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

June 2001

BUDGET ACTIVITY
3 - ADV TECHNOLOGY DEV

PE NUMBER AND TITLE
0603270A - Electronic Warfare Technology

COST (In Thousands)		FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost		15678	30575	13868	0	0	0	0	0	0	0
K15	ADVANCED COMM ECM DEMO	6709	5277	6584	0	0	0	0	0	0	0
K16	NON-COMMO ECM TECH DEM	8969	9941	7284	0	0	0	0	0	0	0
K19	MULTIPLE INTEL REMOTED SENSOR SYSTEM - BLK 1	0	12385	0	0	0	0	0	0	0	0
K20	SHORTSTOP	0	2972	0	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification:

PLEASE NOTE: This administration has not addressed FY2003-2007 requirements. All FY 2003-2007 budget estimates included in this book are notional only and subject to change.

This Program Element (PE) matures and demonstrates multi-intelligence remote sensor technologies and Electronic Warfare (EW) systems in support of the Army's Objective Force commanders. It addresses the need to locate, disrupt or destroy the enemy's command, control, and communications (C3) systems and infrastructure. The goal of this PE is to significantly enhance the Objective Force's conduct of information operations (IO) to win the information war (IW). Both non-communications and communications applications are addressed by this PE. It also looks at communications countermeasures (CM) and communications counter-countermeasures (CCM) applications. Project DK15 provides technology demonstrations in CM, information collection and reporting to transition to Army intelligence and electronic warfare (IEW) systems. This transformation will be accomplished through the block improvement process. This project also supports demonstrations of automatic/automated fusion of intelligence, information, and data from multiple sources. Project DK16 focuses on the feasibility and effectiveness of non-communications Electronic Countermeasures (ECM) and electronic support/electronic intelligence (ES/ELINT). This project provides self-protection from radar, electro-optical (EO), and infrared (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 developed and matured as part of this PE will be demonstrated in the Integrated Situation Awareness (SA) and Targeting (ISAT) Advanced Technology Demonstration (ATD), and the Integrated Counter Measures (ICM) platform survivability effort. Project DK19 develops testable prototypes showing the operational payoff of advanced self-configuring, multiple intelligence remote sensors. By integrating this suite of advanced technologies into an operational system, it allows the Special Operations Forces and US Army to develop tactics and techniques to put the technology to use when it is fielded. The cited work is consistent with the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, Project Reliance, and the tri-service Reliance agreements on EW. Work in this PE is related to and fully coordinated with PE 0602270A (Electronic Warfare Technology), and various Navy and Air Force PEs in accordance with the Reliance joint planning process. Navy developments are conducted in PEs 0604755N (Ship Self Defense), 0604575N (Electronic Warfare Support), and 0604573N (Shipboard Electronic Warfare Improvements). Air Force developments are conducted in PEs 0604738F (Protective Systems), 0604793F (Tactical Protective Systems) and 0604710F (Reconnaissance Electronics Warfare Systems). The PE contains no duplication with any effort within the Military Departments. Work is performed by the US Army Communications-Electronics Command (CECOM), Fort

Monmouth, NJ.

B. Program Change Summary	FY 2000	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2001 PB)	16060	15359	13818	0
Appropriated Value	16169	30859	0	
Adjustments to Appropriated Value	0	0	0	
a. Congressional General Reductions	0	0	0	
b. SBIR / STTR	-382	0	0	
c. Omnibus or Other Above Threshold Reductions	-59	0	0	
d. Below Threshold Reprogramming	0	0	0	
e. Rescissions	-50	-284	0	
Adjustments to Budget Years Since FY2001 PB	0	0	50	
Current Budget Submit (FY 2002/2003 PB)	15678	30575	13868	0

Change Summary Explanation: Funding - FY 2001 - Congressional adds were received for:
Shortstop to enhance and expand techniques against Category 1 fuses, mature countermeasure techniques against Category 2 fuses and design and mature antenna and battery box for man-pack version of Shortstop Electronic Protection System (+3000).
Multiple Intelligence Remoted Sensor System to establish and demonstrate an initial prototype capability for block one packaging of Multiple

Intelligence Remoted Sensor System initial operational capability with low risk/low development items(+12500).

