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Exhibit R-2, PB 2011 Army RDT&E Budget Item Justification									DATE: February 2010		
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE							
2040: Research, Development, Test & Evaluation, Army BA 3: Advanced Technology Development (ATD)				PE 0603001A: Warfighter Advanced Technology							
COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	72.271	54.290	37.364	0.000	37.364	38.411	40.888	42.843	46.169	0	369.600
242: AIRDROP EQUIPMENT	3.701	3.791	3.801	0.000	3.801	3.860	3.926	3.999	4.065	Continuing	Continuing
543: AMMUNITION LOGISTICS	1.242	1.346	1.347	0.000	1.347	1.369	1.394	1.419	1.443	Continuing	Continuing
C07: JOINT SERVICE COMBAT FEEDING TECH DEMO	2.251	2.342	2.361	0.000	2.361	2.413	2.467	2.516	2.568	Continuing	Continuing
J50: FUTURE WARRIOR TECHNOLOGY INTEGRATION	35.374	29.899	29.855	0.000	29.855	30.769	33.101	34.909	38.093	Continuing	Continuing
J52: WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)	29.703	16.912	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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 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 deloyability and resupply (project 543), combat rations and combat feeding equipment (project C07) and combat clothing and personal equipment (including protective equipment such as personal armor, helmets, and eye wear) (project J50). 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), and PEs 0602623A and 0603607A (Joint Service Small Arms Program). 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 and the Armament Research, Development, and Engineering Center (ARDEC), Picatinny, NJ.											

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Exhibit R-2, PB 2011 Army RDT&E Budget Item Justification				DATE: February 2010	
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 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	73.352	37.574	38.551	0.000	38.551
Current President's Budget	72.271	54.290	37.364	0.000	37.364
Total Adjustments	-1.081	16.716	-1.187	0.000	-1.187
• Congressional General Reductions		-0.284			
• Congressional Directed Reductions					
• Congressional Rescissions		0.000			
• Congressional Adds		17.000			
• Congressional Directed Transfers					
• Reprogrammings	0.831	0.000			
• SBIR/STTR Transfer	-1.912	0.000			
• Adjustments to Budget Years	0.000	0.000	-1.187	0.000	-1.187
Change Summary Explanation					
FY10 Congressionally directed increases.					

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COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
242: <i>AIRDROP EQUIPMENT</i>	3.701	3.791	3.801	0.000	3.801	3.860	3.926	3.999	4.065	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates equipment and innovative techniques for aerial delivery of cargo and personnel. Aerial delivery is a key capability for rapid force projection and global precision delivery and provides a long-range, autonomous airdrop capability with the option to deliver separate and distinctive payloads to multiple locations with improved accuracy; enhancing cargo, crew, and aircraft survivability. 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 Program (\$ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1 Advanced Cargo Airdrop: This effort demonstrates enhancements for increasing the precision of airdrop delivery using components and technical breakthroughs from PE 0602786A/project 283. In FY09, optimized latest Guidance, Navigation & Control (GN&C) airdrop technologies in a precision airdrop concept designed for accurate resupply in complex, mountainous terrain with small, challenging drop zones; provided hardware and software GN&C component upgrades to demonstrate GN&C technology improvements in all weight classes of the Joint Precision Airdrop Delivery System (JPADS) family. In FY10, mature and demonstrate emerging GN&C component technologies and spiral promising GN&C components candidates for transition to PM Force Sustainment Systems (PM-FSS) and demonstrate 5K-20K lb. Advanced Low Velocity Airdrop System - Light (ALVADS-L) releases and modifications to existing inventory system. Transition to PM Force Sustainment Systems (PM FSS) mature advanced navigational aid and display technologies that improve situational awareness. In FY11, will mature and demonstrate 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); will conduct scaled (i.e., weight, altitude and number of parachutes) airdrop testing of the 22K-42K lb. Advanced Low	3.701	3.704	3.041	0.000	3.041

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Velocity Airdrop System - Heavy (ALVADS -H). Evaluate results and select full scale design for 500 ft. Above Ground Level (AGL) delivery of heavy payloads. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO						
Program #2 Advanced Airborne Insertion (Personnel airdrop): This effort demonstrates enhancements for improved insertion safety and security using components and technical breakthroughs from PE 0602786A/Project 283. In FY11, will demonstrate payload-to-payload and person-to-person in-flight communications. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base		0.000	0.000	0.760	0.000	0.760

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<u>B. Accomplishments/Planned Program (\$ in Millions)</u>					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
<i>OCO FY 2011 Plans:</i> FY 2011 OCO					
Program #3 Small Business Innovative Research/Small Business Technology Transfer Programs <i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO	0.000	0.087	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	3.701	3.791	3.801	0.000	3.801
<u>C. Other Program Funding Summary (\$ in Millions)</u> N/A					
<u>D. Acquisition Strategy</u> N/A					
<u>E. Performance Metrics</u> 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.					

