Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*				R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*							
COST ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**Cost To Complete**	**Total Cost**
Total Program Element	37.040	27.746	29.835	-	29.835	28.180	28.481	28.694	29.557	Continuing	Continuing
283: *AIRDROP ADV TECH*	2.449	2.527	2.369	-	2.369	2.516	2.563	2.775	2.822	Continuing	Continuing
E01: *Warfighter Technology Initiatives (CA)*	10.585	-	-	-	-	-	-	-	-	Continuing	Continuing
H98: *CLOTHING & EQUIPM TECH*	18.594	19.624	19.602	-	19.602	18.447	18.517	18.320	18.867	Continuing	Continuing
H99: *JOINT SERVICE COMBAT FEEDING TECHNOLOGY*	5.412	5.595	5.514	-	5.514	5.732	5.841	5.949	6.118	Continuing	Continuing
VT4: *EXPEDITIONARY MOBILE BASE CAMP TECHNOLOGY*	-	-	2.350	-	2.350	1.485	1.560	1.650	1.750	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) investigates and develops technologies which improve Soldier and Small Combat Unit survivability, sustainability, mobility, combat effectiveness, and field quality of life. This PE supports the design, development, and improvement of components used for air delivery of personnel and cargo (project 283), combat clothing and personal equipment (including protective equipment such as personal armor, helmets and eye wear) (project H98) and combat rations and combat feeding equipment (project H99) and expeditionary base camps (VT4). Project E01 funds congressional special interest items. The projects in this PE adhere to Tri-Service Agreements on clothing, textiles, and food with coordination provided through the Cross Service Warfighter Equipment Board, the Soldier as a System Integrated Concepts Development Team, and the DoD Combat Feeding Research and Engineering Board.

Work in this PE is related to, and fully coordinated with, PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0603001A (Warfighter Advanced Technology, PE 0602787A (Medical Technology Initiatives)0602716A (Human Factors Engineering Technology) and PE 0602784A (Military Engineering Technology)

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work is led, performed, and/or managed by the Natick Soldier Research, Development, and Engineering Center (NSRDEC), Natick, MA.

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	38.347	27.746	28.335	-	28.335
Current President's Budget	37.040	27.746	29.835	-	29.835
Total Adjustments	-1.307	-	1.500	-	1.500
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-0.812	-			
• SBIR/STTR Transfer	-0.495	-			
• Adjustments to Budget Years	-	-	1.500	-	1.500

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT 283: *AIRDROP ADV TECH*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
283: *AIRDROP ADV TECH*	2.449	2.527	2.369	-	2.369	2.516	2.563	2.775	2.822	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project researches, investigates and evaluates component technologies to enhance cargo and personnel airdrop capabilities for global precision delivery, rapid deployment, and insertion for force projection into hostile regions. Areas of emphasis include parachute technologies, parachutist injury reduction, precision offset aerial delivery, soft landing technologies, and airdrop simulation.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is led, performed and/or managed by the US Army Natick Soldier Research, Development and Engineering Center (NSRDEC), Natick, MA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Precision Aerial Delivery Enhancements	1.838	1.770	2.369
Description: This effort investigates technologies for enhanced payload extraction and subsequent gliding capabilities, improves delivery accuracy of varying load weights, and investigates technologies for improved insertion safety and security for airborne personnel.			
FY 2010 Accomplishments: Researched and evaluated performance of height sensor technology, to include a radar height sensor to augment existing Sound Detection and Ranging (SODAR) height sensors; investigated and developed wireless advanced navigational aid and display technologies for Military Free Fall (MFF) applications.			
FY 2011 Plans: Research and evaluate performance of adaptive Guidance Navigation and Control (GN&C) software and wind sensor technology to incorporate into on-board airborne guidance unit (AGU) enabling wind updates to be transmitted to the AGU for parafoil flight pattern adjustment.			
FY 2012 Plans: Will explore aerial delivery concepts from rotary wing Army aircraft to provide a wider range of resupply capabilities to include automatic helicopter sling load (SL) hook up/drop-off , will analyze human systems performance limits and injury mechanisms			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT 283: *AIRDROP ADV TECH*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
during SL and MFF operations; will complete assessment of oxygen requirements for extended range, high altitude MFF operations; will develop a medium fidelity engineering model of the Army's new T11 parachute system steady state descent.			
Title: Enabling Airdrop Research and Technologies ***Description:*** This effort investigates technologies for enhanced payload extraction and subsequent gliding capabilities. ***FY 2010 Accomplishments:*** Expanded Domain Specific Software Architecture (DSSA) modeling capabilities to include low altitude opening and main parachute design to allow both extracting the payload from the aircraft and decelerating the payload to a desirable descent rate. ***FY 2011 Plans:*** Verify and validate both physics and engineering based aerial delivery models; investigate methods to increase the airfoil glide ratio, which allows the jumper/cargo to exit the aircraft further from the target. These methods include the optimization of parafoil canopy design, such as variations in canopy size, shape, materials, and suspension lines. In FY12 funding will transition to Precision Aerial Delivery Enhancements.	0.611	0.757	-
Accomplishments/Planned Programs Subtotals	2.449	2.527	2.369

