Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Army										DATE: February 2012	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603270A: *Electronic Warfare Technology*							
COST ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**Cost To Complete**	**Total Cost**
Total Program Element	18.973	23.640	21.683	-	21.683	22.598	22.788	23.319	23.632	Continuing	Continuing
K15: *ADVANCED COMM ECM DEMO*	9.103	12.029	9.799	-	9.799	9.951	9.797	9.977	10.145	Continuing	Continuing
K16: *NON-COMMO ECM TECH DEM*	9.870	11.611	11.884	-	11.884	12.647	12.991	13.342	13.487	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates electronic warfare (EW) sensors and software intended to deny, disrupt, locate or destroy the enemy's command, control, and communications (C3) systems and intelligence, surveillance and reconnaissance assets. This PE matures both countermeasures (CM) and counter-countermeasures (CCM) to deny the enemy the use of their systems while protecting US assets from enemy deception and jamming. Project K15 matures and demonstrates capabilities to locate and exploit enemy communication systems including computer networks. Project K16 matures and demonstrates multifunctional EW capabilities (jamming) to enhance platform survivability and provide near real-time situational awareness to the commander through the detection, identification and geo-location of emitters of interest.

Work in this PE is complimentary of PE 0602120A (Sensors and Electronic Survivability), PE 0602270A (Electronic Warfare Technology), and PE 0603772A (Advanced Tactical Computer Science), and fully coordinated with PE 0603003A (Aviation Advanced Technology) and PE 0603313A (Missile and Rocket Advanced Technology).

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Work in this PE is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications-Electronics Research, Development, and Engineering Center (CERDEC), Aberdeen Proving Ground, MD.

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B. Program Change Summary ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**
Previous President's Budget	18.350	23.677	21.501	-	21.501
Current President's Budget	18.973	23.640	21.683	-	21.683
Total Adjustments	0.623	-0.037	0.182	-	0.182
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	1.200	-			
• SBIR/STTR Transfer	-0.406	-			
• Adjustments to Budget Years	-	-	0.182	-	0.182
• Other Adjustments 1	-0.171	-0.037	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
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COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
K15: *ADVANCED COMM ECM DEMO*	9.103	12.029	9.799	-	9.799	9.951	9.797	9.977	10.145	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates sensor and software technologies to locate and identify modern tactical enemy and blue force (friendly) radio frequency (RF) communications, radars and computer networks and nodes. This project enables uninterrupted air and ground based intelligence collection and long range targeting operations in a hostile electromagnetic and cyber environment, and enables communications countermeasures (CM) and counter-countermeasures (CCM) to first intercept, identify, and locate tactical communications, then degrade threat-computer networks and their components.

