Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced 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	51.596	37.364	52.979	-	52.979	40.814	43.658	43.802	44.211	Continuing	Continuing
242: *AIRDROP EQUIPMENT*	3.684	3.801	3.860	-	3.860	3.926	3.999	4.065	4.134	Continuing	Continuing
543: *AMMUNITION LOGISTICS*	1.308	1.347	2.187	-	2.187	2.285	2.484	2.504	2.247	Continuing	Continuing
C07: *JOINT SERVICE COMBAT FEEDING TECH DEMO*	2.331	2.361	2.413	-	2.413	2.467	2.516	2.553	2.566	Continuing	Continuing
J50: *FUTURE WARRIOR TECHNOLOGY INTEGRATION*	28.953	29.855	42.419	-	42.419	29.136	31.019	30.830	31.624	Continuing	Continuing
J52: *WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)*	15.320	-	-	-	-	-	-	-	-	Continuing	Continuing
VT5: *EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION*	-	-	2.100	-	2.100	3.000	3.640	3.850	3.640	Continuing	Continuing

Note

FY12 funding increase for high priority efforts.

A. Mission Description and Budget Item Justification

This program element (PE) provides Soldiers and Small Combat Units with the most effective personal clothing, equipment, and rations at the least weight and sustainment burden. This PE supports the maturation and demonstration of technologies associated with air delivery of personnel and cargo (Project 242), rapid ammunition/munitions deployability and resupply (Project 543), combat rations and combat feeding equipment (Project C07), combat clothing and personal equipment (including protective equipment such as personal armor, helmets, and eye wear) (Project J50) and expeditionary base camps (Project VT5). Project J52 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 0602786A (Warfighter Technology), PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0602624A (Weapons and Munitions Technology), PE 0602705A (Electronics and Electronic Devices), PE 0603004A (Weapons and Munitions Advanced Technology), PE 0603008A (Command, Control, Communications Advanced Technology), PEs 0602623A and 0603607A (Joint Service Small Arms Program) and PEs 0602784A (Military Engineering Technology) and 0603734A (Military Engineering Advanced 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603001A: *Warfighter Advanced Technology*

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

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	54.290	37.364	38.411	-	38.411
Current President's Budget	51.596	37.364	52.979	-	52.979
Total Adjustments	-2.694	-	14.568	-	14.568
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-1.592	-			
• SBIR/STTR Transfer	-1.102	-			
• Adjustments to Budget Years	-	-	14.568	-	14.568

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT 242: *AIRDROP EQUIPMENT*	

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
242: *AIRDROP EQUIPMENT*	3.684	3.801	3.860	-	3.860	3.926	3.999	4.065	4.134	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates equipment and innovative techniques for precision aerial delivery of cargo and personnel. Aerial delivery is a key capability for rapid force projection and global precision delivery. These efforts are designed to advance state of the art precision delivery technologies for currently equipped aircraft, unmanned aerial systems (UAS) and advanced rotary wing aircraft. These efforts provide the Warfighter with highly accurate, timely cargo/payload delivery and resupply in all terrain and weather conditions. Precision delivery/resupply reduces vulnerability of ground soldiers (lessens exposure to IEDs and other battlefield threats), aircraft and crew. Precision aerial delivery supports remote warfare with activities such as placement of battlefield sensors, reduction of Soldier load and initial delivery of key expeditionary base camp assets. Demonstrated technologies transition to Product Manager (PM)-Force Sustainment Systems (PM FSS), PM-Soldier Clothing and Individual Equipment (PM-SCIE) as well as other Army PMs.