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT E01: *Warfighter Technology Initiatives (CA)*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
E01: *Warfighter Technology Initiatives (CA)*	10.585	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Warfighter Technology Applied Research.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Biosecurity Research for Food Safety ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Developed a biosafety level 3 biocontainment facility to support both military and civilian research needs regarding biological agent contamination of the nation's food supply chain.	1.592	-	-
Title: Injection Molded Ceramic Body Armor ***Description:*** This is a Congressional interest Item. ***FY 2010 Accomplishments:*** Improved upon the density, dimensional stability and hardness of injection molded silicon carbide technology.	0.796	-	-
Title: Joint Precision Air Drop Systems-Wind Profiling Portable Radar ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Investigated a method to obtain real-time wind updates on an aircraft for airdrop purposes.	1.830	-	-
Title: Nano-Enabled Ultra High Storage Density Non-volatile Memory for Commanders Digital Assistant ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Question	2.387	-	-
Title: Improved Thermal Resistant Nylon for Enhanced Durability and Thermal Protection in Combat Uniforms. ***Description:*** This is a Congressional Interest Item.	3.183	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT E01: *Warfighter Technology Initiatives (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
FY 2010 Accomplishments: Worked on three objectives: migration from the manual to semi-automated process for metal nanodot synthesis for higher nanodot quality (i.e., diameter control, purity), repeatability and throughput; tighten nanodot coating uniformity while maintaining ultra-high coating density for better cell-to-cell distribution; and extend the single flash memory cell to high-density mini-arrays of memory transistors.			
Title: In-Theater Evaluation of Ballistic Protection ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Fabricated ballistic panel systems for tent systems and Containerized Housing Units.	0.797	-	-
Accomplishments/Planned Programs Subtotals	10.585	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT H98: *CLOTHING & EQUIPM TECH*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
H98: *CLOTHING & EQUIPM TECH*	18.594	19.624	19.602	-	19.602	18.447	18.517	18.320	18.867	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project investigates and evaluates components and materials that have potential to enhance Soldier survivability from combat threats (flame and thermal threats, blast and ballistic threats, and lasers) and the field environment (e.g., cold, heat, wet) to increase operational effectiveness while decreasing the Soldier's cognitive and physical burden. Included are technologies and novel materials related to personnel armor, helmets, hearing protection, eyewear, and protective inserts for shelters. In addition, this project supports the development and refinement of essential analytic tools needed to predict and/or assess the combat effectiveness of next generation Soldier systems with a focus on network centric warfare technologies and human science investigation to identify and develop methods to assess human cognitive responses to sensory, physical, cognitive, and affective stimuli and stressors.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work is led, performed and/or managed by the Natick Soldier Research, Development, and Engineering Center (NSRDEC), Natick, MA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Ballistic and Blast Protection for the Individual Soldier	5.621	5.594	7.207
Description: This effort focuses on material modeling, novel materials, and component designs to protect Soldiers against ballistic and blast threats. This effort is fully coordinated with PE 0602787/Project FH2, Project VB3 and Project 874 (Medical Technology). ***FY 2010 Accomplishments:*** Validated enhancements to survivability modeling tool (including the Integrated Casualty Estimation Methods model) for personnel ballistic and blast protection systems development. Developed improved ballistic body armor plate designs based on medical forensic data and 3D body scans. Completed ballistic experiments on selected materials configurations to obtain critical data for advancement of ballistic plate technology. ***FY 2011 Plans:*** Investigate and conduct trade analysis of parameters which could lead to lighter weight ballistic and blast protective systems for individuals and shelters; construct and evaluate initial soft armor and composite armor components using emerging materials (from PE 0602105A/project H84 or others) and geometry data from the Integrated Casualty Estimation Method modeling tool;			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT H98: *CLOTHING & EQUIPM TECH*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
transition enhanced survivability analysis and modeling tools to materiel developers and Product Managers to aid in future requirements, design, and acquisition decisions. ***FY 2012 Plans:*** Will develop methodology to characterize multidirectional bending/ flexing behavior of multi-layer armor material systems, apply human flexure findings to digital human models and investigate advanced armor material and configurations to accommodate body flexure; will develop reduced weight material concepts for head and face protection and research emerging ballistic and blast protective materials for application to shelter systems. Conduct research to increase fundamental understanding of blast effects on humans; Personal Protective Equipment design factors effecting exposure limits, scope of future threats and the potential impact to Ground Soldiers.			
Title: Soldier Vision Protection and Enhancement ***Description:*** This effort focuses on technologies which provide eye protection from battlefield threats. ***FY 2010 Accomplishments:*** Developed an eyewear lens scaffold (pixilated lens with a battery operated sensor) that can sense and respond to visible and infrared (IR) irradiation sources to protect Soldiers' eyes, maximize overall visual acuity, and determine directionality of threats; matured lens technology to serve as the baseline for subsequent vision protection enhancement technologies and examined Soldier acceptance issues by evaluating the ability to differentiate color or objects in both day and night scenarios. ***FY 2011 Plans:*** Develop and evaluate against the baseline variable transmission eyewear technologies, material properties and methods to integrate glare, laser flash and dazzle protection into eyewear. ***FY 2012 Plans:*** Will begin integration of eye protection and variable transmission technologies into a single lens design with multiple levels of light transmission control.	2.120	2.493	2.546
Title: Soldier and Small Unit Modeling and Analysis ***Description:*** This effort will focus on Small Combat Unit (SCU) modeling and analysis to provide critical data and the rationale necessary for making technology decisions for the Soldier and Small Combat Units. This effort is fully coordinated with PE 0602716A/Project H70 (Human Factors Engineering Technology) and PE 0602784A/Project H71 (Military Engineering Technology.) ***FY 2010 Accomplishments:***	2.210	2.331	1.439

