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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	31.597	39.295	37.403	-	37.403	34.475	35.567	36.303	37.029	-	-
283: <i>Airdrop Adv Tech</i>	-	2.392	3.085	3.432	-	3.432	2.813	2.773	2.827	2.884	-	-
E01: <i>Warfighter Technology Initiatives (CA)</i>	-	6.300	3.500	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-
H98: <i>Clothing & Equipm Tech</i>	-	18.589	27.642	26.571	-	26.571	23.407	24.576	25.096	25.598	-	-
H99: <i>Joint Service Combat Feeding Technology</i>	-	3.029	3.310	4.919	-	4.919	5.030	5.066	5.164	5.267	-	-
VT4: <i>Expeditionary Mobile Base Camp Technology</i>	-	1.287	1.758	2.481	-	2.481	3.225	3.152	3.216	3.280	-	-

A. Mission Description and Budget Item Justification

This Program Element (PE) investigates and develops integrated technologies which improve Soldier and Small Combat Unit survivability, sustainability, mobility, combat effectiveness, and field quality of life and assess the impact of each on Soldier performance. This PE supports the design, development, and improvement of components used for aerial delivery of personnel and cargo (Project 283), combat clothing and personal equipment including protective equipment such as personal armor, helmets, and eyewear (Project H98), combat rations and combat feeding equipment (Project H99), and expeditionary base camps (Project VT4). This PE supports the investigation and advancement of critical knowledge and understanding of Soldier physical and cognitive performance. Project E01 funds Congressional special interest items. The projects in this PE adhere to Tri-Service Agreements on clothing, textiles, and food with coordination provided through the Cross Service Warfighter Equipment Board, the Soldier and Squad Integrated Concepts Development Team, and the Department of Defense (DoD) Combat Feeding Research and Engineering Board.

Efforts in this Program Element support the Army Science and Technology Soldier/Squad Portfolio.

Work in this PE is related to, and fully coordinated with, PE 0603001A (Warfighter Advanced Technology), PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0602787A (Medical Technology Initiatives), PE 0602716A (Human Factors Engineering Technology), 0603004A (Weapons and Munitions Advanced Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0602784A (Military Engineering Technology), PE 0603125A (Combating Terrorism Technology Development), and PE 0603772A (Advanced Tactical Computer Science and Sensor Technology).

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

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

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	32.044	35.795	34.603	-	34.603
Current President's Budget	31.597	39.295	37.403	-	37.403
Total Adjustments	-0.447	3.500	2.800	-	2.800
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	3.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.447	-			
• Adjustments to Budget Years	-	-	2.800	-	2.800

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: E01: *Warfighter Technology Initiatives (CA)*

Congressional Add: *Program Increase*

	FY 2015	FY 2016
	6.300	3.500
Congressional Add Subtotals for Project: E01	6.300	3.500
Congressional Add Totals for all Projects	6.300	3.500

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Appropriation/Budget Activity 2040 / 2					R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>				Project (Number/Name) 283 / <i>Airdrop Adv Tech</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
283: <i>Airdrop Adv Tech</i>	-	2.392	3.085	3.432	-	3.432	2.813	2.773	2.827	2.884	-	-

A. Mission Description and Budget Item Justification

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

Efforts in this Project support the Army Science and Technology Soldier/Squad Portfolio.

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

Work in this project is fully coordinated with Program Element (PE) 0603001A (Warfighter Advanced Technology).

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

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

	FY 2015	FY 2016	FY 2017
Title: Airdrop/Aerial Delivery Research and Technology	2.392	3.085	3.432
<p>Description: This effort investigates technologies that enhance payload extraction, increase parachute gliding capabilities, and mature delivery accuracy of cargo aerial delivery systems that support varying payload weights. Research in the area of novel parachute materials will provide increased capabilities for cargo and personnel aerial delivery systems. This effort will support an investigation of new Modeling and Simulation (M&S) tools in order to develop validation methods for airdrop concepts. This effort also investigates technologies that advance airborne personnel insertion safety and security. This work is coordinated with PE 0603001A/Project 242.</p> <p>FY 2015 Accomplishments: Investigated wind detection methods/methodologies for precision guidance, navigation, and control; developed static line reserve parachute automatic activation technologies for future incorporation into personnel parachute systems to increase operator safety; designed system to increase safety of high altitude and military free fall parachutists through risk reduction of collision or near-miss events between automated cargo delivery systems while jumpers are also in the airspace; investigated methods/methodologies for enhancing autonomous glide and precision delivery landing accuracy.</p> <p>FY 2016 Plans:</p>			