This project supports Army science and technology efforts in the Command, Control and Communications, Soldier, Ground and Air portfolios.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications - Electronics Research, Development, and Engineering Center (CERDEC), Aberdeen Proving Ground, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Offensive Operations	4.551	7.296	4.900
Description: This effort matures and demonstrates integrated electronic attack (EA) and computer network operations (CNO) hardware and software to execute force protection (FP), EA, electronic surveillance (ES) and signals intelligence (SIGINT) missions in a dynamic, distributed and coordinated fashion. This results in the capability to engage a multitude of diverse multi-node, multi-waveform, multi-platform and cyber (internetworked computers) targets while maximizing overall network efficiency and effectiveness, and preserving blue force/non-combatant communications. Work being accomplished under PE 0603270A/ project K16 and PE 0602270/project 906 compliment this effort.			
FY 2011 Accomplishments: Enhanced system baseline for distributed operation; focused techniques development on threat priorities; identified and implemented EW asset and network load balancing techniques to ensure effective and efficient operation; developed techniques to ensure coordination and interoperability with Counter Remote Control Improvised Explosive Device (RCIED) Electronic Warfare (CREW) systems.			
FY 2012 Plans:			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Continue fabrication and coding of integrated networked EW technologies and techniques to address current and emerging threat priorities; complete network load balancing and resource management techniques to aid in this integration; refine and integrate real-time, On-The-Move (OTM) direction finding / Geolocation technologies; demonstrate EW technologies in a distributed Comms-EW mission at various levels of interoperability with network registered assets (e.g., coexistence, interoperation, and fully integrated) in conjunction with an existing FP mission. Possible demonstration scenario: an individual EW asset acquires three threat signals but is only able to address and defeat one of them due to constraints (e.g., power, bandwidth, or etc.). Because all three detections are reported to the network, other EW assets can address and defeat the two outstanding signals. ***FY 2013 Plans:*** Will develop and demonstrate supporting messaging structures and human-machine interfaces to enable remote users to coordinate the planning and management of EW assets; finalize specifications and protocols to support the collaborative OTM EW functionality of future tactical EW systems; develop CYBER situation awareness functionality for non-traditional tactical EW/Cyber assets.			
Title: Stand-off Non-Cooperative Multi-Intelligence Technologies	4.552	4.733	4.899
Description: This effort matures and demonstrates hardware and software to conduct standoff intelligence, surveillance and reconnaissance in a three dimensional urban battlespace. The goal is to detect, identify, map and display personnel, RF devices and other anomalies located within structures and complex terrain to provide dismounted and remote users with real-time, immediate-area situational awareness. ***FY 2011 Accomplishments:*** Improved and implemented new algorithms and techniques for detection of slow-moving and stationary personnel inside structures and reduce false positives due to multipath signal propagation in urban environments; leveraged data from IED efforts to develop algorithms that would allow through-the-wall detection of personnel carrying weapons and explosive devices; assessed/leveraged recent developments in 3-D visualization and mapping efforts and apply radio frequency detection techniques as necessary to selected ground radars and/or their ground stations. ***FY 2012 Plans:*** Integrate and demonstrate software, algorithms and techniques that provide stand-off sense-through-the-wall, counter-cover/ concealment/camouflage, and denial-and-deception as pre-planned product improvement increments into PEO Soldier/PM Soldier Sensors & Lasers hand held devices; demonstrate target identification and discrimination technologies (e.g., RF measures and signals intelligence appliques, personnel detection and fused reporting) against select modern RF emitter threats, RCIEDs and other targets with low or indistinct emissions for both airborne and ground based platforms. ***FY 2013 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Will examine current and emerging RF threat discrimination and neutralization algorithms and hardware suites of disparate RF measurement and signals intelligence (MASINT) systems to design an integrated MASINT/Multi-INT vehicle-mounted detection system that is fully interoperable with current electronic countermeasures; analyze and identify new waveforms, techniques and common hardware components needed to facilitate integration and modularity of an integrated multi-INT system; compose sensor cross cueing algorithms to increase the probability of detection of threat devices with low or indistinct emissions at greater standoff distances; extend detection capability to monitor multiple threat device emissions/transmissions simultaneously.			
Accomplishments/Planned Programs Subtotals	9.103	12.029	9.799

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, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
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COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
K16: *NON-COMMO ECM TECH DEM*	9.870	11.611	11.884	-	11.884	12.647	12.991	13.342	13.487	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates non-communication, multi-functional electronic warfare (EW) capabilities that enhance the survivability of Army air and ground platforms and dismounted Soldiers. This project matures and demonstrates radio frequency (RF), infrared (IR) and electro-optical (EO) sensors and jamming sources to detect, locate, deceive, and neutralize (jam) booby traps, radar-directed target acquisition systems, target-tracking sensors, surface-to-air missiles (SAMs), air-to-air missiles (AAMs), and top-attack and electronically-fuzed munitions. This project also enables electronic support (ES) hardware and software to detect, identify and geolocate emitters of interest from an effective standoff distance to provide near real-time situational awareness.