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT H98: *CLOTHING & EQUIPM TECH*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Provided credible Soldier physiological representations within the suite of Soldier/Small Unit models and simulations to include effects of equipment load on Soldier movement and the effect of helmets on sound detection and direction; expanded analysis capabilities to determine impact to small unit effectiveness by using combined arms scenarios to identify a number of interactions that occur between ground Soldiers, base camps and vehicle platforms. ***FY 2011 Plans:*** Link models and simulations and provided data analysis to examine the issue of Soldier load; develop counterinsurgency scenarios for Soldier and SCUs; analyze SCU?s logistics supply chain and capability to sustain themselves in austere environments; model SCUs combat effectiveness utilizing notional capabilities compared to the current capabilities of Force Provider systems; analyze fuel and water systems, cost/benefits of unmanned sensors for stand-off recognition and intelligence gathering. ***FY 2012 Plans:*** Analyze the utility of tailorable/modular/scalable body armor and recommend optimal configurations to ensure the proper balance of protection and Soldier load for any given missions and scenario. Continue to conduct analyses to support Expeditionary Mobile Base Camps as Combat Outposts (COPs) that will allow SCUs to sustain themselves in austere environments.			
Title: Measurement, Prediction and Improvement of Soldier Performance ***Description:*** This effort focuses on human science methods (psychological, anthropometric, and psychophysical) and biomechanical models to assess human responses to sensory, physical, cognitive and affective stimuli and stressors to support human systems design concepts for Warfighter equipment. This work is collaborative with the Army Research Laboratory PE 0602716A/H70 and the Medical Research and Materiel Command PE 0602787. ***FY 2010 Accomplishments:*** Identified brain and cognitive mechanisms underlying dismounted Soldier performance relative to battlespace awareness using human experimental studies and cognitive task analysis of squad-level operations. ***FY 2011 Plans:*** Develop an initial set of standard cognitive metrics for quantifying and evaluating Soldier performance under stressed and non-stressed task situations based on cognitive task analysis and human experimental studies; conduct human research to quantify the influence of contextual variables (e.g., physical fatigue) on cognitive processes involved in performing squad-level infantry tasks. ***FY 2012 Plans:*** Will mature and validate cognitive metrics for quantifying and evaluating Soldier performance affected by contextual variables; conduct human research to identify mitigation strategies for performance decrements; provide anthropometric specifications for	2.976	3.590	2.956