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June 2001

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - ADV TECHNOLOGY DEV	**0603270A - Electronic Warfare Technology**	**K15**

COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
K15 ADVANCED COMM ECM DEMO	6709	5277	6584	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: This project improves the Army's Objective Force ability to conduct uninterrupted intelligence operations in a hostile electromagnetic environment. Recent operations have re-enforced the necessity for timely and accurate gathering and dissemination of information and intelligence. The intent of this project is to provide flexible, modern systems to achieve information dominance, protect the force, and shape the battlespace. This project investigates, researches, and demonstrates communications CM and CCM technologies to intercept, identify, locate and manipulate threat computer networks and their components. Further, it focuses on testing, evaluating, and integrating specific IO/IW components, hardware (HW), and software (SW). It also demonstrates and evaluates electronic attack products that have the ability to disrupt, deny, degrade or destroy computer networks and resident information/data. Knowledge gained will be used to assess the vulnerability of US/friendly systems to threat cyber-attack, and to develop protection capabilities. This program supports the Objective Force transition path of the Transformation Campaign Plan (TCP).

FY 2000 Accomplishments

- 1761
  - Integrated signal intelligence (SIGINT)/moving target indicator (MTI) sensor cross-cueing and situation displays into the Common Ground Station (CGS) and All Source Analysis System (ASAS). Completed transition of operator planning tool to Guardrail.
  - Designated system architecture and began prototyping for JISR Advanced Concept Technology Demonstration (ACTD). Identified joint experiments.
- 762
  - Integrated technology to provide intelligence collection, CM/CMM capabilities and alerts/warnings for tactical units to enable interception, identification, and geolocation of threat emitters in the presence of decoys, deception, and jamming.
  - Matured brassboard remotely reprogrammable payload to support close-in, pre-filtering for electronic mapping of the battlefield.
  - Assessed collection, timing allocation, and operational concept of multi-function capability through Battle Lab Distributed Interactive Simulation (DIS) experiments.
- 4186
  - Demonstrated capability to mature and launch both radio frequency (RF) and wired-based attacks against Army information systems as a tool to validate protection mechanisms.
  - Performed field testing and validation of Army First Digitized Division (FDD) command and control (C2) protection systems against developed attacks.

FY 2000 Accomplishments (Continued)

- Conducted vulnerability assessment to evaluate level of security achieved / tool suitability based on test results.
- Iteratively revised protect/attack tools to counter newly identified threats.

Total 6709

FY 2001 Planned Program

- 1462 - Integrate wide-band conformal-antenna and specific emitter identification technology into advanced intelligence collection and CM models. Prototype in tactical software radio testbed.
  - Perform additional Battle Lab simulation experiments to further refine operational concepts, and improve signal mapping and visualization and analysis tools for Future Combat Systems (FCS).
  - Demonstrate a multi-function RF collector prototype to search for, intercept, identify and locate low-power threat emitters.
- 3707 - Provide Objective Force with information operation capability to detect and recognize threat computers and resident information.
  - Provide a stealthy information operation capability to disrupt, deny, degrade or destroy information resident in threat computers or computer networks.
  - Design and conduct distributed simulation experiments to support maturation efforts and training for integrated C2 protect and attack capabilities. Demonstrate in a field test for the digitized division. Provide results/recommendations to Program Executive Officer (PEO) Command, Control and Communications Systems (C3S) and PEO Intelligence, Electronic Warfare and Sensors (IEW&S). Jointly develop a transition and integration plan.
- 108 - Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs.

Total 5277

FY 2002 Planned Program

- 1141 - Demonstrate the ability to protect the Army's tactical information systems by evaluating the effectiveness of attack tools against protection mechanisms in a laboratory demonstration. Validate the successful attainment of Tactical C2 Protect ATD exit criteria.
- 3393 - Demonstrate and evaluate the multi-function electronic collection and mapping system in a simulation model that reflects the FCS environment.
- 2050 - Complete tools for automated intelligence support system mission planning and military intelligence (MI) asset management tools.

FY 2002 Planned Program (Continued)

- Complete antenna pattern test system mission planning tools for JISR ACTD.
- Complete terrain reasoning tools for JISR ACTD.

