Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Army										DATE: February 2012	
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 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**Cost To Complete**	**Total Cost**
Total Program Element	36.122	52.896	39.359	-	39.359	42.186	42.958	43.139	44.680	Continuing	Continuing
242: *AIRDROP EQUIPMENT*	3.677	3.854	3.222	-	3.222	3.268	3.312	3.363	4.221	Continuing	Continuing
543: *AMMUNITION LOGISTICS*	1.304	2.184	2.308	-	2.308	2.505	2.524	2.261	2.300	Continuing	Continuing
C07: *JOINT SERVICE COMBAT FEEDING TECH DEMO*	2.310	2.409	2.180	-	2.180	2.237	2.505	2.504	2.466	Continuing	Continuing
J50: *FUTURE WARRIOR TECHNOLOGY INTEGRATION*	28.831	42.352	28.616	-	28.616	30.495	30.721	31.328	31.947	Continuing	Continuing
VT5: *EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION*	-	2.097	3.033	-	3.033	3.681	3.896	3.683	3.746	Continuing	Continuing

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 combat rations, and shelters and logistical support items 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 Assistant Secretary of Defense, Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Army					DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*		R-1 ITEM NOMENCLATURE PE 0603001A: *Warfighter Advanced Technology*			
B. Program Change Summary ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**
Previous President's Budget	37.364	52.979	40.814	-	40.814
Current President's Budget	36.122	52.896	39.359	-	39.359
Total Adjustments	-1.242	-0.083	-1.455	-	-1.455
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.951	-			
• Adjustments to Budget Years	-	-	-1.455	-	-1.455
• Other Adjustments 1	-0.291	-0.083	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
242: *AIRDROP EQUIPMENT*	3.677	3.854	3.222	-	3.222	3.268	3.312	3.363	4.221	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 such as parachutes, guidance and navigation and control components and subsystems, tracking sensors, software algorithms, and safety rigging which integrates with 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, 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.

Efforts in this program element support the Army science and technology Soldier portfolio.

Work in this project is fully coordinated with PE 0602786A (Warfighter Technology).

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this project is performed by the Natick Soldier Research, Development, and Engineering Center (NSRDEC), Natick, MA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Advanced Precision Aerial Delivery of Cargo	2.941	2.889	-
Description: Beginning in FY13, this effort will be captured in the new Airdrop/Aerial Delivery Demonstration technology effort. This effort demonstrates enhancements for increasing the precision of aerial delivery using components and technical breakthroughs from PE 0602786A/Project 283.			
FY 2011 Accomplishments: Matured and demonstrated 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); conducted scaled (i.e., weight, altitude and number of parachutes) airdrop testing of the low velocity, heavy payload (22K-42K lb) technologies. Evaluated 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 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
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:*** Beginning in FY13, this effort will be captured in the new Airdrop/Aerial Delivery Demonstration technology effort. 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 Accomplishments:*** Transitioned mature chest-mounted navigational aid and display technologies to PM-SCIE and demonstrated payload-to-payload and jumper-to-jumper in-flight communications. ***FY 2012 Plans:*** Mature technologies for cargo/jumper locators and demonstrate payload-to-payload, jumper-to-jumper and payload-to-jumper in-flight communications.	0.736	0.965	-
Title: Airdrop/Aerial Delivery ***Description:*** This effort (previously conducted in Advanced Precision Aerial Delivery of Cargo and Advanced Airborne Insertion (Personnel Airdrop) matures and demonstrates parachute materials and designs, precision guidance and navigation software and hardware, tracking sensors and safety devices to increase the accuracy in the delivery of cargo to remote locations and/or complex terrains, as well as, increase safety of personnel insertions into theaters of operations. Projects transition to this effort from previous Advanced Precision Aerial Delivery of Cargo entry. This work further evolves breakthroughs from PE 0602786A/ Project 283 and is coordinated with PE0602786A/Project VT4. ***FY 2013 Plans:*** Will demonstrate Helicopter Sling Load (HSL) hardware for unmanned payload hookup to increase safety for ground personnel; mature in-flight deconfliction and tracking sensors and software to prevent midair collisions of payloads; demonstrate mission planning software and tracking devices for rapid drop zone (DZ) assembly of troops and their equipment.	-	-	3.222
Accomplishments/Planned Programs Subtotals	3.677	3.854	3.222

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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*

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 2013 Army			DATE: February 2012
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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
543: *AMMUNITION LOGISTICS*	1.304	2.184	2.308	-	2.308	2.505	2.524	2.261	2.300	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.