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: Advanced Precision Aerial Delivery of Cargo	3.684	3.041	2.895
Description: This effort demonstrates enhancements for increasing the precision of aerial delivery using components and technical breakthroughs from PE 0602786A/project 283. Projects transition to the Joint Precision Airdrop System (JPADS).			
FY 2010 Accomplishments: Matured and demonstrated emerging Guidance Navigation & Control (GN&C) software component technologies and transitioned promising GN&C components candidates to PM -FSS and demonstrated technologies for low velocity, light payload (5K-20K lb.) airdrop.			
FY 2011 Plans: Mature and demonstrate precision airdrop sensor technologies for real-time monitoring of height (height sensors integrated with terrain data) as well as air properties (temperature, air density, velocity, changing pressure); conduct scaled (i.e., weight, altitude and number of parachutes) airdrop testing of the low velocity, heavy payload (22K-42K lb) technologies. Evaluate results and select full scale design for Above Ground Level (500 ft.) delivery of heavy payloads.			
FY 2012 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT 242: *AIRDROP EQUIPMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Will mature, demonstrate and transition sensor technologies for real-time monitoring of weather to PM-FSS JPADS ; mature advanced rotary wing aerial delivery sling load net technologies for low cost one-time-use.			
Title: Advanced Airborne Insertion (Personnel Airdrop) ***Description:*** This effort demonstrates technical breakthroughs identified by PE 0602786A/Project 283 which provide safety and security enhancements for the aerial insertion of Airborne troops. ***FY 2011 Plans:*** Transition mature chest-mounted navigational aid and display technologies to PM-SCIE and demonstrate payload-to-payload and jumper-to-jumper in-flight communications. ***FY 2012 Plans:*** Will mature technologies for cargo/jumper locators and demonstrate payload-to-payload, jumper-to-jumper and payload-to-jumper in-flight communications.	-	0.760	0.965
Accomplishments/Planned Programs Subtotals	3.684	3.801	3.860

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 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*				PROJECT 543: *AMMUNITION LOGISTICS*			
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**
543: *AMMUNITION LOGISTICS*	1.308	1.347	2.187	-	2.187	2.285	2.484	2.504	2.247	Continuing	Continuing

Note

Not applicable

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies for rapidly deploying and resupplying munitions and improving the return of unused ammunition from deployment. This effort contributes to force readiness and reduction in the logistics footprint through improvements in Materials Handling Equipment (MHE), ammunition and missile packaging/palletization, explosives safety, weapons re-arm, and asset throughput/management.

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 performed and managed by the US Army Armament Research, Development, and Engineering Center (ARDEC), Picatinny Arsenal, NJ.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Tactical Ammunition Accountability (TAA)	1.308	1.347	-
Description: This effort demonstrates advanced supply chain procedures coupled with state-of-the-art remote surveillance devices at the weapon system/munition level to provide precise knowledge of ammunition count, location and health status throughout an Area Of Responsibility (AOR).			
FY 2010 Accomplishments: Fabricated an automated ammunition expenditure reporting design mounted on a surrogate weapon system and conducted demonstration of ammunition consumption transactions from the weapons system to Army's property recording system			
FY 2011 Plans: Complete development of the automated expenditure reporting design; conduct demonstration in a tactically relevant environment.			
Title: Automated Material Handling Technology	-	-	1.300
Description: This effort demonstrates smart sensors and robotic technology as add-on kits for side loading forklifts used in ammunition storage igloos and tactical forklifts to provide quick, safe, and cost effective transfer of munitions pallets between storage areas and transportation assets.			
FY 2012 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT 543: *AMMUNITION LOGISTICS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Will apply automated capabilities to a manually operated forklift and evaluate performance within an ammunition igloo.			
Title: Weapon System Rearm Technology ***Description:*** This effort demonstrates automated modular re-arm systems for the medium caliber ground combat vehicle, as well as towed and self-propelled howitzers. ***FY 2012 Plans:*** Will select concepts and preliminary designs for re-arm system designs.	-	-	0.887
Accomplishments/Planned Programs Subtotals	1.308	1.347	2.187

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 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT C07: *JOINT SERVICE COMBAT FEEDING TECH DEMO*	

