ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE
3 - Advanced technology development	**0603270A - EW TECHNOLOGY**

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
Total Program Element (PE) Cost		23537	18756	11273	9213	17448	18489	18744	18944
K12	AN/AVVR-1 LASER WARNING RECEIVERS	0	1906	0	0	0	0	0	0
K15	ADVANCED COMM ECM DEMO	6330	3134	4853	2764	8466	9335	9385	9368
K16	NON-COMMO ECM TECH DEM	7038	7617	6420	6449	8982	9154	9359	9576
K19	MULTIPLE INTEL REMOTED SENSOR SYSTEM - BLK 1	4413	6099	0	0	0	0	0	0
K20	SHORTSTOP	5756	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: Matures and demonstrates multi-intelligence remote sensor technologies and electronic warfare (EW) survivability systems to significantly enhance the Objective Force's survivability, lethality and ability to conduct offensive operations to win the information war. It addresses the need to locate, disrupt or destroy the enemy's command, control, and communications (C3) systems and infrastructure, tactical radar surveillance and radio frequency (RF)/infrared (IR)/electro-optical (EO) homing, guided and directed munitions and missile systems. Communications countermeasures (CM) and communications counter-countermeasures (CCM) applications are matured to deny the enemy the use of their sensors while protecting US Army sensors from enemy deception and jamming. The advanced communications Electronic Countermeasures (ECM) K15 project provides technology demonstrations in CM, information collection and reporting to transition to Army intelligence and electronic warfare (IEW) systems. This project also supports demonstrations of automatic/automated fusion of intelligence, information, and data from multiple sources to provide unit of action/unit of employment common operating picture (COP). The Non-communication ECM technology demonstration project (K16) focuses on the feasibility and effectiveness of non-communications ECM and electronic support/electronic intelligence. This project provides self-protection from radar, (EO), and (IR) guided anti-aircraft artillery, surface-to-surface missiles, artillery, and top attack weapons. Further, it provides precise targeting information on non-communications emitters. Technologies matured as part of this PE will be demonstrated in the integrated situation awareness (SA) and targeting advanced technology demonstration (ATD), and the integrated counter measures platform survivability effort. Deception and jamming of the enemy through long range netted sensor webs will assist in neutralizing the enemy's ability to see, understand, decide and shoot first. RF based detection and jamming techniques will be matured, in coordination with on-going IR sensor research, to protect ground forces against command and sensor initiated booby trap improvised explosive devices (IEDs). This work is consistent with the Army Science and Technology Master Plan, and the Army Modernization Plan. The program element contains no duplication with any effort within the Military Department. Work is provided by the US Army Communications-Electronics Command, Fort Monmouth, NJ. This program supports the Objective Force transition path of the Transformation Campaign Plan (TCP).

There are no Defense Emergency Response Funds provided to this program.

B. Program Change Summary	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget (FY 2003)	24367	11600	10867	14556
Current Budget (FY 2004/2005 PB)	23537	18756	11273	9213
Total Adjustments	-830	7156	406	-5343
Congressional program reductions				
Congressional rescissions		-695		
Congressional increases		8400		
Reprogrammings	-232	-108		
SBIR/STTR Transfer	-598	-441		
Adjustments to Budget Years			406	-5343

Change Summary Explanation: Funding - FY 2004/2005: Funds realigned to higher priority requirements.

FY03 Congressional Adds:
($2000) AN/AWR-1 Laser Warning Receivers, Project K12; ($6400), Multi-functional Intelligence & Remote Sensing System, Project K19.

Projects with no R-2A:
AN/AWR-1 Laser Warning Receivers, Project K12 ($1972). The objective of this one year congressional add is to complete the qualification of the AN/VVR-3, procure prototype systems and perform a demonstration on a combat vehicle. Conduct an analysis of improvements to the AN/VVR-3 to determine the modifications necessary to update the system for future threats and to incorporate an Angle of Arrival module. No additional funding is required to complete this project.

Multi-functional Intelligence & Remote Sensing System, Project K19 ($6310): The objective of this one-year congressional add is to: Investigate new power management techniques/algorithms for Multi-functional Intelligence Ground Sensors; Integrate advanced geo-physical and EO/IR sensors into the Block IA Silent Warrior ruggedized system; Investigate techniques for Low Probability of Intercept/Low Probability of Detection communications; Demonstrate Silent Warrior Block 1A systems to refine tactics, techniques and procedures. No additional funding is required to complete this project.

