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

February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE
3 - Advanced technology development	**0603772A - Advanced Tactical Computer Science and Sensor Tech**

	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	15890	22153	20255	31565	52597	53665	36539	29895
101	TACTICAL AUTOMATION	12861	16318	15214	14313	19449	20852	21163	21191
1AA	IMRSV PROGRAM FOR SIMULATION BASED OPERATION	0	1431	0	0	0	0	0	0
243	SENSORS & SIGNALS PROC	3029	4404	5041	17252	33148	32813	15376	8704

A. Mission Description and Budget Item Justification: This Program Element (PE) supports information dominance for the Army's Objective Force. To gain and maintain battlefield dominance, the Objective Force needs to understand, decide and act more rapidly than its adversaries. This PE will allow forces to more effectively collect, transfer and display digital information around the battlefield. It provides architectures and products to correct command and control (C2) deficiencies affecting rapid mobile, dispersed operations. It demonstrates technologies necessary for integrated battlefield situational awareness (SA), force synchronization, data correlation, tactical surveillance, and combat identification. Additionally, the technologies support split-based, on-the move (OTM) C2 operations, and multi-sensor payload for an A-160 class unmanned platform. The PE also addresses radar and signal processing. Technology solutions from this PE will be demonstrated in the Agile Commander Advanced Technology Demonstration (ATD) and the Logistics C2 (Log C2) ATD. The cited work is consistent with the Army Science and Technology Master Plan (ASTMP), and the Army Modernization Plan.

Work in this PE is related to and fully coordinated with PE 0602783A (Computer and Software Technology), PE 0602782A (Command, Control and Communications Technology), and PE 0602120A (Sensors and Electronic Survivability). 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. This program supports the Objective Force transition path outlined in the Transformation Campaign Plan.

No Defense Emergency Funds were provided to the program.

B. Program Change Summary	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget (FY 2003)	16366	21674	21794	23159
Current Budget (FY 2004/2005 PB)	15890	22153	20255	31565
Total Adjustments	-476	479	-1539	8406
Congressional program reductions				
Congressional rescissions		-1645		
Congressional increases		2500		
Reprogrammings	-223	-127		
SBIR/STTR Transfer	-253	-249		
Adjustments to Budget Years			-1539	8406

Program Change Summary Explanation: Funding - FY 2005: Funds increased to support Mission Equipment Package for A-160 efforts.

FY03 Congressional Adds:
Automated Passive Propagation Sensor/Analyzer, Project 243 ($1000); IMRSV Program for Simulation Based Operation, Project 1AA ($1500).

Project with no R-2A:
($1500) IMRSV Program for Simulation Based Operation, Project 1AA: The objective of this one year Congressional add is to demonstrate technologies enabling simulation based operation. No additional funding is required to complete this project.

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

February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603772A - Advanced Tactical Computer Science and Sensor Tech**	**101**

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
101	TACTICAL AUTOMATION	12861	16318	15214	14313	19449	20852	21163	21191

A. Mission Description and Budget Item Justification: This project provides improved command and control architectures and technologies for Objective Force information dominance. For the Army Objective Force, the key change in battle command will be in the use of automated information technologies embedded throughout its units that enable it to use information as an element of combat power. This project supplies the tools to provide commanders at all echelons better and more timely information and allow them to command from anywhere on the battlefield, freed from their command posts and while on-the-move. This will allow Objective Force commanders to understand, decide and act faster than their adversaries, resulting in increased OPTEMPO, improved force synchronization and reduced fratricide. This project matures advanced computer science and technology (S&T) solutions addressing: (1) digital transfer and display of horizontal battlefield situational awareness (SA) and a common view of the battlefield; (2) synchronization of combined and joint force operations; and (3) command and control (C2) on-the-move (OTM). It matures key technologies in the following areas: automated decision support; advanced database development and distribution; dynamic digital display and manipulation; web-based architectures for intelligent software agents and mission execution monitoring; and mobile adaptive computing. The Agile Commander ATD will demonstrate digital hardware and software technologies that provide agile, rapidly deployable, split-based C2 operation. The Logistics C2 ATD will mature course of action (COA) analysis and support software tools for combat service support and operational commanders. The Networked Sensors for the Objective Force ATD will demonstrate flexible C2 technologies to enable the commander of a Unit Cell to manage multiple unmanned air and ground platforms in a timely, effective manner. The Tactical Intelligence, Surveillance and Reconnaissance effort will demonstrate a common C2 and Intelligence database that provides the tactical commander a real-time, integrated Red and Blue forces picture with drill-down capability to the underlying intelligence sensor data. Joint developer/warfighter demonstrations will be conducted in coordination with the mounted, dismounted, battle command and combat service support battle labs. Products are transitioned to the Program Executive Offices for integration. 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
- This effort matures and demonstrates technologies that enable distributed C2 while On-the-move. In FY02, demonstrated advanced COA generation software tools to support battle management and enable the commander to rapidly develop and compare courses of action in a collaborative environment that supports parallel planning at different echelons; integrated a model C2 and corresponding vehicle for a C4ISR on-the-move demonstration. Demonstrated logistics COA development and Class III and V COA analysis software and intelligent agents; demonstrated decision support software tools for combat commanders to plan crewing. In FY03, demonstrate COAA and wargaming capabilities and web-based intelligent agents for execution monitoring; and mature initial mobile adaptive computing software, integrate and demonstrate with scaleable communications capabilities to ensure C2 under varying operating conditions, both dispersed and while on-the-move. Participate in C4ISR On-The-Move testbed demonstrations; and mature and transition COA and decision support software to PM-CSSCS and automated data input software to PM-FBCB2. In FY04, demonstrate an increased capability of the C2 model to include execution monitoring of 300 events, tasking of sensors, the reception of a fused sensor data picture and the enabling of networked sensors and fires. In FY05, identify and mature C2 tools for the dismounted commander, from squad leader to unit cell commander, which enable dispersed, collaborative, real-time, on-the-move mission planning and updates through mission execution and analysis. Mature a set of web-based decision support and modeling and simulation tools for FCS and Army Objective Force commanders to collaboratively plan coalition activities in highly mobile operations, mature and demonstrate Army Objective Force manned and unmanned platform and weapons systems operational models and sustainment planning tools for combat service support.	9997	13435	11834	11313
Tactical Intelligence, Surveillance and Reconnaissance - In FY02, evolved performance requirements for a common C2 and intelligence database to provide tactical forces a real-time, integrated Red and Blue forces picture with the capability to drill down to the underlying sensor data, defined battlespace visualization requirements, and adapted COA tools to integrate C2, intelligence and resource allocation data to reduce workload of mission planners. In FY03, demonstrate an integrated common C2 and intelligence database, battlespace visualization products and COA development tools that provide tactical forces a real-time Red and Blue forces picture with drill down capability to underlying sensor data.	2864	2883	0	0