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Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>	Project (Number/Name) 283 / <i>Airdrop Adv Tech</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017
<p>Investigate adaptive flight software to overcome rigging errors and broken control lines of Joint Precision Aerial Delivery System cargo parafoils; utilize M&S of parafoil type decelerators to determine optimum location of actuators for increased control authority and minimize actuator quantities to optimize future system cost; conduct assessment of technologies to increase airdrop system stealth capability while in flight and after impact; continue further advancements of life saving paratrooper static line reserve parachute automatic activation technologies.</p> <p><i>FY 2017 Plans:</i> Will study, design, and conduct experiments with precision aerial delivery software and hardware components to enhance high altitude precision aerial delivery capabilities in GPS denied areas, urban terrains, and jungle environments; investigate novel textiles for parachute applications that enable material properties to be customized which can enhance parachute performance; investigate non-destructive inspection methodologies for helicopter sling load cordage components; refine and validate software algorithms for static line reserve parachute automatic activation technologies.</p>			
Accomplishments/Planned Programs Subtotals	2.392	3.085	3.432

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 2					R-1 Program Element (Number/Name) PE 0602786A / Warfighter Technology				Project (Number/Name) E01 / Warfighter Technology Initiatives (CA)			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
E01: Warfighter Technology Initiatives (CA)	-	6.300	3.500	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Warfighter Technology Applied Research.

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

	FY 2015	FY 2016
Congressional Add: Program Increase	6.300	3.500
FY 2015 Accomplishments: Program Increase		
FY 2016 Plans: Program Increase		
Congressional Adds Subtotals	6.300	3.500

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 2					R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>				Project (Number/Name) H98 / <i>Clothing & Equipm Tech</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
H98: <i>Clothing & Equipm Tech</i>	-	18.589	27.642	26.571	-	26.571	23.407	24.576	25.096	25.598	-	-

A. Mission Description and Budget Item Justification

This project investigates components and materials focused on enhancing Soldier survivability from combat threats (flame and thermal threats, blast and ballistic threats, and lasers) and environmental threats (e.g., cold, heat, and wet) to increase operational effectiveness while decreasing the Soldier's physical and cognitive burden. Included are technologies and novel materials related to personnel armor, helmets, hearing protection, and eyewear. In addition, this project supports the development and refinement of essential analytic tools needed to predict and/or assess the combat effectiveness of next generation Soldier systems to identify and develop methods to assess human responses to sensory, physical, cognitive, and affective stimuli and stressors.

Efforts in this Project support the Army Science and Technology Soldier/Squad Portfolio.

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

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

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

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

	FY 2015	FY 2016	FY 2017
Title: Soldier Blast and Ballistic Protection	4.010	5.909	6.858
Description: This effort supports the investigation of novel materials, component design, and material modeling to design and develop technologies that protect Soldiers against ballistic and blast threats. This effort utilizes a cross-disciplinary, human-focused approach to develop technologies which optimize tradeoffs in ballistic and blast protective component design. This effort is fully coordinated with PE 0602787A/Project FH2, PE 0602787A/Project VB3, PE 0602787A/Project 874, PE 0602618A/H80, PE0602105A/Project H84, PE0602716A/Project H70, and PE 0603001A/Project J50. This effort supports the Force Protection Soldier & Small Unit capability research and addresses the Army top challenge of easing overburdened Soldiers in small units.			
FY 2015 Accomplishments: Designed predictive models for estimation of performance of ballistic fibers after exposure to adverse operational and storage environments; investigated laboratory methods of simulating and measuring forces and accelerations induced by blast overpressure on soldiers wearing headborne equipment; designed and evaluated reduced weight head and torso protection concepts for small arms and fragment protection using novel materials and assembling approaches; continued development of advanced modeling, simulation, and assessment tools that define ballistic and blast survivability/mobility/lethality trade space;			