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
C07: *JOINT SERVICE COMBAT FEEDING TECH DEMO*	2.331	2.361	2.413	-	2.413	2.467	2.516	2.553	2.566	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies for military combat feeding systems and combat rations. Demonstration areas of emphasis include: enhanced nutrient composition to maximize cognitive and physical performance on the battlefield; cutting edge food stabilization and preservation techniques that increase the variety and quality of rations used by the Joint Services; novel ration packaging technologies to minimize degradation of combat rations during storage; field portable biosensors for foodborne detection and identification; and predictive modeling tools to protect the warfighter from foodborne illnesses. This project demonstrates combat feeding technology with reduced logistics (in component parts, weight, volume, fuel, and water) and labor requirements, while improving the quality of food service. The project, a Department of Defense (DoD) program for which the Army has Executive Agent responsibility, provides technology development for Joint Service Combat Feeding. The DoD Combat Feeding Research and Engineering Board provides oversight for this project. Demonstrated field feeding equipment technologies transition to Product Manager (PM)-Force Sustainment Systems (PM FSS).

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. 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	0.893	0.903	1.091
Description: This effort demonstrates equipment and energy technologies to enhance effectiveness and reduce logistics footprint of field feeding systems.			
FY 2010 Accomplishments: Integrated and demonstrated an ethylene control system in refrigerated containers to extend the shelf-life of fresh fruits and vegetables, integrated technology improvements for waste to energy systems.			
FY 2011 Plans: Demonstrate a JP8 powered flameless individual in-line water heater for heating dehydrated rations and beverages; demonstrate a passive container cooling system for rations stored in high ambient temperature to reduce ration spoilage.			
FY 2012 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Will demonstrate a fully integrated Battlefield Kitchen with improved habitability and safety, as well as reduced fuel consumption; demonstrate a grey water recycling system for mobile kitchens to manage liquid waste on the battlefield; demonstrate mission tailorable, man-portable appliances capable of integrating into current kitchen platforms.			
Title: Ration Stabilization, Packaging, Nutrient Delivery and Food Safety Technologies ***Description:*** This effort demonstrates technologies for enhancing nutrition, food stabilization, ration packaging and food safety to support warfighters physical and cognitive performance on the battlefield. ***FY 2010 Accomplishments:*** Demonstrated shelf stability of probiotic enhanced ration components and encapsulated oils for ration systems; prepared field manual on validated assays/surveys for the analysis of food pathogens and biological agents and transitioned to the Veterinary Services Activity/Office of the Surgeon General; and demonstrated the optimal use of analytical food pathogen detection diagnostics and the accompanying procedures for high throughput screening of foods. ***FY 2011 Plans:*** Demonstrate shelf stable sandwiches with emulsion based fillings; health benefits of probiotic ration components for bacterial reductions in fresh vegetables and component food. Develop packaging prototypes using novel multilayer polymer films to enhance barrier's mechanical and insulating properties and transition ration, packaging and nutrient delivery technologies. ***FY 2012 Plans:*** Will demonstrate ration packaging permeability models that will be used to develop better ration packaging systems to decrease battlefield waste and packaging weight; will demonstrate fortified ration components that will result in a wider variety of eat-on-the-go rations with nutrient composition optimized for warfighter physical and cognitive performance for specific missions.	1.438	1.458	1.322
Accomplishments/Planned Programs Subtotals	2.331	2.361	2.413

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 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT J50: *FUTURE WARRIOR TECHNOLOGY INTEGRATION*	

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
J50: *FUTURE WARRIOR TECHNOLOGY INTEGRATION*	28.953	29.855	42.419	-	42.419	29.136	31.019	30.830	31.624	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures, demonstrates and integrates high-payoff technologies to provide the Soldier and Small Combat Units (SCU) with the most effective personal protective clothing, electronics subsystems, and mission specific equipment while reducing weight, sustainment and cognitive burden. Efforts in this project focus on maturation, integration and demonstration of technologies such as personal armor and headgear; lightweight, ruggedized, durable electronic components for situational awareness and network connectivity; Soldier load-optimization and power/power management components/systems for the individual Soldier and SCU. These efforts utilize field demonstrations to obtain relevant user feedback for design and performance validation.