Total 6584

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - ADV TECHNOLOGY DEV	**0603270A - Electronic Warfare Technology**	**K16**

COST (In Thousands)		FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
K16	NON-COMMO ECM TECH DEM	8969	9941	7284	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: This project researches and investigates the Army's Objective Force non-communications EW HW/SW CM technologies. The intent of this project is to provide Army aviation and ground vehicles with full dimensional protection using an integrated multispectral suite of precision warning sensors. It demonstrates and evaluates the feasibility and utility of these technologies to provide self-protection against optical, EO, IR and radar threats. The project will demonstrate integrated multispectral radar and IR CM to provide Army aircraft with full spectrum protection against advanced missiles and Integrated Air Defense Systems (IADS). Additionally, this project will demonstrate a "non-traditional" use of electronic combat systems to provide precision targeting, combat identification, and real time SA updates. This program supports the Objective transition path of the Transformation Campaign Plan (TCP).

FY 2000 Accomplishments

- 7623
  - Conducted Distributed Interactive Simulations (DIS) experiments to refine integrated sensors, targeting functional modes, and operator interfaces for aviation and ground users.
  - Investigated multi-wavelength missile warning sensor technologies to provide extended range detection of missile launches, reduce false alarms, and provide sufficient signature data to discriminate anti-tank from anti-aircraft missiles.
  - Investigated laser warning technologies that can locate and discriminate between laser designators, range finders, and beamriders.
  - Identified communication links and defined variable message format (VMF) requirements to report missile launch, laser designator, laser range finder, laser beamriders and radar from aircraft to ground vehicles and command/intelligence fusion centers.
  - Investigated new instantaneous/time refined techniques to precisely locate surveillance and targeting air defense radars.
  - Investigated algorithms/software for correlating missile warning data and digital terrain elevation data to provide location missile launches.
  - Conducted modeling and simulation activities with the Air Maneuver Battle Lab to refine technology architecture for advanced SA and targeting concepts.
- 1346
  - Matured and conducted hardware-in-the-loop tests of an advanced coherent RF jammer modulator/transmitter to defeat coherent phased array radars and anti-aircraft artillery employing RF fuzes.

FY 2000 Accomplishments (Continued)

- Matured and evaluated techniques to counter a new generation of surface-to-air and anti-tank guided munitions (ATGMs) directed against aviation.

Total 8969

FY 2001 Planned Program

- 8142 - Conduct DIS experiments with aviation and ground users to evaluate integrated sensors and targeting functions, then define demonstration scenarios and performance measures.
  - Complete maturation of compact, multi-wavelength missile warning sensor modules.
  - Continue maturation of data fusion software and circuit card modules that locate and identify missile launches, radars, laser designators, laser range finders and laser beamriders.
  - Complete maturation of data fusion software modules to generate SA displays and messages, and select and manage countermeasure responses based on specific threats.
  - Incrementally integrate ISAT modules into the I2WD Systems Integration Lab testbed and conduct hardware-in-the-loop simulation and testing to verify end-to-end functionality.
  - Complete maturation of precision angle of arrival (AOA) laser warning sensor.
- 1523 - Mature, integrate and test component technologies for an ICM capability.
  - Integrate and test Defense Advanced Research Projects Agency (DARPA) and Army Research Laboratory (ARL) microwave and millimeter wave power modules that will reduce transmitter weight and increase reliability and jamming power output.
- 276 - Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs.

Total 9941

FY 2002 Planned Program

•	5445	- Conduct DIS to evaluate ISAT feeds into the Joint Intelligence, Surveillance and Reconnaissance (JISR) Advanced Concept Technology Demonstrations (ACTD).
		- Initiate and complete integration of ISAT hardware and software in a UH-60 (Black Hawk) test aircraft.
		- Demonstrate through flight testing the overall, ISAT compared to Exit Criteria, capability and transition the ISAT technologies.
•	1839	- Integrate and test Integrated Countermeasures (ICM) STO capabilities in a ground vehicle.
		- Field test millimeter wave electronic countermeasures (ECM), live fire top attack fuze jamming and deception of battlefield surveillance radars.

Total 7284