Efforts in this program element support the Army science and technology Soldier portfolio.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

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 2011	FY 2012	FY 2013
Title: Tactical Ammunition Accountability (TAA)	1.304	-	-
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 2011 Accomplishments: Completed development of the automated expenditure reporting design; conducted demonstration in a tactically relevant environment.			
Title: Automated Material Handling Technology	-	1.300	2.308
Description: This effort demonstrates smart sensors and robotic load handling equipment 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 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
Apply automated capabilities to a manually operated forklift and evaluate performance within an ammunition igloo. ***FY 2013 Plans:*** Will integrate inventory planning and control software into a robotics applique kit; demonstrate autonomous forklift operations in 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.	-	0.884	-
Accomplishments/Planned Programs Subtotals	1.304	2.184	2.308

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 2013 Army			DATE: February 2012
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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
C07: *JOINT SERVICE COMBAT FEEDING TECH DEMO*	2.310	2.409	2.180	-	2.180	2.237	2.505	2.504	2.466	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies for military combat feeding systems and combat rations. 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 solutions to minimize degradation of combat rations during storage; field portable biosensors for food borne pathogen detection and identification as well as predictive modeling tools to protect the Warfighter from food borne illnesses. This project demonstrates combat feeding equipment 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 transition to Product Manager (PM)-Force Sustainment Systems (PM FSS).

Efforts in this program element support the Army science and technology Soldier portfolio.

Work in this project complements and is fully coordinated with PE 0602787A (Medical Technology).

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Joint Combat Feeding Equipment Technology	0.884	1.200	0.940
Description: Beginning in FY13, this effort will be renamed from Combat Feeding Equipment Technologies to Joint Combat Feeding Equipment Technology Demonstration. This effort demonstrates equipment and energy technologies to enhance effectiveness and reduce logistics footprint of field feeding systems.			
FY 2011 Accomplishments: Demonstrated a JP8 powered flameless individual in-line water heater for heating dehydrated rations and beverages; demonstrated 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 2013 Army		DATE: February 2012
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
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. ***FY 2013 Plans:*** Will conduct technology demonstration of kitchen appliances with an integrated fuel fired, low cost, rugged burner that enables high efficiency operation and is logistically supportable.			
Title: Ration Stabilization, Packaging, Nutrient Delivery and Food Safety Technology ***Description:*** This effort matures and demonstrates mature nutritional biochemistry, food processing and packaging solutions to enhance nutrition and improve food stabilization, ration packaging and food safety to support Warfighter's physical and cognitive performance on the battlefield. ***FY 2011 Accomplishments:*** Demonstrated shelf stable sandwiches with emulsion based fillings; health benefits of probiotic ration components for bacterial reductions in fresh vegetables and component food. Developed 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:*** Demonstrate ration packaging permeability models that will be used to develop better ration packaging systems to decrease battlefield waste and packaging weight; 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. ***FY 2013 Plans:*** Will evaluate the effectiveness of using Super-Critical Carbon Dioxide to increase the long term storage shelf life of rations; evaluate the capability for the Joint Biological Agent Identification System (JBAIDS) to detect both bio-threat agents and food service risk and demonstrate nutritional compounds identified in collaboration with US Army Medical Research Institute of Environmental Medicine to augment muscle recovery.	1.426	1.209	1.240
Accomplishments/Planned Programs Subtotals	2.310	2.409	2.180

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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*

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 2013 Army			DATE: February 2012
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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
J50: *FUTURE WARRIOR TECHNOLOGY INTEGRATION*	28.831	42.352	28.616	-	28.616	30.495	30.721	31.328	31.947	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures, demonstrates and integrates light weight and multifunctional materials and components to provide the Soldier and Small Combat Units (SCU) with the most effective personal protection, electronics connectivity and mission specific equipment while reducing physical weight, cognitive burden and sustainment needs of the Small Combat Unit. Efforts in this project focus on maturing, integrating and demonstrating personal protection (such as armor, headgear, eyewear and hearing protection); durable clothing for all weather conditions; lightweight, durable, reliable hand held electronic components for communication and situational awareness; and power components/power management solutions. In addition, special focus is on understanding and demonstrating the impacts of physical and cognitive load on Soldier mission performance and implementing strategies to reduce load and/or optimize loads to reduce injuries. These efforts integrate geographically dispersed laboratory environments to conduct comprehensive assessments and report the technical viability of Soldier system solutions and conducts field demonstrations to obtain relevant feedback for user acceptance and performance validation.

Efforts in this program element support the Army science and technology Soldier portfolio.

Work in this project complements and is fully coordinated with PEs 0602786A (Warfighter Technology), PE 0602618A (Ballistics Technology), PE 0602105A (Materials Technology), PE 0602787A (Medical Technology), PE 0602716A (Human Factors Engineering Technologies), PE 0602705A (Electronics and Electronic Devices), PE 0603710A (Night Vision Advanced Technology), PE 0602624A (Weapons and Munitions Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0603004A (Weapons and Munitions Advanced Technology) and 0603015A (Next Generation Training & Simulation Systems.)

