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

February 2003

BUDGET ACTIVITY
3 - Advanced technology development

PE NUMBER AND TITLE
0603001A - Warfighter Advanced Technology

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
	Total Program Element (PE) Cost	59815	57014	63882	68763	71439	56567	84170	84775
242	AIRDROP EQUIPMENT	3777	3398	8668	7428	4017	4093	4183	4279
393	MIL OPS IN URBAN TERRAIN (MOUT)	13309	0	0	0	0	0	0	0
543	AMMUNITION LOGISTICS	771	775	950	1565	1512	1446	1481	1515
545	FORCE PROJECTION LOGISTICS	0	7107	0	0	0	0	0	0
557	BIOSYSTEMS TECHNOLOGY	4125	4098	0	0	0	0	0	0
594	METROLOGY & CALIB	963	953	0	0	0	0	0	0
C07	JOINT SERVICE COMBAT FEEDING TECH DEMO	2161	2215	2238	2341	2430	2488	2525	2586
J50	FUTURE WARRIOR TECHNOLOGY INTEGRATION	34709	38468	52026	57429	63480	48540	75981	76395

A. Mission Description and Budget Item Justification: This Program Element (PE) matures and demonstrates technologies to enhance dismounted soldier system capabilities while reducing the logistics burden on the battlefield; decreasing operation and sustainment (O&S) costs; and improving ammunition logistics system performance. This PE contains several projects. The major effort in the Future Warrior Technology Integration project (J50) is Objective Force Warrior (OFW), an integrated soldier system of systems providing the next generation of capabilities beyond Land Warrior Blocks I and II. A competitive multiple contractor strategy has been implemented to foster innovation and reduce risk of bringing enhanced capabilities to the warfighter. OFW will provide a lightweight, stealthy armored suit, integrated with multi-functional sensors, weapons and proactive medical capabilities. The OFW will have connectivity to other dismounted personnel, Future Combat Systems (FCS), and robotic air/ground platforms for improved situational understanding and effects. The intent of OFW is to provide the dismounted soldier with combat overmatch capabilities for the full spectrum of Objective Force missions. The Military Operations in Urban Terrain (MOUT) project (393) consists of two Advanced Concept Technology Demonstrations (ACTD); the MOUT ACTD completed in FY02 and a second effort that continues in partnership with DARPA to develop a robotic Micro Air Vehicle (MAV) for urban and complex environments. The MAV ACTD will supply a close-in, real-time surveillance capability for small units, thereby reducing the operational and tactical risks associated with small unit operations. The Joint Service Combat Feeding Technology project (C07) demonstrates technologies for military combat feeding systems and combat rations to include processing, preservation, packaging and equipment and energy technologies to reduce the logistics footprint while enhancing warrior mental and physical agility. The Ammunition Logistics project (543) demonstrates technology that optimizes weapon system rearm, ammunition packaging/palletization, explosives safety, material handling equipment, and ammunition throughput/management for improved munitions availability and survivability. The Force Projection Logistics project (545) demonstrates embedded training simulations to support vehicle crews and mature logistics simulations that relate combat performance to logistics requirements.

The funding for project 545 will be realigned to newly established PE 0603015A in FY 2004. The Airdrop Equipment project (242) provides enhancements to rapid deployment and force projection capability by maturing and demonstrating technology required for dropping cargo to precise locations from higher altitudes, greater offset distances and higher speeds. The objective is increased survivability of aircraft and crews, and increased probability that materials delivered will land in a usable condition. This PE supports the Army Transformation in the areas of improved dismounted soldier capabilities (projects J50 and 393), logistics footprint reduction (projects C07, 543 and 545) and rapid deployment (project 242). The cited work is consistent with the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and Project Reliance. This program adheres to Tri-Service Reliance Agreements on clothing, textiles, food, and explosive ordnance disposal with oversight and coordination provided by the Joint Directors of Laboratories through the Warrior Systems Technology Base Executive Steering Committee. Work in this PE is related to and fully coordinated with efforts in PE 0602786A (Warfighter Technology), PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE0602624A (Weapons and Munitions Technology); PE 0602705A (Electronics and Electronic Devices), PE0603004 (Weapons and Munitions Advanced Technology); PE 0603008A (Command, Control, Communications Advanced Technology), and PEs 0602623A and 0603607A (Joint Service Small Arms Program). This PE contains no duplication with any effort within the military departments. Work is performed by the Natick Soldier Center; the Armament Research, Development, and Engineering Center; the Aviation and Missile Command; and the Provisional Research, Engineering, and Development Command. It supports the transition path to the Objective Force described by the Transformation Campaign Plan. No Defense Emergency Response Funds have been provided to this program.