This project supports Army science and technology efforts in the Command Control and Communications, Ground, Air and Soldier portfolios.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications-Electronic Research, Development, and Engineering Center (CERDEC), Aberdeen Proving Ground, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Distributed Aperture Infrared Countermeasures (DAIRCM) Technologies	4.861	4.444	5.193
Description: This effort matures and demonstrates countermeasure technologies that provide platform protection and integrated cueing against electro-optically (EO) and infra-red (IR) guided threats.			
FY 2011 Accomplishments: Completed design of closed loop IRCM techniques and multi-band laser demonstrator; integrated advanced two color IR missile warning capability to improve overall demonstrator performance with high probability of detection/low false alarm, while the pointer-tracker expands the mission profile by increasing pointer-tracker reliability and permits simultaneous multiple threat engagement; developed target identification database for mission post analysis; finalized digital threat-warning hardware design; performed assessment on correlation algorithms and architecture.			
FY 2012 Plans: Conduct field demonstration of single modular, compact pointer tracker capability with a multiband laser jammer and an advanced 2-color missile warner capable of searching and defeating multiple engagements of enemy EO/IR threats; demonstrate capability			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
against a representative advanced infrared man-portable air defense system design; perform assessment on correlation algorithms and architecture. ***FY 2013 Plans:*** Will modify the pointer tracker optics to broaden the wavelength coverage from near to mid-IR to allow for simultaneous jam and receive capability; integrate modified optics and design, code and integrate jam/receive deconfliction algorithms into pointer tracker system; demonstrate closed-loop interrogation techniques against seekers in a hardware-in-the-loop laboratory environment; conduct limited field assessment of closed-loop interrogation techniques against simulated IR missiles.			
Title: Advanced Tactical Radio Frequency Countermeasures (ATRFCM) Technologies ***Description:*** This effort matures and demonstrates integrated EW/direction finding technologies that provide protection of air, ground and dismounts from emerging RF threats at standoff distances. Work accomplished under PE 0602120A/project H15, PE 0602270A/project 906, and PE 0603270A/project K15 complements this effort. ***FY 2011 Accomplishments:*** Optimized platform protection capabilities through the coordination of real-time dynamic antenna selection; demonstrated real time on-the-move direction finding and geolocation capabilities that complement targeting and cueing activities of overarching force protection and Comms EW missions to support a common operating picture. ***FY 2012 Plans:*** Demonstrate a distributed, networked, multi-platform (air and ground) EW framework enabling the coordinated detection, geolocation, reporting, and engagement of multiple diverse threat waveforms; demonstrate automatic synchronization of EW framework with blue force communications to deconflict threats from friendly forces for improved survivability and situational awareness. ***FY 2013 Plans:*** Will enhance software and firmware of advanced EW demonstration platform to implement and demonstrate coordinated detect/defeat capability; demonstrate increased threat coverage and protection range offered by distributed, cooperative jamming capability for protection of convoys; develop dynamic, local area timing schemes to support simultaneous/multi-function EW/defensive electronic attack (EA) capabilities; design logic circuitry and associated software code to integrate electronic support (ES) and EA functionalities in a coordinated ES/EA capability.	5.009	4.667	4.191
Title: Combat ID Technology Demonstrations ***Description:*** This effort augments and enhances existing light weight dismount and tactical vehicles systems to add real-time Combat Identification (CID) capabilities, along with embedded training, without significantly altering size, weight and power of current and emerging equipment packages. The focus is on making current systems and capabilities (weapon sites, radios,	-	2.500	2.500

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
sensors, and etc.) multifunctional rather than adding stand-alone CID systems that would increase the burden on the Soldier. Work accomplished under PE 0602120A/project H15 compliments this effort. ***FY 2012 Plans:*** Leverage light vehicle demonstration to complete final waveform modifications and select Software Radio Waveform interrogation approach for coding onto Joint Tactical Radio System platform. ***FY 2013 Plans:*** Will integrate duel interrogation (laser/RF with weapons orientation sensors) capability to increase probability of positive friend, enemy, neutral, non-combatant identification at increased ranges; modify wireless personal area network waveforms and soldier radio waveform to transmit RF position location information to existing mobile/handheld displays; modify existing weapons system software to add audible, tactile and visual cues into weapon sight for display; improve CID training mode with electronic bullet capability for existing hardware to support both mission execution and training functions; exploit multiple sensor (infrared, RF, etc.) integration to support non-cooperative CID.			
Accomplishments/Planned Programs Subtotals	9.870	11.611	11.884

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.