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Soldier/Small Unit Ballistic and Blast Protection	3.521	8.278	-
Description: Beginning in FY13, this effort will be captured in the Soldier /Small Unit Integrated Protection and Load Management technology effort. 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, 0602618/Project 61 and 0602787A/Project 878 Demonstrated technologies transition to Product Manager-Soldier Protection and Individual Equipment and/or industry partners..			
FY 2011 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
Developed and refined test devices and protocols for additional injury mechanisms of blast and ballistic events; refined and evaluated ballistic and blast protection system prototypes and obtained user feedback; developed/refined combat effectiveness metrics linking physical effects of load to cognitive performance. ***FY 2012 Plans:*** Improve the body armor assessment protocol by validating range of motion measurements with operationally-relevant Soldier agility assessment techniques; 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 Load Management ***Description:*** This effort (previously conducted under Soldier/Small Unit Ballistic and Blast Protection, and Soldier/Small Unit Load Management and Mobility Enhancement) matures and demonstrates proven components and material innovations which are integrated into experimental ensembles or prototypes that have potential to significantly increase protection of individual Soldiers and/or reduce physical load at equal or better capability. This work is fully coordinated with PE 060786A/Project H98, PE 0602716A/Project H70 and PE 0602705/Project H94. Demonstrated technologies transition to various PEO-Soldier Product Managers. ***FY 2011 Accomplishments:*** Fabricated, evaluated and optimized interfaces for Soldier-centric headgear components; refined headgear system design based on sizing, shape, stability and balance; used human performance, Soldier load, and threat assessment data to begin optimization of modular Soldier as System protection variants; identified 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:*** 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. ***FY 2013 Plans:*** Will demonstrate protective eyewear with improved ballistic impact, anti-fog, scratch resistance lenses; demonstrate upgradeable headgear protection with improved ballistic, eye, face, hearing protection and a display that enhances the situational awareness in combat conditions (night, rain, obscurants); complete validation of a body armor assessment protocol integrating Soldier agility and physiology parameters; develop camouflage ensemble components for a lab-based assessment; build on ballistic and blast strategy developed in FY12 to exploit lighter weight materials, processing methods, and equipment configurations to reduce	3.684	4.440	10.820

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
Soldier borne load; apply modeling and simulation tools to assess load mitigating technologies to reduce physical injuries and enhance small unit mobility and Soldier endurance.			
Title: Soldier/Small Unit Load Management and Mobility Enhancement ***Description:*** Beginning in FY13, this effort will be captured in the Soldier /Small Unit Integrated Protection and Load Management technology effort. This effort uses a system engineering approach to reduce Soldier and Small Unit load by integrating lighter weight materials into components, employing energy/power management strategies and devising mechanisms/equipment to offload some mission equipment. This work is fully coordinated with PE 060786A/Project H98, PE 0602716A/Project H70 and PE 0602705/Project H94. ***FY 2011 Accomplishments:*** Investigated load carriage options for placement of Soldier loads (i.e., fuel, batteries) on the Lower Body Human Augmentation (LBHA) System; drafted technical and operationally-based system assessment protocols and analyzed components of Soldier Load which could be matured with lighter weight raw materials, reduce packaging or maturing technologies. ***FY 2012 Plans:*** Focus on a holistic approach to identify capabilities that enable the Small unit to efficiently shoot or move across varying terrain; devise measures to assess the impact of load on marksmanship performance; conduct field validation of mobility aids to exploit Soldier's use and application of spatial information; develop Soldier/Small Unit applications to be incorporated into mission planning tools for load management, Soldier cross-loading and resupply analysis.	3.021	4.520	-
Title: System Integration of Soldier and Small Unit Operated Electronics ***Description:*** This effort (previously titled Small Unit C4 Interfaces) matures and integrates hardware and software components into a robust and effective information system of systems for Soldier and Small Unit. The goal of this effort is to define standard electronic interfaces for select platforms and aggregate information from unattended robotic assets that support Small Unit operations. Effort is coordinated with PE 0602786A/Project H98, PE 0603710A/Project K70 and PE 0602624A/Project H18 PE 0603005/Project 497 and PE 0603004/Project 232. ***FY 2011 Accomplishments:*** Conducted laboratory analysis and conducted field demonstrations of Soldier-borne wireless personal area network (WPAN) system and obtained National Security Agency (NSA) approvals; demonstrated 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:***	6.823	6.935	7.212