B. Program Change Summary	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget (FY 2003)	62089	50262	85024	69911
Current Budget (FY 2004/2005 PB)	59815	57014	63882	68763
Total Adjustments	-2274	6752	-21142	-1148
Congressional program reductions		-3500		
Congressional rescissions		-1281		
Congressional increases		13400		
Reprogrammings	-637	-328		
SBIR/STTR Transfer	-1637	-1539		
Adjustments to Budget Years			-21142	-1148

Significant Changes:

FY04: Funds realigned to newly established PE 0603015A in FY04.
FY05: Funds realigned to higher priority requirements.

FY03 Congressional Adds:
FY03 – Congressional adds were made for Metrology, Project 594 ($1000); Biosystems Technology, Project 557 ($4300); Scorpion Future Combat Helmet, Project J50 ($5600); Personal navigation of the future warfighter, Project J50 ($2500)
FY03 Congressional Reduction: Objective Force Warrior, Project J50 (-$3500)

Projects with no R-2A:

($7107), Force Projection Logistics, Project 545: Demonstrates embedded training simulations to support vehicle crews. The project also matures logistics simulations that relate combat performance to logistics requirements to demonstrate the effect of strategic policy and decisions on the size, cost, and effectiveness of the deployed force. Funding realigned to newly established PE0603015A in FY04.
($4098), Biosystems Technology, Project 557: The objective of this Congressional add is to demonstrate biosystems technologies with potential for military applications. No additional funding is required to complete this project.
($953), Metrology, Project 594: The objective of this Congressional add is to demonstrate and analyze standards for aerosol particles, microwave, and radiation calibration systems. No additional funding is required to complete this project.

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

February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603001A - Warfighter Advanced Technology**	**242**

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
242	AIRDROP EQUIPMENT	3777	3398	8668	7428	4017	4093	4183	4279

A. Mission Description and Budget Item Justification: This project focuses on the maturation and demonstration of equipment and innovative techniques for aerial delivery of cargo and personnel. This is a key capability for rapid force projection and global precision delivery as envisioned in the Army Vision for the Objective Force. Precision airdrop can provide a long-range, autonomous airdrop capability, with the option to deliver separate and distinctive payloads to multiple locations. Capitalizing on advances in decelerator, guidance and sensing (e.g., Global Positioning System (GPS)), and wind sensing technologies, precision airdrop systems have the ability to be deployed from high altitudes (up to 25,000 ft) and to deliver payloads with better accuracy, i.e. a 100 meter Circular-Error-Probable (CEP). Capabilities envisioned are delivery of up to 10,000 lbs. from 15 to 20 miles offset and extended range delivery of 500-2000 lbs. from 100 km offset (using powered glide augmentation), both with 100 meter CEP accuracy. An effort to increase the payload weight to 26,000 lbs for the same offset distance and altitude will begin in FY04. Delivery from high altitudes and large offset distances improves cargo, personnel, and aircraft survivability. The efforts in this project support the Army Transformation in the area of rapid deployment. This project is managed by the US Army Natick Soldier Center, Natick, MA. This project supports the transition path to the Objective Force in the Transformation Campaign Plan. No Defense Emergency Response Funds have been provided to this project.