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COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
543: AMMUNITION LOGISTICS	1.242	1.346	1.347	0.000	1.347	1.369	1.394	1.419	1.443	Continuing	Continuing
A. Mission Description and Budget Item Justification											
This project matures and demonstrates technologies for rapid munitions deployability, resupply, and unused ammunition returned from deployment for the Army's Future Force. It enhances force readiness and reduces the logistics footprint through improvements in Materials Handling Equipment (MHE), ammunition and missile packaging/palletization, explosives safety, weapons rearm, 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 Program (\$ in Millions)											
							FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1 Tactical Ammunition Accountability (TAA): 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). In FY09, developed and validated software interfaces for tactical ammunition management systems and integrated them with health monitoring sensors. In FY10, fabricate an automated ammunition expenditure reporting prototype mounted on a surrogate weapon system; initiate demonstration of ammunition consumption transactions from weapons system to Army's property recording system using prototype. In FY11, will complete the automated expenditure reporting prototype demonstration; will conduct demonstration in a tactically relevant environment. FY 2009 Accomplishments: FY 2009							1.242	1.316	1.347	0.000	1.347

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010					
Base FY 2011 Plans: FY 2011 Base					
OCO FY 2011 Plans: FY 2011 OCO					
Program #2	0.000	0.030	0.000	0.000	0.000
Small Business Innovative Research/Small Business Technology Transfer Programs					
FY 2009 Accomplishments: FY 2009					
FY 2010 Plans: FY 2010					
Base FY 2011 Plans: FY 2011 Base					
OCO FY 2011 Plans: FY 2011 OCO					
Accomplishments/Planned Programs Subtotals	1.242	1.346	1.347	0.000	1.347

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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.		

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>				PROJECT C07: <i>JOINT SERVICE COMBAT FEEDING TECH DEMO</i>			
COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
C07: <i>JOINT SERVICE COMBAT FEEDING TECH DEMO</i>	2.251	2.342	2.361	0.000	2.361	2.413	2.467	2.516	2.568	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies for military combat feeding systems and combat rations to include processing, preservation, packaging, and equipment and energy technologies that reduce the logistics footprint. This project demonstrates combat feeding technology with reduced logistics (in component parts, weight, cube, 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. 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 Program (\$ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1 Combat Feeding Equipment Technologies: This effort demonstrates technologies for military combat feeding systems. In FY09, demonstrated joint service Battlefield Kitchen based on using state-of-the-art power generation systems and transitioned to Program Manager - Force Sustainment Systems (PM-FSS); completed limited technology demonstration of Waste-to-Energy Converter and transitioned to Military Encampment Waste to Electrical Power System (MEWEPS). In FY10, integrate and demonstrate an ethylene control system (prolongs freshness) in refrigerated containers to extend the shelf-life of fresh fruits and vegetables and integrate technology improvements for waste to energy systems. In FY11, will demonstrate a JP8 powered flameless individual in-line water heater for heating dehydrated rations and beverages and will transition technologies successfully demonstrated within this effort to PM-FSS for Engineering and Manufacturing Development (EMD).	0.860	0.894	0.903	0.000	0.903