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT H98: *CLOTHING & EQUIPM TECH*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
3D digital human models representing body size/proportional variations for males and females and link individual Soldier physical task simulations to better predict and model the effect of equipment loads on Soldier performance.			
Title: Multifunctional Fibers, Textiles and Materials for the Soldier ***Description:*** This effort focuses on technologies that aid in the design and evaluation of multifunctional protective materials and concealment concepts for Soldier clothing, equipment and shelters. ***FY 2010 Accomplishments:*** Investigated textile and film-based alternatives to create wearable Soldier power technologies, completed laboratory testing of new flame-resistant (FR)/thermal protective materials and developed analytical tools to assess their protection levels. ***FY 2011 Plans:*** Investigate modeling and control of low cost electrospinning processes to produce micro/ nanostructure fibrous materials; apply analytical methods to design and fabricate multifunctional fibers for advanced flame, thermal and concealment/signature protective textiles and composite concepts. ***FY 2012 Plans:*** Will assess multifunctional fiber technologies for key flame and thermal protection capabilities, cut and abrasion resistance, concealment and electronic/electrical properties as well as fiber composite toughness enhancement improvement for multiple Soldier items; will integrate selected novel FR protective materials into fibers and research new FR characterization methodologies and modeling of layered FR materials to determine the physical properties controlling FR performance; will determine the effect of enhanced process control on electrospun materials, and evaluate performance for a wide range of operational conditions; and will investigate textile properties effecting signature reduction and performance evaluation techniques for a wide range of operational conditions and sensors.	5.667	5.616	5.454
Accomplishments/Planned Programs Subtotals	18.594	19.624	19.602

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT H99: *JOINT SERVICE COMBAT FEEDING TECHNOLOGY*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
H99: *JOINT SERVICE COMBAT FEEDING TECHNOLOGY*	5.412	5.595	5.514	-	5.514	5.732	5.841	5.949	6.118	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project investigates, develops and evaluates novel ration packaging, combat feeding equipment/systems and advanced food processing technologies to prolong shelf-life. This project also investigates technologies that detect food safety hazards on the battlefield and enhances quality, nutritional content and the variety of food items in military rations. Efforts funded in this project support all Military Services, the Special Operations Command, and the Defense Logistics Agency. The Army serves as Executive Agent for this Department of Defense (DoD) program, with oversight and coordination provided by the DoD Combat Feeding Research and Engineering Board. Technologies developed within this effort transition to PE 0603001A/project C07 for maturation.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is led, performed, and/or managed by the US Army Natick Soldier Research, Development and Engineering Center (NSRDEC), Natick, MA, and this project has collaborative efforts with the US Army Research Institute for Environmental Medicine.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Combat Feeding Equipment Technologies	2.246	2.320	1.620
Description: This effort investigates equipment and energy technologies to enhance effectiveness and reduce logistics footprint of Joint Services field feeding operations in a wide range of environmental and operational contexts. ***FY 2010 Accomplishments:*** Developed technology concepts for a standard size container that extends the shelf life of semi-perishable rations in hot environments; designed and evaluated an off-grid pallet chiller with self-containing power supply for bottled water; and completed concept development of a flameless individual water heater. ***FY 2011 Plans:*** Develop recycling technology concepts for greywater (non-industrial wastewater) generated from field food sanitation systems for the Food Sanitation Center; and complete concept development of self-powered appliances with next generation high efficiency thermoelectric modules to reduce reliance on JP8. ***FY 2012 Plans:*** Will investigate innovative mission-specific, man portable feeding technologies; will evaluate high efficiency thermoelectric powered appliances to reduce reliance on JP8 and other power sources to operate kitchen appliances; will investigate novel			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT H99: *JOINT SERVICE COMBAT FEEDING TECHNOLOGY*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
heating technologies that will allow the warfighter to self heat a wider range or rations, including group rations, in a variety of environmental conditions without kitchen equipment.			
Title: Ration Stabilization and Novel Nutrient Delivery Technologies ***Description:*** This effort identifies and develops nutrient compositions to maximize Soldier cognitive and physical performance on the battlefield. ***FY 2010 Accomplishments:*** Researched acceptance of shelf-stable sandwiches containing emulsion-based fillings to control food water content; down-selected component food matrices for incorporation of performance optimizing and nano-sized functional ingredients. ***FY 2011 Plans:*** Explore shelf-stable pocket bread formulas and production parameters; evaluate the efficacy of carbon dioxide treatment of fresh fruits and vegetables and antimicrobial effects on ration components; and demonstrate nanotechnology-based carriers (ration component) for enhancing micronutrient stability in food items of military rations. ***FY 2012 Plans:*** Will explore the integration of antioxidants into various ration components to improve the overall health of the warfighter; will develop new baked food items that will increase the variety of baked goods available in military rations; will develop ration components that increase the warfighter appetite satisfaction rate relative to ration size to support Soldier mental and physical performance.	1.580	1.698	1.933
Title: Ration Packaging and Food Safety Technologies ***Description:*** This effort investigates biosensors models and designs for food products and novel ration packaging technologies to minimize nutritional degradation and protect the warfighter from foodborne illnesses. ***FY 2010 Accomplishments:*** Developed an integrated sensor circuit concept diagram for printed electronic display of real-time ration condition assessment to determine remaining shelf life; developed a bacteriophage (viruses that infect specific bacteria) cocktail to reduce bacteria in fresh fruits and vegetables; conducted polymer processing of thermoplastic materials to optimize novel multilayer polymer films properties; optimized conductive membranes for sensing to capture and detect pathogenic bacteria through optical detection techniques. ***FY 2011 Plans:***	1.586	1.577	1.961