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
Aerial delivery of cargo - In FY02, conducted system-level soft landing technology testing for a roll-on/roll-off capability for 15,000-20,000 lb payload . Designed and evaluated (radio controlled) a 1/4-scaled prototype high altitude parachute control system. In FY03, demonstrate the system for a roll on/roll-off capability for 15,000-20,000 lb payload providing a 60% decrease in labor intensive rigging; transition technology to PM Force Sustainment for System Development and Demonstration. Design full-size prototype and test (autonomous controlled) a 1/4 scaled prototype high altitude parachute control system. Design and plan test of 10,000 lb. autonomous offset "just-in-time" resupply airdrop system prototype. In FY04, perform component level evaluations and system modeling for the high altitude parachute control system prototype. Perform component level evaluations and system modeling for the autonomous, offset, "just-in-time" resupply airdrop system prototype. Demonstrate autonomous, offset airdrop (up to 20 miles) up to 10,000 lbs and transition to PM-Force Sustainment for System Development and Demonstration. In FY05, demonstrate controllable cargo parachutes with 10,000 lb. loads from high altitude and with complete autonomous control and transition to PM-Force Sustainment for System Development and Demonstration. Perform component-level evaluations and system modeling for Objective Force heavy precision airdrop (20-ton) system.	2814	3398	3813	2200
Heavy Precision Airdrop - In FY04, Complete component modeling for Objective Force heavy precision airdrop (26,000 lbs) system. In FY05, Perform component-level evaluations and begin system modeling for Objective Force heavy precision airdrop system.	0	0	4855	4728
Personnel Parachute Technology – In FY05, demonstrate technology for a static line parachute automatic opening capability providing 100% detection of total malfunctions and transition technology to PM –Soldier Equipment for System Development & Demonstration.	0	0	0	500
This one year Congressional add demonstrated pneumatic muscle soft landing technology for heavy equipment airdrop systems. No additional funding is required to complete this project.	963	0	0	0
Totals	3777	3398	8668	7428

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

February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603001A - Warfighter Advanced Technology**	**543**

COST (In Thousands)	FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
543 AMMUNITION LOGISTICS	771	775	950	1565	1512	1446	1481	1515

A. Mission Description and Budget Item Justification: This project develops technology that provides rapid munitions deployability, resupply, and rearm for the Army's Objective Force. It enhances force readiness and reduces the logistics footprint through improvements in explosive safety, Materials Handling Equipment (MHE), ammunition and missile packaging/palletization, and asset throughput/management. It also improves weapon system rearm for artillery, armor, air defense, aviation, and infantry. One major effort, Remote Readiness Asset Prognostics Diagnostics System (RRAPDS) demonstrates an integrated system that provides "health status" information on critical high value munitions to ensure safety and reliability. The system integrates low power environmental micro-sensors, data storage, and on-board prognostics & diagnostics to monitor munitions throughout their lifecycle into an affordable device. A second major effort will demonstrate an automated rearm and resupply capability for the Future Combat System (FCS) Multi-Role Armament and Ammunition System (MRAAS). The rearm/resupply capability contains “plug-in” ammunition modules or clips and an automated upload mechanism that will enable rapid “pit-stop” resupply operations by providing 2.5X faster rearm. This project is managed by the U.S. Army Armament Research, Development, and Engineering Center, Picatinny Arsenal, NJ. Technology will transition to weapons and munitions development programs for weapons, munitions, MHE, and tactical vehicles. This project supports the transition path to the Objective Force described by the Transformation Campaign Plan. No Defense Emergency Response Funds have been provided to this project.

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
RRAPDS - In FY02, completed demonstration of prototype systems that capture a complete 3-axis shock and temperature history over the course of an entire munitions shipment and wirelessly feed data to Army management information systems for local and remote command center access.	418	0	0	0
Automated Rearm and Resupply Capability for the FCS MRAAS - In FY02, developed design concepts for ammunition modules and the automated upload mechanism. In FY03, complete preliminary design of ammunition modules and automated upload mechanism. In FY04, complete design integration with autoloader. In FY05, fabricate prototype modules and upload mechanism and conduct system testing.	353	775	950	1565
Totals	771	775	950	1565

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

February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603001A - Warfighter Advanced Technology**	**C07**

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
C07	JOINT SERVICE COMBAT FEEDING TECH DEMO	2161	2215	2238	2341	2430	2488	2525	2586

