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

February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE
3 - Advanced technology development	**0603008A - Electronic Warfare Advanced Technology**

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	0	0	28254	21729	20689	22083	23156
TR1	TAC C4 TECHNOLOGY INT	0	0	14823	15288	14747	15077	15955
TR2	DIGITAL BATTLEFLD COMM	0	0	13431	6441	5942	7006	7201

A. Mission Description and Budget Item Justification: The goal of this program element (PE) is to provide the Army's Objective Force with distributed, mobile, secure, self organizing communications networks. It will demonstrate the capability to seamlessly integrate command, control, communications (C3) and, networking technologies across all layers, including unattended systems and sensor layers, maneuver layers and space layers. Commercial communication technologies will be investigated and leveraged, wherever possible. The Multifunctional On-the-Move (OTM) Secure Adaptive Integrated Communications (MOSAIC) Advanced Technology Demonstration (ATD) will provide the communications technology foundation that seamlessly and automatically supports secure, high volume, multimedia traffic in a dispersed OTM network. It provides protection technologies for tactical networked systems against modern network attacks. Smart sensor networking technologies will provide the ability to network and control unmanned systems anywhere on the battlefield, providing a timely sensor-decider-engagement linkage to defeat critical targets. Advanced antenna technologies will provide the Objective Force and Joint Tactical Radio System (JTRS) with greater communications mobility, range and throughput. This program also tests and evaluates networked radio, common user, advanced antenna concepts, and distributed communications equipment and automated network management aids, in conjunction with the Defense Advanced Research Projects Agency (DARPA) and the other services. The cited work is consistent with the Army Science and Technology Master Plan , the Army Modernization Plan, and Project Reliance. Work in this program element is related to, and fully coordinated with, efforts in PE 0602782A (Command, Control and Communications Technology), PE 0203740A (Maneuver Control System), PE 0203726A (Advanced Field Artillery Tactical Data System), PE 0602783A (Computer and Software Technology), PE 0602702E (Tactical Technology), PE 0603772A (Advanced Tactical Computer Science and Sensor Technology), and PE 0603789F (C3I Technology Development) in accordance with the ongoing Reliance Joint Planning Process. The PE contains no duplication with any effort within the Military Departments. Work is performed by the US Army Communications-Electronics Command , Fort Monmouth, NJ. This program supports the Objective Force transition path of the Army Transformation Campaign Plan (TCP). THIS IS NOT A NEW START IN FY03. PLEASE REFERENCE PROGRAM ELEMENT 0603006 (Space Applications Technology) FOR INFORMATION REGARDING THIS EFFORT IN FY02. Per OSD direction, existing PE 0603006 was designated as a Space Related PE. All non-space related funding in that PE was realigned to this PE starting in FY03.

B. Program Change Summary	FY 2001	FY 2002	FY 2003
President's Previous Budget (FY 2002 PB)	0	0	0
Appropriated Value	0	0	0
Adjustments to Appropriated Value	0	0	0
a. Congressional General Reductions	0	0	0
b. SBIR / STTR	0	0	0
c. Omnibus or Other Above Threshold Reductions	0	0	0
d. Below Threshold Reprogramming	0	0	0
e. Rescissions	0	0	0
Adjustments to Budget Years Since (FY 2001/2002 PB)	0	0	0
BES Adjustments Since FY 2002 PB	0	0	28254
Current Budget Submit (FY 2003 PB)	0	0	28254

Change Summary Explanation:

FY03 (+$28254) - Project TR1 (+$14823) and Project TR2 (+$13431) restructured from Program Element 0603006 (Projects 247 and 257). THIS IS NOT A NEW START IN FY03. PLEASE REFERENCE PROGRAM ELEMENT 0603006 (Space Applications Technology) FOR INFORMATION REGARDING THIS EFFORT IN FY02.