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. The Soldier Ballistic and Blast Protection task is executed in collaboration with the DoD Medical Research Program for Prevention, Mitigation and Treatment of Blast Injuries and leverages and integrates technologies developed in PEs 0602786A/project H98 and 0602787A/project 878.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Soldier/Small Unit Ballistic and Blast Protection	4.420	3.521	8.290
Description: This effort matures and demonstrates Soldier systems level modeling, test devices, protocols and technologies to improve Warfighter survivability against blast and ballistic (B&B) threats. Work in this project is fully coordinated with PEs 0602786A/Project H98 (Warfighter Technology), 0602618/Project 61 (Ballistics Technology) and 0602787A/Project 878 (Medical Technology). Demonstrated technologies transition to Product Manager-Soldier Protection and Individual Equipment and/or industry partners.			
FY 2010 Accomplishments: Matured materials for individual blast protection concept, blast assessment protocol; used ballistic and blast protective materials from PE 0602786A/project H98 and PE 0602105A/project H84 to demonstrate enhanced ballistic and blast protection system for thorax area; matured and demonstrated breadboard enhanced helmet to address emerging threats.			
FY 2011 Plans:			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Develop and refine test devices and protocols for additional injury mechanisms of blast and ballistic events; refine and evaluate ballistic and blast protection system prototypes and obtain user feedback; develop/refine combat effectiveness metrics linking physical effects of load to cognitive performance. ***FY 2012 Plans:*** Will improve the body armor assessment protocol by validating range of motion measurements with operationally-relevant Soldier agility assessment techniques; will demonstrate head and face protection retrofit for existing helmets and will transition detailed specification and prototypes; synchronize and focus Modeling and Simulation programs to analyze existing data (mobility, protection, payload, lethality) and establish trade space, quantify risk/tradeoffs to optimize protection concepts and advance state-of-the-art design rules for individual armor.			
Title: Soldier /Small Unit Integrated Protection and Capability Enhancement ***Description:*** This effort matures Soldier protection technologies, integrates components and demonstrates innovative capability enhancement technologies for the Soldier/Small Combat Unit. This work is fully coordinated with PE 060786A/Project H98 (Warfighter Technology), PE 0602716A/Project H70 (Human Factors Engineering Technologies) and PE 0602705/Project H94) (Electronics and Electronic Devices). Demonstrated technologies transition to various PEO-Soldier Product Managers. ***FY 2010 Accomplishments:*** Evaluated Microclimate Cooling (MC) technologies from PE 0602786A/project H98 in load carriage context; conducted joint technical demonstration with Joint Science and Technology Office Chemical and Biological Defense (JSTO CBD) for advanced Soldier CB protection to determine thermal burden; selected promising battlefield noise, laser protection technologies (0602105A/ project H84), displays, sensors, interfaces and battle command applications for next generation Soldier-centric headgear. ***FY 2011 Plans:*** Fabricate, evaluate and optimize interfaces for Soldier-centric headgear components; refine headgear system design based on sizing, shape, stability and balance; use human performance, Soldier load, and threat assessment data to begin optimization of modular Soldier as System protection variants; identify baseline data required to support development of leader mission planning tools to assist leaders in the field in the selection of appropriate mission specific modular load configurations. ***FY 2012 Plans:*** Will continue to refine and improve the integrated Soldier-centric headgear design and conduct system evaluations; select promising Flame Resistant, visual, thermal, ballistic and concealment/signature management technologies; and baseline mission specific equipment for modular Soldier as a System protection variants.	3.341	4.183	4.440
Title: Soldier/Small Unit Load Management and Mobility Enhancement	3.669	3.129	4.530