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February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603270A - EW TECHNOLOGY**	**K15**

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
K15	ADVANCED COMM ECM DEMO	6330	3134	4853	2764	8466	9335	9385	9368

A. Mission Description and Budget Item Justification: This project matures and demonstrates the ability to locate and identify modern tactical battlefield enemy and blue force radio frequency (RF) communications and radars for the Objective Force to conduct uninterrupted air and ground based intelligence collection and long range targeting operations in a hostile electromagnetic environment. This project provides flexible, modern systems to achieve information dominance, protect the force and shape the battlespace. The aim of the Warfighter Electronic Collection and Mapping program is to provide the warfighter at the unit level with the ability to locate enemy tactical radio RF emitters. Electronic Support for the Objective Force (OF) will provide lightweight, low cost UAV and Unattended Ground Sensors (UGS) Electronic Support Measures (ESM) to detect and locate modern signals of interest. The Joint Intelligence, Surveillance, and Reconnaissance (JISR) Advanced Concept Technology Demonstration (ACTD) provides the tools that allow the warfighter, at all echelons, a comprehensive near-real time view of ISR information based on both traditional and selected non-traditional sensors to enhance situation awareness. Information Operations for the OF investigates, researches, and demonstrates communications countermeasures (CM) and counter-countermeasures (CCM) technologies to first intercept, identify, and locate tactical communications and then manipulate threat computer networks and their components. The C2 Protect and Attack ATD demonstrated electronic attack products that have the ability to disrupt, deny, degrade, deceive or destroy computer networks, C2, and resident information/data. This project supports the Objective Force transition path of the Transformation Campaign Plan.

No Defense Emergency Response Funds were provided to the project.

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
- Tactical C2 Protect ATD: In FY02, demonstrated the ability to protect the Army's tactical information systems by evaluating the effectiveness of attack against protection mechanisms in a laboratory demonstration. Numerous vulnerabilities of the tactical internet were uncovered in field tests. Remedial steps to prevent intrusion/unauthorized access were documented and passed on to PEO-C3-T for implementation.	1141	0	0	0

Accomplishments/Planned Program (continued)	FY 2002	FY 2003	FY 2004	FY 2005
- JISR ACTD: In FY02, demonstrated software for automated intelligence support system mission planning and military intelligence (MI) asset management tools. Completed antenna pattern test system mission planning. Demonstrated terrain-reasoning tools. In FY03, integrate advanced intelligence web applications into existing brigade intelligence systems to enhance situation awareness by ultimately increasing sensor feeds, timeliness, and number of users accessing shared data. Demonstrate initial operational capability and participate in two field exercises. Other work related to this project is performed under project K16.	2050	2431	0	0
- Warfighter Electronic Collection, Mapping, and Support for Objective Force: This effort matures and demonstrates technologies that enable tactical signal intercept and jamming. In FY02, completed design and fabrication of three hardware platforms for field test and evaluation of RF collection algorithm performance. In FY03, integrate warfighter RF collection system co-resident algorithms on Small Unit Operations (SUO) radio platform to enable SUO radios to perform RF collection. In FY04, provide advanced simulation capability of ESM sensors and integrate to the Mounted Maneuver Battlespace Lab at Ft. Knox to evaluate tactics and tactical internet throughput requirements to support networked, unattended radio frequency sensors for Future Combat Systems. In FY05, perform lab and field test for networked radio frequency (RF) Electronic Support Measure (ESM) sensor architecture for unmanned ground and air vehicle applications for Future Combat Systems. Integrate and demonstrate unattended ground and air RF ESM sensors with the network radio links matured by the Networked Sensors for the Objective Force (NSfOF) Advance Technology Demonstration program and other future combat system (FCS) efforts. Integrate software in model of Information Operations systems, test wired and wireless detection and recognition algorithms for correlation of virtual addresses and real locations. Other work related to this project is performed under project K16.	3139	703	4853	2764
-	0	0	0	0
Totals	6330	3134	4853	2764

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603270A - EW TECHNOLOGY**	**K16**

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
K16	NON-COMMO ECM TECH DEM	7038	7617	6420	6449	8982	9154	9359	9576