Accomplishments/Planned Program (continued)	FY 2002	FY 2003	FY 2004	FY 2005
- Networked Sensors for the Objective Force - In FY04, leverage, mature, integrate and demonstrate initial C2 tools for mission planning that provide C2 for tactical networked sensors through the management of unmanned platform assets; mature modeling and simulation capability and demonstrate C2 for networked sensors. In FY05, enhance and mature the C2 tools, conduct modeling and simulation to include unmanned weapons platforms, mature a model multi-echelon C2 that includes management of robotic sensor and weapons systems.	0	0	3380	3000
Totals	12861	16318	15214	14313

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February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603772A - Advanced Tactical Computer Science and Sensor Tech**	**243**

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
243	SENSORS & SIGNALS PROC	3029	4404	5041	17252	33148	32813	15376	8704

A. Mission Description and Budget Item Justification: The Army needs a single multi-role sensor with sufficient mobility to support early entry forces or contingency theaters. A full complement of battlefield sensors cannot currently be expediently deployed. The Multi-Mission Radar (MMR) program will mature a Multi-mission HMMWV mounted radar (MMR) technology to support air defense, counter-battery, and air traffic control missions within a single system to enhance FCS mobility and agility. MMR will be self-contained to process target data, identify aircraft/unmanned aerial vehicles (UAVs), and classify artillery, mortar and rockets. All target data will be distributed to relevant units in the battlefield through network centric channels. The Foliage Penetration Radar Program will provide the Warfighter an all weather airborne capability to detect and locate tactical targets employing camouflage and foliage as deceptive tactics. The goal of the Eye in the Sky (EIS) Program is to demonstrate multi-function, integrated sensor, including with moving-target-indicator (MTI)/synthetic aperture radar (SAR), Night Vision and Electronic Sensors Directorate (NVESD)'s electro-optical/infrared (EO/IR) and signals intelligence technologies. This sensor suite will demonstrate manned and tactical unmanned aerial vehicles (UAVs), such as the A-160, with wide area reconnaissance, surveillance and targeting capability in adverse weather. Synergistic operation of sensors with on-board sensor management, correlation of data for an integrated operational picture will be matured with significant leveraging of signal processing developments from industry, DARPA and other services. This project supports the Objective Force transition path of the Transformation Campaign Plan.

No Defense Emergency Response Funds were provided to this project.

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
- Multi-Mission Radar (MMR) and Foliage Penetrating Radar (FOPEN) - In FY02, matured and demonstrated high speed, high-throughput radar processors. Matured and demonstrated energy management for track-while-scan. Conducted verification test to evaluate the achieved performance and determined the readiness of FOPEN synthetic aperture radar (SAR) for participation in an operational demonstration. Demonstrated/validated the concept of operation to use the FOPEN SAR in support of potential users such as SOUTHCOM mission through testing performed at Camp McCain, MS and Appalochecola, FL. In FY03, mature software and hardware components for subsystem to include signal processor and software algorithm. In FY04, perform integration for software and algorithm for target classification, mission sorting and target queuing management. Perform hardware, software, and engineering test. In FY05, perform test with dedicated targets. Demonstrate efficient/lightweight transmitters and power supplies.	3029	3441	5041	11448
- Mission Equipment Package for A-160 - In FY05, mature limited integration of multi-sensor, eye-in-the sky payload for an A-160 class unmanned platform. Sensors include a medium range, high resolution SAR with moving target indicator capability, EO/IR sensor with commensurate range capability, and possible signals intelligence sensor. Mature integrated sensor architecture for automatic cross cueing of sensors and onboard data development.	0	0	0	5804
Automated Passive Propagation Sensor/Analyzer: The purpose of this one year congressional add is to demonstrate an automated weather data collection and measurement module that will be integrated into existing sensor systems. This information, along with target identification data, will be furnished in near real time to shooter for rapid, accurate targeting of threat systems. No additional funding is required.	0	963	0	0
Totals	3029	4404	5041	17252