A. Mission Description and Budget Item Justification: The Joint Service Combat Feeding Technology Demonstration project matures and demonstrates nutritionally advanced rations; biosensor technologies for ration contamination/wholesomeness assessment; and logistically streamlined combat feeding systems with enhanced fuel efficiencies to decrease the combat feeding logistics tail. The project demonstrates advances in combat rations technology, materials, energy utilization, and heating technologies to provide efficient and effective field feeding with reduced resupply. It exploits advances in ration formulation and quality, packaging, preservation, and nutritional content to improve morale, extend endurance, and sharpen mental acuity. It also demonstrates modeling and simulation for predictive models to assist in ration design, mission planning, and Class I (subsistence) distribution and tracking. This project supports the Army Transformation with a goal to demonstrate technology that will reduce the logistics of field feeding by over 75% (in component parts, weight, cube, fuel and water) and labor requirements by 50%, while improving the quality of food service. This project is a DoD program for which the Army has Executive Agent responsibility and is managed by the U.S. Army Natick Soldier Center, Natick, MA. This project supports the Objective Force transition path of the Transformation Campaign Plan. No Defense Emergency Response Funds have been provided to this project.

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
Equipment and Energy Technologies – In FY02, fabricated 20 Remote Unit Self Heated Meal (RUSHM) prototypes and conducted initial technology demonstrations. In FY03, integrate optimized packaging, heater, and food for the RUSHM prototype and complete final demonstrations, showing logistical reductions and new capability to sustain the warfighter in remote locations (90% reduction in manpower, weight and cost). Integrate Field-feeding and Advanced Sustainment Technology (FAST Food Service) subsystems including co-generator, appliance heat exchangers, steam generator, control system, heat driven refrigeration, compact insulated food containers, and water recycling sanitation system. Demonstrate a co-generator for legacy kitchens that reduces kitchen fuel consumption by 50% and noise by at least 10dB. In FY04, conduct multi-service demonstrations of FAST Food Service, validate metrics. In FY05, demonstrate durable nonstick coatings to improve cleanability and lower operation/support costs for cookware; transition to 6.4.	342	580	1038	449
Technologies for Novel Ration Preservation & Stabilization, Revolutionary Packaging and Food Safety – In FY02, demonstrated novel preservation/stabilization technologies, such as, non-foil packaging for microwave/radio frequency sterilized ration components, compressed meal components to reduce size/weight, and passive/non-passive shelf-life extension for fresh fruits/vegetables. Utilized modeling/simulation tools to increase ration quality/variety while reducing the logistics footprint by up to 65%. In FY03, mature novel preservation/stabilization capabilities that were demonstrated in FY02. Conduct limited field demonstration for an integrated ration monitoring, inventory and tracking system as part of a computer based Global Asset Visibility System. In FY04, conduct producibility tests for novel shelf-stable breakfast items to expand menu variety, while enhancing ration acceptance/consumption. Fabricate and conduct technical demonstration of a surface scanning biosensor. In FY05, validate/optimize diagnostic techniques to detect chemical/biological agents and/or naturally occurring food pathogens in food matrices and incorporate into biosensor detection systems for food safety testing in combat field feeding systems and in military dining facilities. Demonstrate nanocomposites, ultra-high barrier polymers, barrier films, and films with chromatic pigments, to extend quality/shelf-life of combat rations, reduce their weight/signature, and minimize environmental impact.	1023	1044	503	1488

Accomplishments/Planned Program (continued)	FY 2002	FY 2003	FY 2004	FY 2005
Technologies for Nutrients and Novel Delivery Systems – In FY02, demonstrated: processing technologies for novel nutrient delivery systems for mission-targeted warfighter performance including a First Strike Ration (FSR) system; enhanced prototypes for extended reconnaissance flight feeding; and performance enhancing gels. Applied modeling/simulation technologies to demonstrate the influence of nutritional initiatives on mission effectiveness. In FY03, transition to 6.4 mature novel nutrient delivery and packaging system for specialized rations to improve consumption, and reduce weight/volume. Conduct limited field evaluation of FSR in various operational Objective Force Warrior (OFW) scenarios (Army SOF/Marines). Conduct prototype scale-up of dairy bars and test bars with increased levels of omega-3 fatty acid; finalize bar design. Demonstrate a suite of models based on energy expenditure, physical fatigue, and rehydration rates to measure soldier performance and mission accomplishments. In FY04, demonstrate production scale-up capability and incorporate shelf stable meat/vegetable bars and gels in FSR. Conduct limited FSR field test in various operational OFW scenarios (Army SOF /Marines) incorporating packaging and component modifications with a goal of 50% reduction in cube/weight, as compared to the MRE. In FY05, determine bio-availability and conduct field tests of components with encapsulated protein. Conduct field demonstration to quantify the effects of glucose modulating components on increasing warfighter performance and demonstrate production scale up capability of these components.	796	591	697	404
Totals	2161	2215	2238	2341