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT J50: *FUTURE WARRIOR TECHNOLOGY INTEGRATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Description: This effort uses a system engineering approach to reduce Soldier and Small Combat Unit load by integrating lighter weight materials into components, employing energy/power management strategies and devising mechanisms/equipment to offload some mission equipment. ***FY 2010 Accomplishments:*** Evaluate performance of Full Body Human Augmentation (exoskeleton) system, optimize and mature low power components to provide a more agile and efficient lightweight LBHA System; conducted technical and biomechanical tests to investigate spatial information to enhance mechanical assist mobility by understanding and remembering user's movements. ***FY 2011 Plans:*** Investigate load carriage options for placement of Soldier loads (i.e., fuel, batteries) on the Lower Body Human Augmentation (LBHA) System; draft technical and operationally-based system assessment protocols and analyze of components of Soldier Load which could be matured with lighter weight raw materials, reduced packaging or maturing technologies. ***FY 2012 Plans:*** Will focus on a holistic approach to identify capabilities that enable the Small unit to efficiently shoot or move across varying terrain; will devise measures to assess the impact of load on marksmanship performance; will conduct field validation of mobility aids to exploit Soldier's use and application of spatial information; will develop Soldier/Small Unit applications to be incorporated into mission planning tools for load management, Soldier cross-loading and resupply analysis.			
Title: Small Combat Unit C4 Interfaces ***Description:*** This effort matures and demonstrates a modular, open architecture personal area networks with graphical user interface for Soldier-borne technologies. Effort is coordinated with PE 0602786A/H98 (Warfighter Technology), PE 0603710A/K70 (Night Vision Advanced Technology) and PE 0602624A/Project H18 (Weapons and Munitions Technology), PE 0603005/Project 497 (Combat Vehicle and Automotive Advanced Technology), and PE 0603004/Project 232 (Weapons and Munitions Advanced Technology). ***FY 2010 Accomplishments:*** Examined interfacing and interference characteristics of wireless protocols with communication devices in relevant field environments; designed Soldier system interface protocols to enable robotic control and image dissemination across the squad. ***FY 2011 Plans:***	6.219	6.823	6.952

