continuing
475: ELECTRONIC WARFARE COMPONENT TECHNOLOGIES (CA)	6.956	5.182	.000						Continuing	Continuing
906: Tactical Electronic Warfare Applied Research	6.953	7.082	16.119						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) designs and develops electronic warfare (EW) component technologies that deny, disrupt, or degrade the enemy's use of the electromagnetic spectrum for offensive or defensive operations. This is accomplished through the investigation of electronic support measures (ESM), countermeasures against communications systems and networks; the development of sensors used to identify and locate threat forces in an asymmetric environment; and threat warning and electronic countermeasures (ECM) against: munitions sensors and targeting capabilities, missile guidance and targeting systems, and booby traps. This PE protects high-value ground platforms, aircraft, and the Soldier from threat surveillance and tracking systems; imaging systems; and advanced radio frequency (RF)/electro-optical (EO)/infrared (IR) missiles, artillery, and smart munitions. Information fusion research addresses sensor correlation, relationship discovery, and management services through use of automated processing, as well as higher level reasoning techniques that support automated combat assessment. This PE also supports efforts related to research and application of key EW technologies to intercept, locate, and disrupt, current and emerging threat communications and non-communications emitters, to provide vital, quality combat information directly to users in a timely actionable manner. Specifically, its technologies focus on detecting threat sensors and emitters associated with weapon systems, targeting systems and command, control, communications, computers, and intelligence systems and networks. Project 475 funds congressional special interest items.

Since the current PE 0602270A, project 442 efforts are complementary to those funded from PE 0602270A, project 906, all efforts funded and executed from project 442 are being transferred to project 906 in FY10 and beyond, to reduce administrative burden.

Work in this PE is related to and fully coordinated with PE 0603270A (EW Technology), PE 0602120A (Sensors and Electronic Survivability), PE 0603772A (Advanced Tactical Computer Science and Sensor Technology), PE 0602783A (Computer and Software Technology), and PE 0602784A (Advanced Concepts and Simulation).

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.

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification	DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602270A Electronic Warfare Technology

Work is performed by the Army Research, Development and Engineering Command, Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Monmouth, NJ.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	30.013	16.611	16.822	
Current BES/President's Budget	25.564	21.739	16.119	
Total Adjustments	-4.449	5.128	-.703	
Congressional Program Reductions	.000	-.072		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	5.200		
Total Reprogrammings	-3.951	.000		
SBIR/STTR Transfer	-.498	.000		

Change Summary Explanation

FY08 funding decrease 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 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602270A Electronic Warfare Technology					PROJECT NUMBER 442	
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**
442: TACTICAL EW TECHNOLOGY	11.655	9.475	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

This objective of this project is to design, develop, and apply electronic warfare technologies to enhance the survivability capabilities of ground combat vehicles, aircraft, and the dismounted Soldier. The survivability approach provides detection avoidance through signature management and hit avoidance using warning receivers and electronic countermeasures. This project applies recent advances in radio frequency (RF), infrared (IR), and electro-optical (EO) sensor and jamming sources to detect, locate, deceive, and jam threats, radar directed target acquisition systems, target-tracking sensors, Surface-to-Air Missiles (SAMs), Air-To-Air Missiles (AAMs), top attack weapons, and electronically fuzed munitions. The ability to neutralize booby traps is pursued, and this project will investigate Electronic Support (ES) technologies used against non-communications signals for targeting and tactical situational awareness.

Since the current PE 0602270A, project 442 efforts are complementary to those funded from PE 0602270A, project 906, all efforts funded and executed from project 442 are being transferred to project 906 in FY10 and beyond, to reduce administrative burden.