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009					
FY 2010 Plans: FY 2010					
Base FY 2011 Plans: FY 2011 Base					
OCO FY 2011 Plans: FY 2011 OCO					
Program #2 Ration Stabilization, Packaging, Novel Nutrient Delivery, and Food Safety Technologies: This effort demonstrates technologies for enhancing nutrient composition/consumption, military ration packaging and food safety. In FY09, demonstrated effectiveness of providing phytonutrients (organic components of plants that promote human health) via buccal delivery (mouth tissue) and incorporated into ration components to demonstrate human performance optimization in validated military performance tasks (e.g., victim rescue, 30m combat rushes); conducted final technology demonstration of novel food pathogen diagnostic technologies incorporated into array systems and transitioned to Veterinary Services Activity/Office of the Surgeon General (VSA/OTSG) for procurement; demonstrated Hybrid Optimal Processing (HOP) techniques to reduce processing time and increase food quality and nutrient retention. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010	1.391	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base						
OCO FY 2011 Plans: FY 2011 OCO						
Program #3 Ration Stabilization, Packaging, and Novel Nutrient Delivery Technologies (cont'd): This effort demonstrates technologies for enhancing nutrient composition/consumption, military ration packaging and food safety. In FY10, demonstrate shelf stability of probiotic enhanced ration components and encapsulated oils for ration systems; prepare field manual on validated assays/surveys for the analysis of food pathogens and biological agents and transition to the VSA/OTSG; demonstrate the optimal use of analytical food pathogen detection diagnostics and the accompanying procedures for high throughput screening of foods. In FY11, will demonstrate shelf stable sandwiches with emulsion based fillings; health benefits of probiotic ration components via efficacy studies, bacteriophage cocktail for bacterial reductions in fresh vegetables and component food matrices for incorporation of performance optimizing and nano-sized functional ingredients. Will develop packaging prototype using novel multilayer polymer films to enhance barrier's mechanical and insulating properties and transition ration, packaging and nutrient delivery technologies to PM-FSS. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base		0.000	1.438	1.458	0.000	1.458

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<u>B. Accomplishments/Planned Program (\$ in Millions)</u>					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
<i>OCO FY 2011 Plans:</i> FY 2011 OCO					
Program #4 Small Business Innovative Research/Small Business Technology Transfer Programs <i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO	0.000	0.010	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	2.251	2.342	2.361	0.000	2.361
<u>C. Other Program Funding Summary (\$ in Millions)</u> N/A					
<u>D. Acquisition Strategy</u> N/A					
<u>E. Performance Metrics</u> 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.					

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COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
J50: <i>FUTURE WARRIOR TECHNOLOGY INTEGRATION</i>	35.374	29.899	29.855	0.000	29.855	30.769	33.101	34.909	38.093	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 at the least weight, sustainment and cognitive burden. Efforts in this project focus on maturation and demonstration of technologies associated with personal armor, helmets, hearing protection and eyewear; lightweight, ruggedized, durable components for situational awareness and network connectivity; load-bearing/load carrying augmentation systems; and power/power management components/systems for the individual Soldier and SCU. These efforts will utilize field testing 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.

B. Accomplishments/Planned Program (\$ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1 Soldier Ballistic and Blast Protection: This effort matures and demonstrates test devices, protocols and technologies to improve Warfighter survivability against blast and ballistic threats. In FY09, finalized test equipment and drafted protocol for primary blast lung injury (PBLI) protection system assessment, benchmarked protection of fielded and developmental material systems; continued to develop system level assessment protocols, test devices and models to address other ballistic and blast-related injury mechanisms (blunt facial and eye injury); began to translate knowledge from blast injury data, and blast event characterization efforts into materiel design solutions and began to evaluate effectiveness of protection systems. In FY10, mature materials for individual blast protection concept, and blast assessment protocol and test devices for transition to PM Soldier Protection and Individual Equipment, Army Test and Evaluation Center and industry; leverage 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. Mature and demonstrate breadboard enhanced helmet for	4.850	4.468	3.521	0.000	3.521

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
next generation armor system. In FY11, will develop and refine test devices and protocols for additional injury mechanisms of blast and ballistic events; will refine and evaluate ballistic and blast protection system prototypes and obtain user feedback from testing; develop/refine combat effectiveness metrics that link physical effects of load to cognitive performance. This task is done 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 & 0602787A/project 878. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO					
Program #2 Integrated Soldier Protection: This effort matures and demonstrates innovative technologies using holistic systems engineering principles, human factors, anthropometry (human body measurement study) and biomechanical sciences to balance and mature Enhanced Soldier/Small Combat Unit and Soldier as a System capability. In FY09, conducted technical tests and field demonstrations of promising protection technology solutions to include ergonomically shaped armor plates and improved camouflage for Operation Enduring Freedom; continued to mature and develop technical and operationally-based system performance metrics to support rapid transition of integrated technology solutions and protective system assessment tools. In FY10, demonstrate Microclimate Cooling (MC) technologies from PE 0602786A/project H98; conduct joint technical	5.284	3.391	4.183	0.000	4.183