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

February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603008A - Electronic Warfare Advanced Technology**	**TR1**

COST (In Thousands)		FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate
TR1	TAC C4 TECHNOLOGY INT	0	0	14823	15288	14747	15077	15955

A. Mission Description and Budget Item Justification: This project matures communications and networking technology for the Objective Force. Commercial technologies will be leveraged where applicable to support mission planning and battlefield decision making, execution and targeting. This project includes the MOSAIC ATD, which seamlessly and automatically will support secure, high volume, multimedia traffic for OTM operations required for the Objective Force. The MOSAIC ATD will mature and demonstrate the core self-organizing, ad hoc, mobile network capability. It will use an open architecture approach, via application program interfaces, to enable integration of other capabilities and technologies. It also will demonstrate the integration of the basic maneuver layer to all other layers. In addition, this project includes protection technologies for tactical networks, C2 information systems, and components and data against modern network attacks. This project advances OTM satellite communications (SATCOM) technology, with the reachback communications capability required to reduce the number of personnel deployed into a theater of operations. Additionally, this project is maturing technologies that are required for the Objective Force and JTRS, to include open system design techniques for wideband networking. Finally, the project matures a family of highly efficient, cost effective antennas and subordinate products covering the 30 MHz to 44 GHz frequency range. This program supports the Objective Force transition path of the TCP.

FY 2003 Planned Program

- 2404 - Mature and demonstrate advanced tactical PKI, mobile code authentication, ad hoc network access controls and synchronized security management.
- 2348 - Complete development and testing of JTRS OTM multiband ground vehicle antenna and mature the JTRS OTM multiband airborne antenna prototype
  - Evolve coding protocols and modems for narrowband protected mode SATCOM OTM.
- 10071 - Enhance and modify MOSAIC communications and networking protocols (based on results of modeling and simulation and limited field test) to support increased mobility of horizontal and vertical hand-off for optimal network operations.
  - Enhance and modify MOSAIC communications and networking protocols to support increased mobility of internet protocol (IP) quality of service (QoS) and ad-hoc networking to support self-initialization, adaptive, mobile networks, bandwidth management, and security solutions.
  - Integrate enhanced mobile protocols.
  - Test and evaluate enhanced mobile protocols in a laboratory environment.

FY 2003 Planned Program (Continued)

- Integrate communication protocols with Agile Commander ATD applications to improve bandwidth utilization in preparation for a joint final demonstration in FY 2004.

Total 14823

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

February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603008A - Electronic Warfare Advanced Technology**	**TR2**

COST (In Thousands)		FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate
TR2	DIGITAL BATTLEFLD COMM	0	0	13431	6441	5942	7006	7201

A. Mission Description and Budget Item Justification: This Project jointly funds, with project TR1, the MOSAIC ATD. The goal of the MOSAIC ATD is to provide the Army's Objective Force with a networked communications capability that supports dispersed wireless elements in diverse, complex terrain. Multiple wireless transmission facilities provide the user flexibility to traverse varied terrain over wide areas, improving system robustness and reducing vulnerability. The overall system will provide a scaleable capability offering the user the best wireless communications system available based on current operating conditions. To provide this highly reliable mobile infrastructure; the communications assets will seamlessly assign bandwidth as a function of range and network conditions. In addition, routing protocols will be automatically reconfigured without operator intervention. Airborne communications payloads will provide a networked, beyond-line-of-sight capability, which allows maneuver elements to be dispersed in excess of 15 km to support split-based, early entry operations associated with the Objective Force. The ability to seamlessly and automatically support OTM, multimedia traffic and sensor data over variable range and bandwidth transmission systems will also be demonstrated. The communications system will dynamically operate over several different transmission systems, including a wireless local area network (LAN), packet radio, wideband cellular radio, unmanned aerial vehicles (UAVs), and satellites. Protection technologies for tactical networks and C2 information systems will be matured and demonstrated. This project also includes the sensor communications networking portion of the Networked Sensors for the Objective Force (NSOF) ATD, providing the ability to task unmanned sensors and transport data and images to data fusion points. A variety of efforts will be leveraged, including the DARPA Small Unit Operations (SUO) and Sensor Information Technology (SensIT) programs as well as technologies developed by the Army Research Laboratory (ARL). This program supports the Objective Force transition path of the TCP.

FY 2003 Planned Program

- 4704 - Apply security architecture approach to link and network layer technologies.
  - Complete modeling and simulation evaluation for scalability of network protocols to larger networks.
  - Integrate low overhead network management tools to provide dynamic network control.
  - Integrate OTM satellite communications and sensor networking technologies.
  - Coordinate with DARPA Future Combat Systems (FCS) Communications program to ensure compatible, integrable communication technologies.
- 8000 - Mature and demonstrate advanced C2 OTM capability.

FY 2003 Planned Program (Continued)

- 727 - Refine protocols to optimize network performance.
  - Extend unattended sensor communications requirements analysis to munitions and robotics.

Total 13431