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Conduct laboratory analysis and conduct field demonstrations of Soldier-borne wireless personal area network (WPAN) system and obtain National Security Agency (NSA) approvals; demonstrate an on-Soldier system architecture that tightly couples three existing subsystems (battery, radio, headset), analyzes system performance/efficiency and develop user interface technologies. ***FY 2012 Plans:*** Will continue gunfire detection, optical weapon sights and target identification efforts started in Small Combat Unit Lethality Integration effort and integrate into Soldier network; increase WPAN functionality to connect a wide range of Soldier-borne hardware components (such as sensors for weapon target pairing) and optimize form factor for efficient operation and layout; will conduct field trials to characterize the system architecture with the complete integration of the WPAN and develop and demonstrate user interface technologies for mission command networking of Soldier and unmanned sensors; will conduct field demonstrations of capabilities Small Units employ during intelligence gathering, training, and other operations; will optimize Soldier acceptance parameters including form factor graphical user displays for efficient task completion and power management.			
Title: Soldier and Small Unit Power and Energy ***Description:*** This effort matures and demonstrates technologies to achieve capability improvements in lightweight Soldier power and power management components and subsystems. This effort is fully coordinated with 0602705A/Project H11 (Electronics and Electronic Devices). ***FY 2010 Accomplishments:*** Conducted user assessments of high-energy density LiCFx primary batteries at half the size, conformal rechargeable batteries, and hybrid power systems (reformed methanol and direct methanol fuel cells); matured an engine based portable power source which enables self-contained power capability. ***FY 2011 Plans:*** Conduct field evaluation of fuel cells (reformed and direct methanol); demonstrate improved hybrid power technology components which can supply a 24 hour mission; conduct field demonstrations of engine based generator and charger system for tactical battery charging; mature a conformal headgear power source and wireless power transfer from body to weapon or helmet. ***FY 2012 Plans:*** Will demonstrate central conformal headgear power source; will demonstrate wireless power transfer from body to weapon or helmet; and mature multi-fueled (JP8, DF, kerosene) man-packable tactical power source and battery charger; will evaluate laboratory data assessing network power requirements and mature smaller, lighter wearable hybrid power source to enable extended missions. Effort is coordinated with PE 0602705A/projects H11 and H94.	3.200	3.687	3.335
Title: Small Combat Unit Lethality Integration	3.328	3.590	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Description: This effort pursues distributed unmanned sensors, integrated gunfire detection system, optical weapon sight with net-centric tactical fire control software that utilizes human decision aides to improve the lethality and combat effectiveness of the Soldier and Small Combat Unit. This project is fully coordinated with PE 0602624A/Project H18 (Weapons and Munitions Technology) and PE 0603004/Project 232 (Weapons and Munitions Advanced Technology). ***FY 2010 Accomplishments:*** Miniaturized Soldier-borne gunfire detection system; evaluated data filtering of information and improved network performance; fused air and ground sensor assets with Soldier-borne network; detected and identified enemy targets and passed information to target identification network; evaluated strategies and minimized time of digital call for fire and lethal effects. ***FY 2011 Plans:*** Mature and demonstrate Soldier-borne 3D gunfire detection capabilities and technologies; demonstrate optical weapon sight (smart sight) using ballistic tables to accurately laze target and perform cooperative engagement; incorporate unmanned assets (Air Vehicles, Ground Vehicles and Ground Sensors) into target identification network and demonstrate target (Soldier and Vehicle) of destruction through innovative message processing, synchronization and accumulation of internal platoon fire assets such as 40 mm grenades, 60 mm Mortars, 120 mm Mortars and Javelin Weapon System. Work in this area will transition in FY12 to Small Combat Unit C4 Interfaces.			
Title: Small Unit Systems Engineering, Integration and Demonstration ***Description:*** This effort develops tools to mature, demonstrate and assess the interoperability of Soldier-borne electronic hardware and software equipment with current and emerging Army mission command systems to improve Soldier mission performance. This effort is coordinated with PE 0603004A/project 232. ***FY 2010 Accomplishments:*** Continued to develop and improve simultaneous constructive, virtual and live simulation modules to assess interoperability and maturity of the Soldier-borne network components to include lethality and survivability systems and assessed simulation tools in field relevant environment. ***FY 2011 Plans:*** Complete enhancement of simulation tools for improved assessment of Soldier networked systems and develop, integrate and demonstrate embedded laboratory data collection tools for assessing network power requirements and mobility technologies; develop and demonstrate networked Soldier System interoperable information management algorithms, software, hardware	4.776	4.922	4.872

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT J50: *FUTURE WARRIOR TECHNOLOGY INTEGRATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
and network component interfaces and power centric architectures; demonstrate and assess the interoperability of existing and emerging networked hardware and software technologies in field relevant environments. ***FY 2012 Plans:*** Will develop, integrate, and demonstrate embedded laboratory data collection tools for assessing cognitive burden associated with information management algorithms and physical burden associated with hardware and network component interfaces; continue assessing maturity of Soldier-borne technologies and power centric architectures in simulated field relevant environments.			
Title: Small Combat Unit Load Reduction ***Description:*** Identify technologies to improve Soldier and Small Unit mobility and endurance. Analyze reductions in physical load and load related injuries as well as impacts to cognitive behavior and mission success. Conduct concept and technology assessments of components and subsystems or systems models and demonstrate general military utility when applied to different types of military techniques. Work in this effort is fully coordinated with all other tasks in this PE. ***FY 2012 Plans:*** Define a Small Combat Unit representative load baseline; survey Government and Industry to identify and harvest opportunities to reduce or better manage loads; identify tools necessary to diagnose and visualize load effects of equipment as well as measure mission effectiveness and mobility; develop concept and technology assessment plan with methods, metrics and measures; conduct a technology assessment of the representative baseline; conduct a concept assessment of the best collection of soldier technologies identified in survey; identify impact to capabilities created by the concept and identify tradeoffs required to make a difference in Small Combat Unit Load.	-	-	10.000
Accomplishments/Planned Programs Subtotals	28.953	29.855	42.419