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
demonstration with Joint Science and Technology Office Chemical and Biological Defense (JSTO CBD) for advanced CB protection integrated with future Soldier systems technologies to provide little or no thermal burden to Soldier; leverage emerging breadboard system from PE 0602786A/project H98 and incorporate advanced materials from PE 0602105A/project H84 to develop next generation Soldier-centric headgear concepts focused on enhanced protection against agile laser, ballistic, impact, and aural threats (battlefield noise), while enhancing integration of head-borne displays, sensors, and battle command applications. In FY11, will select, build prototypes and evaluate the most promising Soldier-centric headgear concepts to include integrated fast responding Visible to IR laser protection and enhanced ballistic materials; will leverage human performance data and ongoing Soldier load and armor assessment tool efforts to refine modular body armor system concepts for Soldier as a System variants. Build leader mission planning tool to assist leaders in the field to select appropriate modular body armor configurations for specific mission. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO						
Program #3 Soldier Mobility and Enhanced Load Carriage: This effort matures and demonstrates mechanical devices that offload a portion of the Soldier weight burden to assist in Warfighter strength and mobility. In FY09, developed and implemented human use protocols to assess effects of wearing Full Body Human Augmentation		3.689	3.689	3.129	0.000	3.129

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
(Exoskeleton) Systems; matured component technology to include hydraulic actuators, embedded electronics and extremity mechanical construction; increased understanding of human gate characteristics and integrated safety performance parameters; conducted limited technical tests and demonstrations with Combined Arms Support Command (CASCOM/FT. Lee); user feedback and tech maturity evaluation determined Full Body Human Augmentation (FBHA) System may have applicability for specialty applications like ammunitions loading and heavy lifting and existing prototypes will be further evaluated by Army PMs. In FY10, monitor FBHA and begin to optimize and mature low power components to provide a lighter, more agile and efficient operation for a lightweight Lower Body Human Augmentation (LBHA) System; conduct mobility aid technical tests and field demonstrations to obtain user performance feedback and conduct field investigations to optimize Soldier use of spatial information to enhance mobility (understand and remember user's movements during tasks for future exoskeleton replication purposes). In FY11, will incorporate limited Soldier equipment load carriage options for placement of Soldier loads (i.e., fuel, batteries) on the Lower Body Human Augmentation (LBHA) System; will conduct technical and user tests to obtain relevant user feedback for design improvement and to meet technical and operationally-based system performance metrics. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO					
Program #4	7.997	6.219	6.823	0.000	6.823

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Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010		
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 Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Small Combat Unit C4 Interfaces: This effort pursues more durable Soldier displays and subsystems that provide greater situational awareness with less cognitive stress. In FY09, continued to mature Soldier, squad, and platoon network technologies (i.e., emerging wireless body receiver, power hub manager, etc); conducted technical tests/ field demonstrations of Soldier-borne networking combined to assess cognitive loading effects. In FY10, examine interfacing and interference characteristics of targeted wireless protocols with emerging communication devices in relevant field environments; design Soldier systems interface to enable robotic control and image dissemination across the squad. In FY11, will conduct laboratory analysis and field demonstrations of Soldier-borne wireless personal area network system and obtain National Security Agency (NSA) approvals on implementation; will demonstrate an on-Soldier system architecture that tightly couples three existing subsystems (battery, radio, headset) and will analyze system performance/efficiency. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO					
Program #5 Soldier Power and Energy: This effort matures and demonstrates technologies to achieve capability improvements in lightweight high-energy and density Soldier power and power management components and subsystems. In FY09, continued to mature methanol-based Soldier hybrid fuel cell power source, higher energy density conformal rechargeable battery (central integrated Soldier battery) and half-sized BA 5590 Li/	4.807	3.233	3.687	0.000	3.687

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
CFx batteries; evaluated rechargeable battery development based on packaging thin film rechargeable battery technology; demonstrated platoon-level generator recharging batteries; conducted technical testing of conformal batteries which led to transition of projected cycle life performance data, environmental characteristics and safety characteristics to Army PMs. In FY10, conduct user assessments of multiple hybrid power systems (reformed methanol, direct methanol) in simulated combat settings for 24 and 72 hour missions; demonstrate engine or fuel cell based portable power sources which enables self-contained power capability. In FY11, will conduct large-scale field test of fuel cells (reformed and direct methanol) integrated into Soldier system; will demonstrate improved hybrid power technology components that increase energy density which can be carried for 24 hour mission (Army objective); will conduct field test of engine or fuel cell based generator and charger system for tactical battery charging. Effort is coordinated with PE 0602705A/projects H11 and H94. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO					
Program #6 Small Unit Lethality Integration: 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. In FY09, continued to mature government-owned open system architectures for current and future networks; demonstrated low	3.255	3.328	3.590	0.000	3.590