A. Mission Description and Budget Item Justification: This project matures and demonstrates the Objective Force non-communication, multi-functional electronic warfare capability to enhance the survivability of ground combat vehicles and the dismounted forces. The vehicle survivability approach will provide detection avoidance through signature management and hit avoidance using warning receivers and countermeasures. This project demonstrates recent advances in radio frequency (RF), infrared (IR) and electro-optical (EO) sensor and jamming sources to detect, locate, deceive and jam booby traps, radar directed target acquisition systems, target-tracking sensors, surface-to-air missiles (SAMs), air-to-air missiles (AAMs), top attack and fuzed munitions. The ability to neutralize booby trap improvised explosive devices (IEDs) will be matured and demonstrated by embedding the maximum capability in projected FCS/Objective Force systems to minimize vehicle weight, cost, logistics and fielding. Additionally, this project will demonstrate EO technologies and countermeasures technologies against laser-aided and electro-optically directed gun or missile systems. This project also demonstrate those Electronic Support (ES) technologies used against communications and non-communications signals for targeting and tactical Situation Awareness (SA). Efforts are focused on detecting, identifying and geolocating emitters of interest from an effective standoff distance and providing near real-time SA updates to the Unit of Action commander to support a "see first, understand first, act first, finish decisively" standard. The Warfighter Electronic Collection and Mapping (WECM) program provides the capability at the unit level to locate enemy tactical radio frequency (RF) emitters. This will employ non-traditional uses of software defined radios to perform tactical, short-range detection of threat emission. The Joint Intelligence, Surveillance, and Reconnaissance (JISR) ACTD will provide the tools that allow the warfighter, at all echelons, a comprehensive near-real time view of ISR information based on both traditional and selected non-traditional sensors to enhance situation awareness. This program supports the Objective Force transition path of the Transformation Campaign Plan.

No Defense Emergency Response Funds were provided to this project.

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603270A - EW TECHNOLOGY**	**K16**

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
- This effort matures and demonstrates technologies that enhance system survivability. In FY02, integrated and evaluated integrated countermeasures capabilities in a ground vehicle. Field tested millimeter wave electronic countermeasures, live fire top attack fuze jamming, and deception of battlefield surveillance radars. In FY03, perform antitank guided missile (ATGM), surface-to-air missile and anti-aircraft artillery CM modeling and simulation. In FY04, integrate 2 color mid-IR ground vehicle missile warning sensors with IR jammers for use against ATGMs with RF counter reconnaissance deception and jammer subsystems for use against surveillance radars and top attack munitions. Mature and conduct lab test for detection, location, deception and countermeasure algorithms against enemy sensors and booby traps, for operation beyond the kill range of the munition, on a moving vehicle. In FY05, Conduct lab and field demos of IED neutralization techniques conducted beyond 1.5 times the kill range of the munition.	1776	2637	6420	6449
- This effort matures and demonstrates technologies that enable the networked information operations with joint intelligence, surveillance, reconnaissance, and intercept. In FY02, conducted distributed interactive simulation to evaluate feeds into the Joint Intelligence, Surveillance and Reconnaissance (JISR) Advanced Concept Technology Demonstrations (ACTD). In FY03, demonstrate in a field test, RF collection system on surrogate RF radio platform to detect and geolocate enemy's close battle, low power tactical communications. Demonstrate electronic mapping at vehicle, company and JISR levels. Demonstrate ability of radios to network and pass threat situation awareness information to Battle Command Brigade and Below and JISR in less than two minutes. Perform final experiment to demonstrate data correlation, cueing, complete mission planning, and analysis tools. Correlate imagery intelligence, human intelligence and signals intelligence into human centered decision making formats that can be quickly used at levels from combat vehicle to division commander. Transition to JISR ACTD, PM Prophet and PM ACS. Perform field test for networked RF collection capabilities as an embedded function in the SUO radio. Perform lab test for the system architecture's ability to detect, identify, and locate enemy tactical radios with a CEP of 200m or better to support the Objective Force Warfighter. Refine and optimize software algorithms to exploit enemy RF transmissions that represent threats to Future Combat Systems vehicles. Other work related to this project is performed under project K15.	5262	4980	0	0
Totals	7038	7617	6420	6449