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

June 2001

BUDGET ACTIVITY
3 - ADV TECHNOLOGY DEV

PE NUMBER AND TITLE
0603772A - Advanced Tactical Computer Science & Sensor Tech

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	27144	15470	18513	0	0	0	0	0	0	0
101 TACTICAL AUTOMATION	17969	10348	15410	0	0	0	0	0	0	0
243 SENSORS & SIGNALS PROC	6311	5122	3103	0	0	0	0	0	0	0
285 COLLABORATIVE TELEMAINTENANCE	2864	0	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) supports information dominance for the Army's Objective Force. It will allow forces to more effectively transfer and display digital information. The PE provides architectures and products to correct command and control (C2) deficiencies impacting 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.

B. Program Change Summary	FY 2000	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2001 PB)	27392	15613	20462	0
Appropriated Value	27610	15613	0	
Adjustments to Appropriated Value	0	0	0	
a. Congressional General Reductions	0	0	0	
b. SBIR / STTR	-565	0	0	
c. Omnibus or Other Above Threshold Reductions	-87	0	0	
d. Below Threshold Reprogramming	317	0	0	
e. Rescissions	-131	-143	0	
Adjustments to Budget Years Since FY2001 PB	0	0	-1949	
Current Budget Submit (FY 2002/2003 PB)	27144	15470	18513	0

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

June 2001

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - ADV TECHNOLOGY DEV	**0603772A - Advanced Tactical Computer Science & Sensor Tech**	**101**

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
101 TACTICAL AUTOMATION	17969	10348	15410	0	0	0	0	0	0	0

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 SA; (2) synchronization of combined and joint force operations; and (3) C2 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 providing agile, rapidly deployable, split-based C2 operations. The Log C2 ATD will mature course-of-action analysis (COAA) 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 Program Executive Offices (PEOs) for integration. This project supports the Objective Force transition path of the Transformation Campaign Plan (TCP).

FY 2000 Accomplishments

- 4888 - Scaled, tailored, and expanded visualization products/tools to the battalion/company level to provide faster, more accurate, more intuitive mission tailored information to the commander/staff at brigade/division level.
- 3026 - Matured a human-in-the-loop capability to provide real-time COAA and revision during its execution within a wargame.
- 3724 - Demonstrated execution monitoring tools to monitor mission plans and alert commanders to significant variation in expectations or execution of the plan, thereby allowing repair/modification of mission plans and resynchronization of forces as required.
- 2116 - Demonstrated Force XXI Battle Command Brigade and Below (FBCB2) automatic data exchange to Global Combat Service Support - Army (GCSS-A) in response to logistics operations planning criteria (LOPC); demonstrated software that combined multiple databases into a web accessible virtual database for the Combat Service Support Control System (CSSCS).
- 317 - Evolved architecture for integration of the Defense Advanced Research Projects Agency's (DARPA) Advanced Logistics Project (ALP) with the Distributed Analysis and Visualization Infrastructure for C4I (DAVINCI).
- 1948 - Selected technologies and developed architecture approach for C2 products capable of dispersed, highly mobile, OTM operations.

FY 2000 Accomplishments (Continued)

- 1950 - Achieved objectives of this one year Congressional special interest effort: matured enhanced physical and communications security features, and improved the ruggedness of the handheld Digital Intelligence Situation Mapboard, which interchanges and displays map-based SA information among individual dismounted soldiers and base stations.

Total 17969

FY 2001 Planned Program

- 4362 - Demonstrate in the laboratory, deliberate course of action (COA) software with logistics data inputs and automatic alerts for rapid replanning. Demonstrate decision support software that optimizes weapon system management based on current fuel, ammunition, and major end item SA to improve readiness and resource utilization.
- 5852 - Demonstrate in the laboratory, initial semi-automated COA and COAA tools for dispersed, highly mobile and OTM operations. Demonstrate a Microsoft Windows-based version of the Advanced Field Artillery Tactical Data System (AFATDS). Mature and demonstrate initial terrain reasoning capability.
- 134 - Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs.

Total 10348

FY 2002 Planned Program

- 5081 - Demonstrate GCSS-A to CSSCS on-line data exchange. Demonstrate logistics COA development software and intelligent agents in an Advanced Warfighting Experiment (AWE) or National Training Center (NTC) 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. Mature initial mobile adaptive computing software. Demonstrate prototype human-computer interface suite that integrates voice recognition with other modalities and includes high information content displays.
- 2981 - 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 15410

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

June 2001

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - ADV TECHNOLOGY DEV	**0603772A - Advanced Tactical Computer Science & Sensor Tech**	**243**

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
243 SENSORS & SIGNALS PROC	6311	5122	3103	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: This project matures and demonstrates advanced radar and signal processing technologies for reconnaissance, surveillance, target acquisition (RSTA), 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 (EO)/IR technologies. This sensor suite, developed under PE 0603710A, will provide manned and tactical Unmanned Aerial Vehicles (UAVs) with wide area surveillance capability in adverse weather. Additionally, new generation radar jointly developed by the Army, Air Force and the DARPA, will provide foliage and ground penetrating technology for aerial surveillance and targeting. Further, Army reconnaissance and attack helicopters will be outfitted with an electronically scanned radar to provide highly reliable, affordable multi-role sensor capabilities for targeting, combat identification, and terrain avoidance. This program supports the Objective Force transition path of the Transformation Campaign Plan (TCP).

FY 2000 Accomplishments

- 3904 - Completed MTI/SAR sensor development and subsystem integration and performed laboratory bench testing to verify functionality.
- 2407 - Conducted engineering flight tests to characterize the capabilities of the foliage penetrating (FOPEN) SAR in detecting tactical targets hidden by foliage and/or camouflage cover.
  - Refined the algorithms to reduce false alarms to enhance the effectiveness of the automatic target detection and cueing in providing valid targets.

Total 6311

FY 2001 Planned Program

- 1934 - Evaluate ground post processing of FOPEN data with a goal of reducing the clutter false alarms by an order of magnitude so an image analyst can effectively discriminate tactical targets embedded in heavy foliage.
  - Continue engineering flight tests to characterize the capabilities of the FOPEN SAR in detecting tactical targets hidden by foliage and/or camouflage cover.

FY 2001 Planned Program (Continued)

- Continue refining the algorithms to reduce false alarms to enhance the effectiveness of the automatic target detection and cueing in providing valid targets.

• 2851 - Complete airborne testing of multi-mission UAV MTI/SAR sensor payload and data collection and verify performance through data analysis.

- Test sensor payloads under environmental extremes for shock, vibration, temperature, altitude, etc.
- Conduct instrumented flight testing under dynamic flight conditions to characterize MTI/SAR sensor performance in surveillance and targeting roles.

- Participate in operational demonstrations for military assessment of multifunctional sensor suite on a tactical UAV.

• 215 - Initiate system study for preparation of the multi-mission radar procurement package.

• 122 - Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs.

Total 5122

FY 2002 Planned Program

• 1303 - 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 3103