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
latency across Soldier-to-Soldier and Soldier-to-Vehicle networks to enable quicker call for fire and lethal effects and battlefield sensor awareness; conducted laboratory experiments and field demonstrations of maturing network architectures to verify desired performance. In FY10, miniaturize Soldier-borne gunfire detection system; evaluate data filtering of information to improve network performance; fuse air and ground sensor assets with Soldier borne network to detect and identify targets and pass information to target identification network; and evaluate strategies to minimize time of digital call for fire and lethal effects. In FY11, will mature and demonstrate Soldier borne gunfire detection capabilities and technologies; optical weapon sight (smart sight) using ballistic tables to accurately laze target and perform cooperative engagement; will incorporate unmanned assets (Air Vehicles, Ground Vehicles and Ground Sensors) into target identification network and demonstrate target (Soldier and Vehicle) destruction through innovative message processing, synchronization and accumulating of internal platoon fire assets such as 40 mm grenades, 60 mm Mortars, 120 mm Mortars and Javelin Weapon System. Effort is coordinated with PE 0603004A/project 232. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO					
Program #7 Small Unit Systems Integration and Demonstration: This effort develops tools to assess and expedite integration of maturing Soldier borne equipment using constructive, virtual and live simulation tools. In FY09, developed	5.492	4.797	4.922	0.000	4.922

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
and implemented transportable Assessment and Demonstration modules and conducted user assessments of equipment integration with unattended ground sensors (UGSs), unmanned ground vehicles (UGVs), gunfire detection and chemical-biological sensors in operationally relevant field environments at FT Dix and FT Benning. In FY10, continue to develop and improve simultaneous constructive, virtual and live simulation modules to assess integration capabilities of maturing technologies for Soldier borne hardware, software, network, lethality, survivability components and systems; continue to develop and evaluate modular open architecture for dismounted Soldiers to facilitate integration across potential network sources and assess maturity of Soldier-borne technologies and simulation tools in field relevant environment. In FY11, will complete development of dismounted Soldier assessment tool suite to expedite integration and assessment of lethality, power, network and mobility technologies available for dismounted Soldier; will develop limited integration of Soldier assessment tool suite with mounted and air platforms for embedded training; and will assess simulation toolset maturity at field relevant venues to recommend future technology transitions. Effort is coordinated with PE 0603004A/project 232. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO					
Program #8 Small Business Innovative Research/Small Business Technology Transfer Programs	0.000	0.774	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011
<i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO					
Accomplishments/Planned Programs Subtotals		35.374	29.899	29.855	0.000
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.					

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Exhibit R-2A, PB 2011 Army RDT&E Project Justification								DATE: February 2010			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>				PROJECT J52: <i>WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)</i>			
COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
J52: <i>WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)</i>	29.703	16.912	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
<u>A. Mission Description and Budget Item Justification</u> Congressional Interest Item funding for Warfighter Advanced Technology development.											
<u>B. Accomplishments/Planned Program (\$ in Millions)</u>											
							FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1 Ration Packaging Materials and Systems for Meals Ready-to-Eat. In FY09, this Congressional Interest Item developed tamper evident features, high barrier polymers and food preservation additives for combat ration packaging systems to improve food protection, food safety, shelf life and flavor/taste retention. <i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO							3.589	0.000	0.000	0.000	0.000
Program #2							1.595	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
High-Pressure/Microwave MRE Processing: In FY09, this Congressional Interest Item provided a capability to sustain Warfighters with near-fresh quality entrees without refrigeration. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO						
Program #3 Flame & Thermal Protection for Individual Soldier: In FY09, this Congressional Interest Item investigated and evaluated flame resistant (FR) textile materials by microencapsulating FR materials as a surface treatment on textiles. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base		3.189	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #4 Technology and Human Systems Integration: In FY09, this Congressional Interest Item enhanced the execution of dual-use Research, Development, Test and Evaluation (RDT&E) projects and promoted technology transfer activities in the Homeland Security sector with particular emphasis on law enforcement applications. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	2.392	0.000	0.000	0.000	0.000
Program #5 Multi-layer Coextrusion for High Performance Packaging: In FY09, this Congressional Interest Item investigated sophisticated die technologies that processed high performance packaging structures for the Unitized Group Ration (UGR) polymeric tray. FY 2009 Accomplishments: FY 2009	2.392	1.592	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010					
Base FY 2011 Plans: FY 2011 Base					
OCO FY 2011 Plans: FY 2011 OCO					
Program #6 Ballistic Precision Aerial Delivery System (BPADS): In FY09, this Congressional Interest Item increased the technology readiness level (TRL) of a 30K lb capacity High Altitude Low Opening (HALO) Unguided Aerial Delivery System through design, test, and analysis. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	0.997	0.000	0.000	0.000	0.000
Program #7	1.196	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Novel Flame Retardant Nylon Fabrics: In FY09, this Congressional Interest Item explored emerging technological approaches to impart Flame Retardant (FR) materials/compounds into nylon fiber and developed a durable and cost effective FR "no melt drip" nylon fiber or fabric for military applications. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO					
Program #8 Chemical and Biological Threat Protection Coating: This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base	2.392	0.000	0.000	0.000	0.000

