

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2004

| | | | | | | | |
|--|---|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| BUDGET ACTIVITY 2 - Applied Research | PE NUMBER AND TITLE 0602783A - COMPUTER AND SOFTWARE TECHNOLOGY | PROJECT Y10 | | | | | |
| COST (In Thousands) | FY 2003 Actual | FY 2004 Estimate | FY 2005 Estimate | FY 2006 Estimate | FY 2007 Estimate | FY 2008 Estimate | FY 2009 Estimate |
| Y10 COMPUTER/INFO SCI TECH | 3931 | 4010 | 3982 | 3688 | 3770 | 3793 | 3845 |

A. Mission Description and Budget Item Justification: This program investigates and matures command, control, communications (C3) software and components to increase Future Combat System (FCS) and Future Force lethality and survivability through improved commanders' decision-making and situational awareness and, where feasible, exploits opportunities to enhance Current Force capabilities. 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 devise collaboration tools to support both the staff and the Commander. Challenges for this program include 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 reducing dependence on mouse and keyboard versus other modes of computer interaction. 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 Future Force. Focus is on providing widely applicable solutions that can be applied across the spectrum of command and control (C2) problems. Work in this PE is related to and fully coordinated with efforts in PE 0602782(Command, Control, Communications Technology), PE 0603772(Advanced Tactical Computer Science and Sensor Technology), and PE 0603008(Command, Control, Communications Advanced Technology). The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). Work in this project is performed by the Army Research Laboratory (ARL).

Accomplishments/Planned Program

- Enhance information processing techniques necessary to improve military decision making through software agent technologies, heterogeneous collaborative agent architectures, data mining, soft computing, and advanced reasoning techniques. In FY03, provided and transitioned to CERDEC technologies to facilitate concurrent Command and Control (C2) decision-making in a multi-echelon operation in order to provide more complete situation awareness to the soldier. In FY04, provide execution-centric technologies to assist Commanders in the Military Decision Making Process (MDMP). In FY05, provide technologies that ensure completeness and timeliness of decision-making in C2 operations.

| | | | |
|--|---------|---------|---------|
| | FY 2003 | FY 2004 | FY 2005 |
|--|---------|---------|---------|

| | | | |
|--|------|------|------|
| | 1227 | 1936 | 2028 |
|--|------|------|------|

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| Accomplishments/Planned Program A(continued) | FY 2003 | FY 2004 | FY 2005 |
|---|-------------|-------------|-------------|
| - - Design secure, stealthy, energy-efficient network protocols on a miniature radio to support the Networked Sensors, a key element of the internetted Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) in providing situational awareness, and to provide enhanced communications capabilities for unattended sensor arrays, smart munitions, and robotics platforms. In FY03, conducted laboratory experiments and tested the protocols for miniature radios. Created networked sensors on a miniature radio in laboratory environment. In FY04, improve the range and energy efficacy of the network protocols for miniature radios. In FY05, conduct tests on sensor networks equipped with miniature radios. | 584 | 440 | 421 |
| - Conduct applied research on tactical information protection technologies for agent-based vulnerability assessment over wireless bandwidth constrained links and security infrastructures for sensor networks. The Future Force (which consists of a heterogeneous mixture of individual soldiers, ground vehicles, airborne platforms, unmanned Aerial Vehicles (UAVs), robotics and unattended microsensor networks) will operate in a complex wireless environment where survivability must be maintained in spite of inherent vulnerabilities of standardized protocols and commercial technologies. In FY03, devised encryption algorithms and deployment techniques that strengthens the security of a sensor network. In FY04, conduct experiments with miniature sensors to validate robustness of algorithms. In FY05, provide suites of information protection codes to miniature sensor developers and deployers. | 1060 | 667 | 653 |
| - In coordination with CERDEC, conduct research into techniques for automated Course of Action (COA) evaluation incorporating "reasonable-time" battlefield information and the development of COA analysis decision tools through the extension of mathematics of wargaming, combat modeling and statistical methods to enhance the staff's planning capability to generate manifold options for the mobile commander in an actual battlefield engagement. In FY03, improved combat models by applying statistical techniques into wargaming. Substantially improved the analysis capability of wargame simulation. In FY04, improve techniques to generate alternate COAs automatically for analysis. In FY05, provide the TRADOC Battle Labs with tools to conduct simulations in the field. | 1060 | 896 | 880 |
| - Small Business Innovative Research/Small Business Technology Transfer Programs | 0 | 71 | 0 |
| Totals | 3931 | 4010 | 3982 |

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| <u>B. Program Change Summary</u> | FY 2003 | FY 2004 | FY 2005 |
|---|---------|---------|---------|
| Previous President's Budget (FY 2004) | 4001 | 4142 | 4102 |
| Current Budget (FY 2005 PB) | 3931 | 4010 | 3982 |
| Total Adjustments | -70 | -132 | -120 |
| Congressional program reductions | | -35 | |
| Congressional rescissions | | | |
| Congressional increases | | | |
| Reprogrammings | -70 | -97 | |
| SBIR/STTR Transfer | | | |
| Adjustments to Budget Years | | | -120 |