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT H99: *JOINT SERVICE COMBAT FEEDING TECHNOLOGY*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Investigate compatibility and integration issues with printed electronic display applications on packaging structures for ration condition assessment; evaluate electrochemical measurements generated by an antibody-antigen reaction with conductive membranes for more rapid and reliable detection of pathogens in foods. ***FY 2012 Plans:*** Will conduct exploratory research on bioactive packaging materials which can detect and kill pathogens present in a food product to protect the warfighter?s health; and will evaluate ration packaging microencapsulation technologies that enhance barrier protection and packaging integrity resulting in higher ration quality and reduced waste.			
Accomplishments/Planned Programs Subtotals	5.412	5.595	5.514

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602786A: *Warfighter Technology*	PROJECT VT4: *EXPEDITIONARY MOBILE BASE CAMP TECHNOLOGY*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
VT4: *EXPEDITIONARY MOBILE BASE CAMP TECHNOLOGY*	-	-	2.350	-	2.350	1.485	1.560	1.650	1.750	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates fully integrated holistic expeditionary base camp (EBC) capabilities with mission-specific plug and play components, subsystems and modules designed to optimized manpower requirements, improve situational awareness, increase survivability, optimize habitation, reduce logistics footprint, enhance supportability and reduce cost. Expeditionary Base Camp (EBC) systems provide an operational capability for Small Combat Units (battalion and below) and Soldiers in varying environments which are rapidly deployable and re-locatable and require no Military Construction and limited materiel handing support. This project integrates mature technologies to create mission specific lab demonstrators and evaluates the performance capabilities using metrics and methodologies developed under PE 0602786//Project VT4.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is led, performed and/or managed by the US Army Natick Soldier Research, Development and Engineering Center (NSRDEC), Natick, MA and fully coordinated with PE 0602786A (Warfighter Technology), PE 0602784A and 0603734A (Military Engineering) PE 0603004A (Weapons and Munitions Advanced Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0603125A (Combating Terrorism Technology Development) and PE 0603772A (Advanced Tactical Computer Science and Sensor Technology).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Expeditionary Base Camp Component Technologies	-	-	2.350
Description: Identify and improve component interoperability and mature and scale component technologies for an integrated holistic base camp concept. ***FY 2012 Plans:*** Will develop a database of physical measurements (size, weight, volume); human metrics (manpower, cognitive load); and interfaces (power, network) and assess technical performance and maturity of technologies (i.e., level of ballistic, environmental and/or chem-bio protection); capture key data regarding mission planning from deploying units and component limitations from returning Soldiers; investigate data and prioritize critical new or improved capabilities through simulations and war-gaming, develop test protocols for technology assessment, and define design and technical performance criteria for achievable capability sets.			
Accomplishments/Planned Programs Subtotals	-	-	2.350

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602786A: *Warfighter Technology*	**PROJECT** VT4: *EXPEDITIONARY MOBILE BASE CAMP TECHNOLOGY*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.