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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 Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO						
Program #9 Compact, Day and Night CMOS for Mini and Micro UAVs: In FY09, this Congressional Interest Item provided new Small Unmanned Aerial Systems Reconnaissance Surveillance and Target Acquisition capabilities to the Army in the area of payload integration. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO		1.994	0.000	0.000	0.000	0.000
Program #10 Improved Lightweight Integrated Communication and Hearing Protection Device: In FY09, this Congressional Interest Item developed an improved multi-option communication system that offered active double hearing protection, increased sound localization, and increased situational awareness. FY 2009 Accomplishments: FY 2009		0.797	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010					
Base FY 2011 Plans: FY 2011 Base					
OCO FY 2011 Plans: FY 2011 OCO					
Program #11 Aerial Firefighting - Precision Container Aerial Delivery System (PCADS): In FY09, this Congressional Interest Item provided the United States Air Force (USAF) with a precision airdrop delivery capability of water bombs for firefighting. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	2.312	0.000	0.000	0.000	0.000
Program #12	1.595	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Compact MVCC Soldier Coding System: In FY09, this Congressional Interest Item increased manufacturing readiness of the vapor compression Personal Microclimate Cooling System by developing manufacturing procedures for vapor compression components and by developing manufacturing system assembly procedures. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO					
Program #13 Precision Guided Airdropped Equipment: In FY09, this Congressional Interest Item improved precision airdrop accuracy through advances in the state-of-the-art Joint Precision Airdrop Systems guidance and navigation for small airdrop resupply payloads. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010	3.668	1.194	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base					
OCO FY 2011 Plans: FY 2011 OCO					
Program #14 Laser Studied & Enhanced Reactive Materials :Self-Decontaminating Polymers for CBD: In FY09, this Congressional Interest Item developed a comprehensive understanding of the fundamental characteristics of reactive self-decontaminating formulations for chemical-biological (CB) protection under Vibrational Sum Frequency Generation Spectroscopy. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	1.595	0.000	0.000	0.000	0.000
Program #15 Advanced Packaging Materials for Combat Rations. This is a Congressional Interest Item.	0.000	0.796	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009					
FY 2010 Plans: FY 2010					
Base FY 2011 Plans: FY 2011 Base					
OCO FY 2011 Plans: FY 2011 OCO					
Program #16 Soldier Personal Cooling System. This is a Congressional Interest Item.	0.000	0.954	0.000	0.000	0.000
FY 2009 Accomplishments: FY 2009					
FY 2010 Plans: FY 2010					
Base FY 2011 Plans: FY 2011 Base					
OCO FY 2011 Plans: FY 2011 OCO					
Program #17	0.000	1.193	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Reducing First Responder Casualties with Physiological Monitoring. This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO						
Program #18 Predictive Casting Process Modeling for Rapid Production of Critical Defense Components. This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO		0.000	1.592	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #19 Deployment of Affordable Guided Airdrop System. This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO		0.000	1.990	0.000	0.000	0.000
Program #20 Compostable and Recyclable Fiberboard Material for Secondary Packaging. This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base		0.000	1.990	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #21 Remote Environmental Monitoring and Diagnostics in the Perishables Supply Chain. This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	0.000	2.189	0.000	0.000	0.000
Program #22 High Pressure Pasteurization & Pressure Assisted Thermal Sterilization. This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010	0.000	3.422	0.000	0.000	0.000

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<u>B. Accomplishments/Planned Program (\$ in Millions)</u>					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
<i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO					
Accomplishments/Planned Programs Subtotals	29.703	16.912	0.000	0.000	0.000
<u>C. Other Program Funding Summary (\$ in Millions)</u>					
N/A					
<u>D. Acquisition Strategy</u>					
N/A					
<u>E. Performance Metrics</u>					
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.					

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