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
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; 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; conduct field demonstrations of capabilities Small Units employ during intelligence gathering, training, and other operations; optimize Soldier acceptance parameters including form factor graphical user displays for efficient task completion and power management ***FY 2013 Plans:*** Will mature and optimize information portrayal interfaces for full spectrum operations in cognitively burdened environments; refine system architectures by duty positions for hand held (e.g. Smart phones) access to Company level data required during tactical operations in restricted terrains and expeditionary base camps; mature and demonstrate optimized dismounted operations software algorithms enabling tactile relevant information transfer and explore technology solutions to refine the design sets for integrating nano unmanned air system into the Soldier Network architecture.			
Title: Soldier and Small Unit Power and Energy ***Description:*** This effort matures and demonstrates lightweight, energy dense Soldier power storage, generation and power management components and subsystems. The goal is to fully support the power needs of a dismounted mission in an electronically equipped battlefield. This effort is fully coordinated with 0602705A/Project H11 and Project H94. ***FY 2011 Accomplishments:*** Conducted field evaluation of fuel cells (reformed and direct methanol); demonstrated improved hybrid power technology components which can supply a 24 hour mission; conducted field demonstrations of engine based generator and charger system for tactical battery charging; matured a conformal headgear power source and wireless power transfer from body to weapon or helmet. ***FY 2012 Plans:*** Demonstrate central conformal headgear power source; 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; 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. ***FY 2013 Plans:*** Will integrate improved power source with one or more systems and demonstrate performance in a relative environment; integrate and evaluate wearable fuel cell hybrid power source enabling longer mission durations; mature higher efficiency wireless power transfer on the body to eliminate cables; demonstrate higher power and energy density multi-fuel engine based man-packable	3.561	3.325	3.441

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
power source; investigate energy harvesting models and concepts; analyze energy efficiency improvements in power sinks to optimize battery size; will demonstrate power centric software.			
Title: Small Combat Unit Lethality Integration ***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 2011 Accomplishments:*** Matured and demonstrated Soldier-borne 3D gunfire detection capabilities and technologies; demonstrated optical weapon sight (smart sight) using ballistic tables to accurately laze target and perform cooperative engagement; incorporated unmanned assets (Air Vehicles, Ground Vehicles and Ground Sensors) into target identification network and demonstrated 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.	3.467	-	-
Title: System Integration Laboratory for Evaluation of Emerging Technological Capabilities ***Description:*** This effort (previously titled Small Unit Systems Engineering, Integration and Demonstration) develops and matures a system integration laboratory environment in which current and emerging Soldier systems can be evaluated in a controlled laboratory environment to determine viability and military utility. This effort also matures and integrates human performance assessment measures, evaluation devices required at various testing locations and develops standardized methodologies required for demonstrations. This effort is coordinated with PE 0602716A/Project H70, PE 0602786A/Project H98, 060315A/ Project S28 and 0603004A/Project 232. ***FY 2011 Accomplishments:*** Completed enhancement of simulation tools for improved assessment of Soldier networked systems and developed, integrated and demonstrated embedded laboratory data collection tools for assessing network power requirements and mobility technologies; developed and demonstrated networked Soldier System interoperable information management algorithms, software, hardware and network component interfaces and power centric architectures; demonstrated and assessed the interoperability of existing and emerging networked hardware and software technologies in field relevant environments. ***FY 2012 Plans:***	4.754	4.854	7.143

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
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. ***FY 2013 Plans:*** Will optimize laboratory diagnostic tool suites required to measure and analyze mission effectiveness, power, and mobility metrics that will provide the necessary information to make trade-off decisions for Soldier and Small Unit capability sets and enabling technologies; will mature the Soldier/Squad virtual simulation capability by integrating design and performance parameters including physical and cognitive load, select blast and ballistic effects, mission command networking, and terrain data.			
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. Beginning in FY13, the results from this effort will transition to Soldier/Small Unit Integrated Protection and Load Management. ***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	28.831	42.352	28.616

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 2013 Army			DATE: February 2012
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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
VT5: *EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION*	-	2.097	3.033	-	3.033	3.681	3.896	3.683	3.746	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates 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.

Efforts in this program element support the Army science and technology Soldier portfolio.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

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 2011	FY 2012	FY 2013
Title: Expeditionary Base Camp (EBC) Technology Demonstrations	-	2.097	3.033
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: 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			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
mature and demonstrate the architecture for a unit mission base camp planning tool identifying pertinent system aspects such as interoperability requirements and power demand. ***FY 2013 Plans:*** Will apply FY12 system effectiveness measures and technical performance criteria to validate that the baseline architecture reduces basing manpower needs and operational energy efficiencies; use performance measures, interoperability criteria and power demand as attributes to begin development of a small unit base camp planning tool; mature passive protection, power, waste and water technology systems in compliance with the parameters defined in the baseline architecture.			
Accomplishments/Planned Programs Subtotals	-	2.097	3.033

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.