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

February 2002

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

	COST (In Thousands)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate
	Total Program Element (PE) Cost	16537	16366	21674	21794	23159	29030	31316
101	TACTICAL AUTOMATION	11537	13290	17911	16469	16376	20999	22589
243	SENSORS & SIGNALS PROC	5000	3076	3763	5325	6783	8031	8727

A. Mission Description and Budget Item Justification: This Program Element (PE) supports information dominance for the Army's Objective Force. It will allow forces to more effectively transfer and display digital information around the battlefield. The PE provides architectures and products to correct command and control (C2) deficiencies affecting rapid mobile operations. It addresses technologies necessary for integrated battlefield situational awareness (SA), force synchronization, data correlation, tactical surveillance, and combat identification. Additionally, the technologies support split-based, and on-the move (OTM) C2 operations. It also has application to radar/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), the Army Modernization Plan, and Project Reliance. 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 TCP.

B. Program Change Summary	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2002 PB)	15470	18513	20333
Appropriated Value	15613	16513	0
Adjustments to Appropriated Value	0	0	0
a. Congressional General Reductions	0	-147	0
b. SBIR / STTR	-256	0	0
c. Omnibus or Other Above Threshold Reductions	0	0	0
d. Below Threshold Reprogramming	1323	0	0
e. Rescissions	-143	0	0
Adjustments to Budget Years Since FY2002 PB	0	0	1341
Current Budget Submit (FY 2003 PB)	16537	16366	21674

Program Change Summary Explanation:

Significant Change:
FY02 ($-2000) Congressional reduction in Project 101, GCSS Demonstration.

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

February 2002

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

COST (In Thousands)		FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate
101	TACTICAL AUTOMATION	11537	13290	17911	16469	16376	20999	22589

A. Mission Description and Budget Item Justification: This program provides improved architectures and products for Objective Force information dominance. Program goals include improved force synchronization and reduced fratricide. This PE matures technologies necessary for display of a common view of the battlefield. It matures advanced computer science and technology (S&T) solutions addressing: (1) digital transfer and display of horizontal battlefield situational awareness (SA); (2) synchronization of combined and joint force operations; and (3) command and control (C2) on-the-move (OTM). This project researches and investigates key technologies in the following areas: automated decision support; advanced database development and distribution; data compression; dynamic digital display and manipulation; web-based architectures; and automated navigation/geopositioning. 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. Joint developer/warfighter demonstrations will be conducted in coordination with the mounted, dismounted, battle command and combat service support battle labs. Products will be transitioned to the Program Executive Offices for integration. This project supports the Objective Force transition path of the TCP.

FY 2001 Accomplishments:

- 4362 - Demonstrated deliberate COA software with logistics data inputs and automatic alerts for rapid replanning and decision support software in the laboratory.
  - Optimized weapon system management based on current fuel and ammunition levels to improve readiness and resource utilization.
- 5852 - Demonstrated initial semi-automated COA and course of action analysis (COAA) tools for dispersed, highly mobile and on-the-move (OTM) operations in the laboratory.
  -Demonstrated a Microsoft Windows-based version of the advanced field artillery tactical data system.
  - Matured and demonstrated initial terrain reasoning capability.
- 323 - Demonstrated a prototype collaborative planning capability by providing two logistics asset classes and operating integrated agent architecture of the Defense Advanced Research Projects Agency (DARPA) advanced logistics project with a tactical knowledge base for COAA.
- 1000 - Prepared pre-milestone B documentation and requested award proposal for system integration and demonstration of the warrior information network–tactical.

Total 11537

FY 2002 Planned Program

- 3581 - Demonstrate logistics COA development software and intelligent agents in an advanced warfighting experiment or National Training Center rotation.

  - Demonstrate decision support software tools for combat commanders to plan crewing.
- 7348 - Demonstrate 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.

  - Develop initial mobile adaptive computing software.