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 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT J52: *WARFIGHTER ADVANCED 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
J52: *WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)*	15.320	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Warfighter Advanced Technology development.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Multi-layer Coextrusion for High Performance Packaging ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Investigated sophisticated die technologies that processed high performance packaging structures for the Unitized Group Ration (UGR) polymeric tray.	1.592	-	-
Title: Precision Guided Airdropped Equipment ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Developed advances in the state-of-the-art Joint Precision Airdrop Systems guidance and navigation for small airdrop resupply payloads.	1.194	-	-
Title: Advanced Packaging Materials for Combat Rations ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Investigated potential alternative processing technologies for heat sensitive foods.	0.796	-	-
Title: Soldier Personal Cooling System ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Developed a 1.0 liter, 3.5 pound, 120 watt (at 125°F) vapor compression, liquid circulating microclimate cooling system in accordance with Air Soldier	0.954	-	-
Title: Reducing First Responder Casualties with Physiological Monitoring	1.193	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT J52: *WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Description: This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Developed a wearable physiological monitoring system for emergency responders that can assist in decision making regarding physical performance and heat stress during training and missions.			
Title: Deployment of Affordable Guided Airdrop System ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Evaluated performance of a precision guided airdrop unit with a 50% decrease in weight and a 75% decrease in volume of the airborne guidance unit.	1.990	-	-
Title: Compostable and Recyclable Fiberboard Material for Secondary Packaging ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Developed and demonstrated a new generation of lightweight recyclable fiberboard with added functionality to improve material / supply chain efficiencies and performance.	1.990	-	-
Title: Remote Environmental Monitoring and Diagnostics in the Perishables Supply Chain ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Developed the capability to determine the remaining shelf life of operational rations based on storage history.	2.189	-	-
Title: High Pressure Pasteurization & Pressure Assisted Thermal Sterilization ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Developed the capability to sustain near-fresh quality entrees without refrigeration.	3.422	-	-
Accomplishments/Planned Programs Subtotals	15.320	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT J52: *WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)*

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 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT VT5: *EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION*	

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
VT5: *EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION*	-	-	2.100	-	2.100	3.000	3.640	3.850	3.640	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 optimize manpower requirements, improve situational awareness, increase survivability, improve habitation, reduce logistics footprint, enhance supportability and reduce cost. Expeditionary Base Camp (EBC) systems (or remote command outposts) provide an operational capability for Small Combat Units (battalion and below) and Soldiers which are rapidly deployable/re-locatable and require no Military Construction and limited materiel handing support. The need for this technologically enabled capability has arisen as a result of new tactics, techniques and procedures used in austere, remote, and challenging environments in which stability operations, counterinsurgency operations and peace keeping missions are conducted. 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 (EBC) Technology Demonstrations	-	-	2.100
Description: This effort assesses and integrates maturing technologies required to plan, establish, operate, protect, sustain and redeploy a holistic small unit base camp system and manage its power, waste and water resources. ***FY 2012 Plans:*** Will assess maturing power, waste and water technologies and define an operationally effective architecture for a basic base camp demonstrator; begin system integration of best performing components, and validate system effectiveness measures; begin to mature and demonstrate the architecture for a unit mission base camp planning tool identifying pertinent system aspects such as interoperability requirements and power demand.			
Accomplishments/Planned Programs Subtotals	-	-	2.100

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*	PROJECT VT5: *EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION*

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.