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 is performed by the Army Research, Development, and Engineering Command, Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Monmouth, NJ.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Low Cost RF Situational Awareness and Countermeasures: This effort provides the electronic countermeasures signal coherency, power, spectral energy efficiency, and jamming capability to protect friendly airborne and surface platforms from wideband threat weapon systems that use advanced radar processing techniques. In FY08, investigated algorithms/waveforms and mitigation techniques to reject/suppress interference from unwanted radar energy from outside the field-of-view of the radar, interference within the field-of view of the radar and interference from residual rotor blade modulations to include electromagnetic modeling of these effects and mitigation techniques.	2.409	1.143	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602270A Electronic Warfare Technology			PROJECT NUMBER 442	
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
In FY09 develop new hardware and software modules with the capability to neutralize the enemy's ability to locate, classify, and engage our forces with radar-based air defense and targeting radars common to both air and ground platforms. In FY10 and beyond funding for this effort was transferred to PE 0602270A/project 906.					
Small Business Innovative Research/Small Business Technology Transfer Programs		.000	.086	.000	
Multispectral Threat Warning: This effort develops affordable EO/IR countermeasure system concepts with multispectral detectors, multiband laser, and advanced countermeasure architectures. It exploits next generation threats to develop advanced EO/IR countermeasure techniques that effectively defeat laser guided munitions, surface-to-air, air-to-air, and anti-tank threats. In FY09, develop and evaluate new algorithm techniques to exploit signals in background clutter to increase detection, identification, and threat classification capabilities. In FY10 and beyond funding for this effort was transferred to PE 0602270A/project 906.		.000	4.371	.000	
Next Generation Electronic Warfare Technology for Survivability: This effort develops technologies to enable a low cost aircraft self-protection suite that is effective in detecting, disrupting, and defeating small arms, rocket propelled grenades, and man-portable air defense system threats, typical of urban environments. In FY08, integrated/interfaced Navy's Distributed Aperture Infrared Countermeasures (DAIRCM) multiband laser prototype with optical fibers and pointing, switching, and steering technologies and conducted laboratory demonstrations against simulated threats; demonstrated next generation countermeasures techniques against advanced electro-optical (EO)/infrared (IR) threats. Related work is also being accomplished under PE 0603270A/project K16.		3.446	.000	.000	
Networked Electronic Warfare: This effort provides autonomous detection, classification, correlation, and geo-location capability against modern wireless emitters and other threats in battlefield and urban environments. In FY08, developed digital wideband receiver capability for the detection and denial across the entire threat band; refined system design and began integration of complementary capabilities such as time difference of arrival geolocation and electronic attack based on geolocation; integrated wideband antennas into an adaptive array; integrated algorithms into government off the shelf hardware. In FY09, integrate capabilities into a net-centric solution that combines detection and jamming, location, and neutralization capabilities; complete fabrication of adaptive processing arrays and algorithm development and validation.		3.509	1.956	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602270A Electronic Warfare Technology	PROJECT NUMBER 442

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Related work is also being accomplished under PE 0602270A/project 906, PE 0603270A/project K15, and PE 0603270A/project K16.				
Fusion Based Technologies: This effort develops an advanced knowledge generation capability to answer warfighting commanders' priority intelligence requirements (PIRs). These answers provide actionable intelligence enabling timely decision-making by commanders and timely action by Soldiers in the execution of operations. In FY08, developed expanded set of representations for different types of enemy tactics to handle more complex scenarios including the prediction of locations of specific types of asymmetric attacks using real data; developed and evaluated in a pre-engagement mode, an initial toolset for evaluating and selecting the most capable and relevant collection assets given PIRs and contextual information; developed another increment of modeling and simulation software that provided more realistic threat behaviors to support development and testing of representations of threat tactics, plausible explanations of threat activities, and early recognition of threat goals and intentions. Related work is also being accomplished under PE 0602120A/project H15, PE 0602270A/project 906, and PE 0603772A/project 243.	2.194	.000	.000	
Advanced Tactical Electronic Support Measures: This efforts supports development of non-communications Electronic Support (ES) components with multi-functional digital receivers, processors and software tools that reduce the space, weight and power requirements for future electronic support systems. In FY09, develop an integrated suite of optimal detection, de-interleaving (arranging received signal components in the appropriate order) and tracking techniques with a goal of full spectrum coverage for all waveform classes in a dense signal environment. In FY10 and beyond funding for this effort was transferred to PE 0602270A/project 906 under the title Passive and Active Targeting Techniques.	.000	1.820	.000	
Cueing Sensor: This effort develops low cost infrared sensors that detect rocket propelled grenades, anti-tank guided missiles, and tank fired kinetic energy and high energy anti-tank rounds and then cue active protection system for Army vehicles. In FY08, optimized focal plane arrays design; enhanced sensor, electronics, and algorithms for on-the-move (OTM) environment. In FY09, complete focal plane array design; evaluate software algorithms for OTM detection capability. Related work effort is also being accomplished under PE 0602120A/project H15, PE 0603270A/project K16, and PE 0603772A/project 243.	.097	.099	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602270A Electronic Warfare Technology	PROJECT NUMBER 442

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Total	11.655	9.475	.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 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602270A Electronic Warfare Technology					PROJECT NUMBER 475	
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**
475: ELECTRONIC WARFARE COMPONENT TECHNOLOGIES (CA)	6.956	5.182	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Electronic Warfare technology applied research.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Silver Fox and Manta Unmanned Aerial Systems	3.092	.000	.000	
Battlefld Connectivity, Multi-Level Secure Network	1.545	1.549	.000	
Dominant Military Operations on Urbanized Terrain Viewer	2.319	.000	.000	
Integrated Information Technology Policy Analysis Research (pending transfer to 62783)	.000	1.550	.000	
Counter-IED Force Protection Program	.000	1.937	.000	
SBIR/STTR	.000	.146	.000	
Total	6.956	5.182	.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 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602270A Electronic Warfare Technology					PROJECT NUMBER 906	
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**
906: Tactical Electronic Warfare Applied Research	6.953	7.082	16.119						Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project design, develop, and apply key electronic warfare (EW)/Information Operations technologies to enhance platform survivability (to include ground combat vehicles, aircraft, and the dismounted Soldier) and to intercept and locate current and emerging threat communications and non-communications emitters. This project applies recent advances in radio frequency (RF), infrared (IR), and electro-optical (EO) sensor and jamming sources to detect, locate, deceive, and jam threats, radar directed target acquisition systems, target-tracking sensors, Surface-to-Air Missiles (SAMs), Air-To-Air Missiles (AAMs), top attack weapons, and electronically fuzed munitions, the ability to neutralize booby traps is also pursued. This project develops information systems to provide vital, quality combat information directly to users in a timely actionable manner in accordance with concepts for future force intelligence operations. This project investigates radio frequency (RF) collection and mapping technologies to offer real time emitter detection, location, and identification. In addition, this project enables a remote capability to disrupt, deny, or destroy threat communication signals, other research areas include fusion (automated assimilation and synthesis) of battlefield intelligence data to enable interpretation of current and future enemy activities and allowing development of courses of action in time to act decisively and in a pre-emptive manner.