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

February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603001A - Warfighter Advanced Technology**	**J50**

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
J50	FUTURE WARRIOR TECHNOLOGY INTEGRATION	34709	38468	52026	57429	63480	48540	75981	76395

A. Mission Description and Budget Item Justification: This project matures and demonstrates leap-ahead technologies and systems for the Objective Force Warrior (OFW), with emphasis on systems integration and multi-functionality to enhance and improve warfighting capability while reducing soldier load. This effort provides the Unit of Action's dismounted soldier the same combat-overmatch, skip-a-generation approach that the Future Combat Systems (FCS) bring to the Maneuver portion of the Objective Force. OFW will employ open system architectures and high-risk/high payoff technologies to yield a lightweight full spectrum integrated protective combat ensemble, integrated with multi-function sensors, networked communications/collaborative situational awareness, enhanced positioning navigation, networked fires, collaborative embedded training, medical status monitoring capabilities, and manportable ("micro") air and ground robot/sensor platforms organic to the squad. The project will also leverage squad relevant FCS unmanned systems (e.g. Mule) and demonstrate mission packages tailored to the squad. The goal is to achieve leap-ahead advances over Land Warrior Blocks I and II in the areas of survivability, networked communications, individual soldier and small team lethality, and agility - to provide dismounted warfighters in the Objective Force Unit of Action with significant overmatch capability, and enable them to operate for extended periods under arduous combat conditions, with minimal loss in physical capabilities from fatigue, stress, and hardship. This soldier system-of-systems will have connectivity to other dismounted personnel, Objective Force platforms including FCS, and robotic air/ground vehicles to form adaptive, distributed sensor networks for better situational understanding of local environments and threats. The OFW Concept and Technology Development (CTD) program (FY02-06) will have two (2) competing industry teams develop initial OFW concepts for all Objective Force Unit of Action soldiers; downselect to a single contractor team to conduct OFW technology design and development of the dismounted variant; and culminate with a comprehensive system-of-systems capstone demonstration. Key performance goals are to demonstrate a system with fighting load of no more than 50 lbs per warfighter; the ability to operate for 24 hrs autonomously at the individual level and 72 hrs at the Unit of Action level; and integration with Warfighter Information Network-Tactical/Joint Tactical Radio System. To achieve these goals, future warrior projects and other relevant supporting Army projects have been redirected to achieve the desired capability within the decade. The project will mature and integrate soldier technologies transitioned from 0602786A. This project will leverage the Army's FCS and Joint Tactical Radio System Squad Level Communications programs, as well as other Army S&T and DoD programs to the maximum extent, in order to maximize return on investment to the Army. This project also will mature and demonstrate advanced technology solutions to complex systems integration problems in the areas of multifunctional integrated head-to-toe combat ensembles (Scorpion) during FY2003. The US Army Natick Soldier Center, Natick, MA manages this project. This project supports the Objective Force transition path of the Transformation Campaign Plan. No Defense Emergency Response Funds have been provided to this project.