  - Demonstrate prototype human-computer interface suite that integrates voice recognition with other modalities and includes high information content displays.
- 2361 -Evolve 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.

  - Define battlespace visualization requirements.

  - Adapt COA tools, traditionally designed for the maneuver commander, to integrate C2, intelligence and resource allocation data to reduce workload of mission planners.

Total 13290

FY 2003 Planned Program

- 6493 - Demonstrate reconstitution decision support software.

  - Transition COA and decision support software to CSSCS and automated data input software to Brigade and Below.
- 8461 - Mature DARPA Command Post of the Future (CPoF) visualization/presentation technologies.

  - Demonstrate COAA and wargaming capabilities and web-based intelligent agents for execution monitoring.

  - Demonstrate a scaleable and re-configurable command, control, communications, computer and intelligence (C4I) multi-role operator environment.

  - Integrate scaleable communications capabilities with mobile adaptive computing software, ensuring C2 under varying operating conditions.

FY 2003 Planned Program (Continued)

- 2957 - 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.

Total 17911

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

February 2002

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

COST (In Thousands)		FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate
243	SENSORS & SIGNALS PROC	5000	3076	3763	5325	6783	8031	8727

A. Mission Description and Budget Item Justification: This project matures and demonstrates advanced radar and signal processing technologies for reconnaissance, surveillance, target acquisition, counter battery, and navigation applications. The goal is to demonstrate an interchangeable, lightweight, low-cost sensor suite equipped with moving-target-indicator (MTI)/synthetic aperture radar (SAR) and electro-optical/infrared (EO/IR) technologies. This sensor suite will provide manned and tactical unmanned aerial vehicles (UAVs) with wide area surveillance capability in adverse weather. Additionally, the Army, Air Force and DARPA will jointly develop new generation radar providing foliage and ground penetrating technology for aerial surveillance and targeting. Army reconnaissance and attack helicopters will be outfitted with an electronically scanned radar to provide potentially highly reliable and affordable multi-role sensor capabilities for targeting, combat identification, and terrain avoidance. This program supports the Objective Force transition path of the TCP.

FY 2001 Accomplishments:

•	1884	- Evaluated ground post processing of foliage penetration (FOPEN) data that reduced the clutter false alarms to allow image analysis to effectively discriminate tactical targets embedded in heavy foliage.
		- Completed two engineering flight tests that characterized the capabilities of the FOPEN SAR in detecting tactical targets hidden by foliage and/or camouflage cover.
		- Completed refining the algorithms to reduce false alarms to enhance the effectiveness of the automatic target detection and cueing in providing valid targets.
•	2536	- Completed airborne testing of multi-mission unmanned aerial vehicle (UAV) MTI/SAR sensor payload and data collection and verify performance through data analysis, and transitioned system to the Program Manager.
		- Tested sensor payloads under environmental extremes for shock, vibration, temperature, altitude, etc.
		- Conducted instrumented flight testing under dynamic flight conditions to characterize MTI/SAR sensor performance in surveillance and targeting roles.
		- Participated in operational demonstrations for military assessment of multifunctional sensor suite on a tactical UAV.
•	580	- Initiated system study for preparation of the multi-mission radar procurement package.
Total	5000	

FY 2002 Planned Program

•	1276	- Conduct preliminary design review for the multi-mission radar program and develop simulation plan.
•	1800	- Conduct verification test to evaluate the achieved performance and determine the readiness of a FOPEN SAR for participation in an operational demonstration.
		- Conduct user tests to demonstrate the real-time application of a FOPEN SAR to meet the need of an all weather detection of concealed threat targets.
		- Demonstrate/validate the concept of operation to use the FOPEN SAR in support of potential users such as European Command and Southern Command.

Total 3076

FY 2003 Planned Program

•	3763	- Complete system design for the multi-mission radar.
		- Begin development of hardware (antenna, high speed/high through-put radar processor) and software (target classification, mission sorting algorithms).
		- Complete test and demonstration plans and conduct critical design review.

Total 3763