Since the current PE 0602270A, project 442 efforts are complementary to those funded from PE 0602270A, project 906, all efforts funded and executed from project 442 are being transferred to project 906 in FY10 and beyond, to reduce administrative burden.

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, Communications-Electronics Research, Development, and Engineering Center (CERDEC), Ft. Monmouth, NJ.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Networked Electronic Warfare: This effort provides autonomous detection, classification, correlation, and geo-location capability against modern wireless emitters and other threats in battlefield and urban environments. In FY08, continued algorithm development for an expanded range of potential targets, as well as software development for data thinning and nodal analysis applications for the purposes of threat identification, classification, and attack technique	6.953	4.091	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602270A Electronic Warfare Technology		PROJECT NUMBER 906	
B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
selection; expanded algorithm development for larger range of targets; continued deception and effects algorithm development. In FY09, investigate and develop techniques to engage emergent communications technologies for inclusion into Information Operations (IO) techniques database; refine IO techniques database for access and use by other users including Joint Service and other members of intelligence community. Related work is also being accomplished under PE 0602270A/project 442; PE 0603270A/project K15, and PE 0603270A/project K16.				
Fusion Based Technologies: This effort develops an advanced knowledge generation capability to answer warfighting commanders' priority intelligence requirements (PIR) for the future force. These answers provide actionable intelligence enabling timely decision-making by commanders and timely action by Soldiers in the execution of operations. In FY09, develop final set of representations for different types of enemy tactics to handle more complex and asymmetric behaviors such as ambushes, vehicle-borne explosive devices, and sniper attacks; demonstrate capabilities to automatically identify and link human-specified critical entities and activities to PIRs, and reveal emerging actionable intelligence; develop and demonstrate an intelligence, surveillance, and reconnaissance planning/re-planning toolset with capabilities to function in an operations execution mode for evaluating and selecting the most capable and relevant collection assets given PIRs and contextual information. Related work is also being accomplished under PE 0602120A/project H15, PE 0602270A/project 442, and PE 0603772A/project 243.	.000	2.991	.000	
Multi-Intelligence Data Fusion and Targeting: This effort investigates and develops software technologies for advanced Intelligence/Battle Command enterprise collaboration that enable the enterprise to identify, fuse, trace/track specific human targets in an asymmetric environment. In FY10, will develop advanced data ingestion (throughput of high volume and non-traditional data types), data alignment/ conversion (normalization), and correlation and data engineering management techniques.	.000	.000	5.452	
Offensive Information Operations Technologies: This effort investigates and develops techniques that capture and identify data traversing enemy networks for the purpose of Information Operations or otherwise countering adversary communications. In FY10, will define distributed communications to allow the technologies to communicate between nodes; will begin development of interception and countermeasure capabilities against network traffic flows of interest; will develop Network Operations techniques against relevant high priority protocols.	.000	.000	3.752	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602270A Electronic Warfare Technology	PROJECT NUMBER 906

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Multispectral Threat Warning: This effort investigates the benefits of augmenting the currently fielded Ultra-Violet (UV)-based Common Missile Warning System (CMWS) threat detection capability with infrared (IR) and acoustic sensors to: improve the probability of detection of Man-Portable Air Defense System (MANPADS)-like threats; reduce atmospheric clutter and, thereby, the false alarm rate, and add detection of ball ammunition to the current CMWS tracer-only capability. In FY10, will investigate integration of acoustic signals into UV-based hostile fire indication (HFI) algorithms; will evaluate acoustic array hardware concepts with regard to algorithm design; will begin correlation of acoustic and UV based HFI data based on hardware integration concepts.	.000	.000	3.715	
Passive and Active Targeting Techniques: This effort investigates passive and active techniques and software algorithm development for three dimensional (3D) detection, identification, and precision geolocation of next-generation wireless communication threats and improved situational awareness (SA) in dense, co-channel, and multipath radio frequency (RF) environments. In FY10, will evaluate and select precision geolocation techniques and analyze performance results under varying environmental conditions; will design software to implement selected techniques on commercial based software defined radio representative hardware; will evaluate techniques for feasibility to implement on representative hardware.	.000	.000	3.200	
Total	6.953	7.082	16.119	

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.