Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Army											DATE: April 2013	
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)	**All Prior Years**	**FY 2012**	**FY 2013#**	**FY 2014 Base**	**FY 2014 OCO ##**	**FY 2014 Total**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**Cost To Complete**	**Total Cost**
Total Program Element	-	23.046	21.683	25.348	-	25.348	22.188	21.319	21.632	22.058	Continuing	Continuing
K15: *Advanced Comm Ecm Demo*	-	11.737	9.799	9.951	-	9.951	9.797	9.477	9.645	9.828	Continuing	Continuing
K16: *Non-Commo Ecm Tech Dem*	-	11.309	11.884	15.397	-	15.397	12.391	11.842	11.987	12.230	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

Note

FY14 increase for EW Countermeasure demonstrations.

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 for 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 2012**	**FY 2013**	**FY 2014 Base**	**FY 2014 OCO**	**FY 2014 Total**
Previous President's Budget	23.640	21.683	22.598	-	22.598
Current President's Budget	23.046	21.683	25.348	-	25.348
Total Adjustments	-0.594	0.000	2.750	-	2.750
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.594	-			
• Adjustments to Budget Years	-	-	2.750	-	2.750

Exhibit R-2A, RDT&E Project Justification: PB 2014 Army			DATE: April 2013
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COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
K15: *Advanced Comm Ecm Demo*	-	11.737	9.799	9.951	-	9.951	9.797	9.477	9.645	9.828	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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, Communications and Intelligence, Soldier, Ground and Air portfolios.

The cited work is consistent with the Assistant Secretary of Defense for 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 2012	FY 2013	FY 2014
Title: Offensive Operations	7.096	4.900	4.976
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 2012 Accomplishments: Continued fabrication and coding of integrated networked electronic warfare (EW) technologies and techniques to address current and emerging threat priorities; completed network load balancing and resource management techniques to aid in this integration; refined and integrated real-time, on-the-move (OTM) direction finding / geolocation technologies; demonstrated EW technologies			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Army		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
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. 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:*** 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. ***FY 2014 Plans:*** Will code and demonstrate protocol exploitation software and techniques that allow users to remotely coordinate, plan, control and manage tactical EW and Cyber assets; develop techniques to exploit protocols of threat devices not conventionally viewed as Cyber to expand total situational awareness by providing access to and control of adversary electronic devices in an area of operations.			
Title: Stand-off Non-Cooperative Multi-Intelligence Technologies ***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. In FY13 and FY14 this effort supports Technology Enabled Capability Demonstration 3.b: Surprise/Tactical Intelligence-Actionable Intelligence. ***FY 2012 Accomplishments:*** Integrated and demonstrated software, algorithms and techniques that provided 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; demonstrated 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:*** 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	4.641	4.899	4.975

Exhibit R-2A, RDT&E Project Justification: PB 2014 Army		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
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. ***FY 2014 Plans:*** Will integrate MASINT/Multi-INT vehicle mounted detection capability with soldier and airborne sensors (electro- optic/infrared/ full motion video) to support higher fidelity standoff detection and targeting of threat emitters for small units; mature multi-platform cross cueing techniques and test multi-int detection and geolocation in a laboratory environment; mature algorithms to fuse multi source detection, geolocation and targeting data into a high fidelity common display and design and code a mechanism to ingest this data into DCGS-A for greater area situational awareness.			
Accomplishments/Planned Programs Subtotals	11.737	9.799	9.951

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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 2014 Army			DATE: April 2013
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COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
K16: *Non-Commo Ecm Tech Dem*	-	11.309	11.884	15.397	-	15.397	12.391	11.842	11.987	12.230	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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, Communications and Intelligence, Ground, Air and Soldier portfolios.

The cited work is consistent with the Assistant Secretary of Defense for 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 2012	FY 2013	FY 2014
Title: Distributed Aperture Infrared Countermeasures (DAIRCM) Technologies	4.344	5.193	4.012
Description: This effort matures and demonstrates countermeasure technologies that provide platform protection and integrated cueing against electro-optically (EO), infra-red (IR) and radio frequency (RF) guided threats.			
FY 2012 Accomplishments: Conducted 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; demonstrated capability against a representative advanced infrared man-portable air defense system design; perform assessment on correlation algorithms and architecture.			
FY 2013 Plans:			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
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. ***FY 2014 Plans:*** Will modify IR jam/receive deconfliction algorithms and interrogation techniques to develop cooperative countermeasures to protect multiple aircraft; integrate air threat detection and geo-location data with ground situational awareness to cooperatively defeat threats to both air and ground platforms; integrate miniature waveform generators, efficient high power amplifiers, and optical fiber signal distribution to add a low weight/power RF jammer to Army rotorcraft; mature and leverage EO, IR and RF jammers for an integrated aircraft survivability architecture for more efficient jamming and reduced observable signature of the aircraft.			
Title: Advanced Tactical Radio Frequency Countermeasures (ATRFCM) Technologies	4.565	4.191	4.762
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 2012 Accomplishments:*** Demonstrated a distributed, networked, multi-platform (air and ground) EW framework enabling the coordinated detection, geolocation, reporting, and engagement of multiple diverse threat waveforms; demonstrated automatic synchronization of EW framework with blue force communications to deconflict threats from friendly forces for improved survivability and situational awareness. ***FY 2013 Plans:*** 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. ***FY 2014 Plans:*** Will modify and integrate previously matured techniques and develop new techniques, algorithms and waveforms for the detection, location and neutralization of RF threat devices; mature techniques to provide an integrated situational awareness			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
picture and countermeasures against identified threats; improve interoperability between detection and neutralization systems with other systems on the platform such as communications, networking and global positioning system/position navigation.			
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, 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. In FY13and FY14 this effort supports Technology Enabled Capability Demonstration 3.b: Surprise/Tactical Intelligence-Actionable Intelligence. ***FY 2012 Accomplishments:*** Leveraged light vehicle demonstration to complete final waveform modifications and selected Software Radio Waveform interrogation approach for coding onto Joint Tactical Radio System platform. ***FY 2013 Plans:*** 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. ***FY 2014 Plans:*** Will complete component modifications to multifunction laser, site and weapon orientation module which are used to increase probability of positive friend, enemy, neutral non-combatant identification at increased ranges; conduct laboratory and limited field test to demonstrate modified wireless personal area network waveforms and Soldier radio waveforms, weapons orientation module and multifunction laser; document and assess user feedback and make appropriate component and integration modifications; mature non-cooperative target identification techniques.	2.400	2.500	3.123
Title: EW Counter Countermeasures ***Description:*** This effort matures and demonstrates hardware and software to counter emerging electronic warfare threats. Work being accomplished under PE 0602270A/project 906 compliments this effort. ***FY 2014 Plans:***	0.000	0.000	3.500

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
Will leverage technical assessments of a family of threat systems and conduct a full vulnerability assessment on these systems, generate potential mitigation strategies, determine associated CONOPs and employment scenarios; mature and optimize mitigation strategies that have the highest probability of success by demonstrating the feasibility of the proposed approached in the laboratory, leveraging threat system components, surrogates and modeling and simulation resources.			
Accomplishments/Planned Programs Subtotals	11.309	11.884	15.397

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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.