

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

February 2002

BUDGET ACTIVITY
2 - Applied Research

PE NUMBER AND TITLE
0602783A - COMPUTER AND SOFTWARE TECHNOLOGY

PROJECT
Y10

COST (In Thousands)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate
Y10 COMPUTER/INFO SCI TECH	4360	4113	4354	4406	4465	4114	4214

A. Mission Description and Budget Item Justification: The goal of this program element is two-fold: 1) To automate the collaboration for decision making (planning and execution) so that it is synchronized, parallel and real time, and 2) to develop collaboration tools to support both the staff and the Commander. Technical barriers to the accomplishment of this program include the non-existence of automated tools to support the flow and synchronization of data/information from humans to humans, from humans to computers, from computers to humans, as well as the fact that automation is currently too dependent on mouse and keyboard versus other modes of communication and understanding. This program element researches and applies information and communications technology to enhance understanding and speed the decision cycle for commanders operating in the mobile dispersed environment envisioned for the Objective Force. Efforts capitalize on computationally intensive approaches that exploit the rapidly evolving capabilities of emerging information and communication technology to create innovative military capabilities so as to yield a significant and real military advantage on the battlefield. Focus is on providing general solutions that can be applied to a wide variety of command and control (C2) problems. Work in this project is conducted by the U.S. Army Research Laboratory, and is consistent with the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and Project Reliance. This program supports the Objective Force transition path of the Transformation Campaign Plan (TCP).

FY 2001 Accomplishments:

- 1361 - Enhanced performance of mobile ad hoc network algorithms and protocols integrated with self-configuring mobility protocols to support secure multicast streaming for mobile wireless nodes.
- Evaluated mobile ad hoc network algorithms and protocols integrated with self-configuring mobility protocols that support secure multicast streaming for mobile wireless nodes.
- Enhanced energy-efficient, self-configuring, ad hoc routing and medium access control algorithms integrated with localization algorithms that support unattended ground sensors.
- Enhanced automated vulnerability assessment tools with the capability to perform directed assessments of bandwidth-constrained wireless networks to confirm the existence of a set of known configuration errors and susceptibilities.

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FY 2001 Accomplishments: (Continued)

- 2999 - The following accomplishments were utilized by the Futures Battle Lab, Ft. Leavenworth KS and Command General Staff College for 3 Prairie Warrior exercises focusing on combat scenarios to establish future C2 requirements in the FCS environment. The exercises provided the necessary verification & validation of the technology and allowed for the collection of data necessary to conduct FY02 experiments with maturing collaborative technology.
 - Installed initial Collaborative Technology operating capability utilized second-generation technology and conducted initial experiments with Futures Battle Lab for design and usability feedback. Converted displays to mapping software, integrated speech / voice capabilities and text summarization tools into test bed.
 - Conducted experiment to empirically measure processing overhead due to intranet routing protocols and compared data to simulation results in order to identify most efficient protocol structures. Measured and evaluated performance improvement of information management algorithms responding to network delay feedback.
 - Integrated agent technologies into the battlespace decision environment to reduce the commander's workload in a command on the move scenario.

Total 4360

FY 2002 Planned Program

- 2766 - Evaluate and refine collaborative planning tools in support of evolving Objective Force command and control process, conduct and document the usability through experiments at TRADOC Futures Battle Lab and Agile Commander ATD.
 - Assess technologies for a low power, miniature radio that can be integrated in a miniature sensor to create a secure network to support forward-deployed unattended munitions, sensors and robotic prototype radio with integrated network protocols.
 - Define the requirements for a common network architecture for unattended sensor arrays, assess candidate protocols for very short duty cycle networks that use low power radios to control and transmit data from sensors, smart munitions and robots.
 - Provide mobile code for protecting tactical wireless networks, allowing Commanders to operate in a dynamically configurable environment.
 - Explore encryption algorithms and protection techniques for microsensors to reduce the vulnerability of unattended sensors arrays on the tactical battlefield.
 - Research various techniques that merge real time battlespace data to simulate proposed courses of action providing advantage and disadvantage insight of alternatives.
- 1347 - Communications and Networks Collaborative Technology Alliance will perform applied research on next generation automated intrusion detection techniques that accommodate wireless, self-configuring, mobile ad hoc networks and adapt to varying resource constraints.

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Y10**FY 2002 Planned Program (Continued)**

- Communications and Networks Collaborative Technology Alliance will develop denial-of-service mitigation techniques for wireless networks with mobile network routers.

Total 4113

FY 2003 Planned Program

- 4354 - Provide tools for near term execution-centric decision making, improve capabilities for concurrent multi-echelon mission planning and immediate plan dissemination; preserve and make guidance available at all levels, provide framework for warfighter to provide feedback to technology.
- Evaluate low-power miniature radios with integrated energy efficient network protocols to provide enhanced communications capabilities for unattended sensor arrays, smart munitions, and robotics platforms.
- Optimize mobile code for protecting tactical wireless networks, allowing commanders to operate in a dynamically configurable environment.
- Provide encryption algorithms and protection techniques for microsensors to reduce the vulnerability of unattended microsensor arrays on the tactical battlefield.
- Integrate COA test-bed techniques that allow acceptance of battlespace data and provide real-time recommendations to the Objective Force commander as a battle progresses.

Total 4354

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<u>B. Program Change Summary</u>	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2002 PB)	3950	6154	4268
Appropriated Value	3987	4154	0
Adjustments to Appropriated Value	0	0	0
a. Congressional General Reductions	0	-41	0
b. SBIR / STTR	-89	0	0
c. Omnibus or Other Above Threshold Reprogramming	0	0	0
d. Below Threshold Reprogramming	499	0	0
e. Rescissions	-37	0	0
Adjustments to Budget Years Since FY2001 PB	0	0	86
Current Budget Submit (FY 2003 PB)	4360	4113	4354

Change Summary Explanation:

FY02 funding to Project Y10 reduced by \$2100 by Congressional action.