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
Concept Development (CD) Phase – In FY02, conducted visioning exercises with Army and other DoD leadership, academia and industry to establish realm of possible capabilities for the OFW in light of technology readiness and program timelines. Solicited for and awarded two Other Transaction Agreements for competitive Lead Technology Integrators (LTI) to execute the CD Phase of the OFW program. Established and implemented robust systems engineering, Integrated Product & Process Design, and software engineering processes and principles to execute the program. In FY03, develop soldier system of systems architectures for all Objective Force Unit of Action soldiers, which are compatible with the FCS architecture and Army concepts of operations. Perform trade-off analyses, technology surveys, and technology assessments underpinned with analytical modeling and simulation. Define specific technology projects required to meet technology goals within the timelines of the OFW Concept and Technology Development (CTD) effort. Define interfaces to Objective Force systems and develop system level requirements. Develop two mock-up prototype sets of systems to physically represent the OFW system of systems concepts. Downselect to a single LTI to execute the Technology Integration Phase of the OFW CTD program.	24212	3838	0	0
Technology Integration Phase - In FY03, begin design of dismounted soldier variant incorporating a set of core technologies common to all Unit of Action soldiers. Allocate system level and interface requirements to subsystems and critical components. Execute a design process that incorporates spiral development, virtual prototyping, component breadboarding, breadboard testing, user assessments, modeling and simulation. Evaluate and assess preliminary design prior to initiation of the detailed design effort, and schedule purchase of critical long lead items. Evaluate and assess FCS systems that require interfaces with OFW. In FY04-05, refine and synthesize the requirements at the system, subsystem, and component levels. Execute the detailed design incorporating a spiral development process, virtual prototyping, component and subsystem brassboard evaluation, user assessments, and modeling and simulation. Secure FCS robotic platforms to support OFW demonstration. Conduct limited objective experiments in simulated environments to validate subsystem/component performance. Develop and document a system of systems training and demonstration plan and begin preparation for the demo. Fabricate 2-4 sets of prototype systems and establish a process for fabricating 18-25 systems.	0	22554	52026	35217
Build and Demonstration Phase - In FY05, procure materials, refine fabrication processes, and begin fabrication of 18-25 sets of prototype OFW systems. Fabricate mission packages for use with FCS robotic platforms Refine the demonstration plans to include tactical experimentation in simulated operational environments, including assessment of interoperability with FCS and other Objective Force systems. Make preparations for FY06 experiments and demonstration.	0	0	0	22212

Accomplishments/Planned Program (continued)	FY 2002	FY 2003	FY 2004	FY 2005
Multifunctional Head-to-Toe Combat Ensemble Subsystem - In FY02, developed five innovative design concepts and system mock-ups of integrated, multi-functional combat ensembles, and three concepts and mock-ups of integrated headgear systems. Explored a variety of integration and design methods to address prioritized user needs developed by soldiers. Investigated connector interfaces for textile based data/power buses, sensors, and/or miniaturized electronics for integration into a personal body local area network for future soldier systems. Initiated development of meso-scale vapor compression cooling prototypes, elastomeric selectively permeable membranes, and multiple visual camouflage patterns for assessment of efficacy in multiple combat environments (i.e. woodland, desert, Military Operations in Urban Terrain (MOUT), day, night). Performed technology assessments and projections to conceptualize an open architecture for the OFW combat ensemble to allow for technology upgrades and mission tailorability. Conducted user juries and technical/user subject matter expert evaluations of the concepts and mock-up prototypes. Provided concepts to the OFW LTI teams as the starting point for the broader OFW Phase I Systems Architecture analysis. In FY03, mature concepts to the greatest extent possible as risk reduction for the OFW CTD Technology Integration Phase. Conduct early technology demonstration with troops in field environments. Continue multi-functional material technology integration for combat ensemble applications. Transition technologies, design concepts, and analyses to the OFW LTI teams.	7137	4348	0	0
Personal Warfighter Navigation (Congressional add) : In FY02, developed Microelectromechanical System (MEMS)/Inertial Navigation System/Global Positioning System with application to ground troops. In FY03, develop enhanced sensor fusion performanance in situations where signal is lost (e.g. under canopies or in buildings). Conduct an initial demonstration to assesss system attributes. No additional funding is required to complete this project.	2400	2385	0	0
Portable Cooling System: This one year Congressional add developed and demonstrated a portable apparel cooling system. No additional funding is required to complete this project.	960	0	0	0
Scorpion Future Combat Helmet: This one year Congressional add will develop a chem./bio respiratory subsystem, Ballistic protective materials, and thermal management subsystems for integration into a combat helmet. No additional funding is required to complete this project.	0	5343	0	0
Totals	34709	38468	52026	57429