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Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>	Project (Number/Name) H98 / <i>Clothing & Equipm Tech</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<p>developed a standardized methodology to assess anthropometric design (fit, area of coverage, and comfort) impacts on body armor system performance.</p> <p>FY 2016 Plans: Complete development of laboratory method of simulating and measuring forces and accelerations induced by blast overpressure on headborne equipment; investigate concepts for improving the above method through inclusion of a biofidelic neck that provides accurate, gender-specific simulation of the dynamic mechanical behavior of the human neck to improve the validity of the results; continue development of head and torso protection concepts for small arms and fragment protection using novel materials and assembling approaches to reduce weight while maintaining/improving penetration performance; complete development of standardized methodology to assess anthropometric design (fit, area of coverage, and comfort) impacts on body armor system performance.</p> <p>FY 2017 Plans: Will continue the development of the biofidelic neck model which will provide a more accurate simulation of the dynamic behavior of the human neck when encountering blast impacts; develop and validate novel fibers, textiles, and components that enhance ballistic protection performance in equipment while reducing Soldier thermal and weight burden; develop enhanced materials, components, and models that mitigate Soldier injuries from blunt impact to head and extremities; continue the development of materials, processes, experiments, and validation tools that reduce threat of injury to the head from ballistic penetration or behind-the-helmet blunt trauma.</p>				
<p>Title: Soldier Vision Protection and Enhancement</p> <p>Description: This effort focuses on the investigation of technologies that provide eye protection against battlefield threats. This effort supports the Force Protection Soldier and Small Unit capability research and addresses the Army top challenge of easing overburdened Soldiers in small units. This effort is fully coordinated with PE 0602787A/Project FH2, PE 0602787A/Project VB3, PE 0602787A/Project 874, PE 0602618A/H80, PE0602105A/Project H84, PE0602716A/Project H70, and PE 0603001A/Project J50.</p> <p>FY 2015 Accomplishments: Matured active and passive technologies for providing improved eye protection against ballistic and laser threats; demonstrated proof of concept for active variable transmission lenses for enhanced situational awareness in rapidly changing light level conditions; developed novel spray coating process for producing optical quality films; investigated ballistic and optical properties of novel transparent composite materials and nanomaterials that can provide >50% increase in ballistic protection compared to current materials; investigated and determined the individual locomotion and cognitive effects of rapid-transition variable transmission lenses and the trade-offs between optical distortion and the extent of eye protection against laser, flash, and ballistic fragmentation.</p> <p>FY 2016 Plans:</p>		3.411	4.140	3.100

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Appropriation/Budget Activity 2040 / 2		R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>	Project (Number/Name) H98 / <i>Clothing & Equipm Tech</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017	
<p>Design breadboard proof of concept for pixilated lens technology that maintains peripheral vision while mitigating laser threats; investigate feasibility of alternative material solutions for tunable laser protection that enable selective blocking of laser threats while maintaining non-threatening light transmission; investigate feasibility of enhancing Soldier vision performance (e.g., on-demand telescopic vision capability) using waveplate technology.</p> <p>FY 2017 Plans: Will investigate the application of the pixelated lens technology on a ballistic fragmentation eyewear lens platform; design proof of concept for enhanced Soldier vision and auditory system technology; conduct experiments to refine the ability to respond and protect against point and broadband light sources using a pixilated lens approach; investigate the ability to detect and locate exposure to non-visible laser sources and other threats; investigate how specific novel visual protective technologies impact visual acuity and Soldier perceptual capabilities and determine the impact on a wide range of Soldier tasks such as movement from indoor to outdoor environments, marksmanship, and move-shoot.</p>					
<p>Title: Measurement, Prediction, and Improvement of Soldier Performance</p> <p>Description: This effort provides a comprehensive investigation of human science methods (psychological, anthropometric, and psychophysical) and biomechanical models to assess human responses to sensory, physical, cognitive, and affective stimuli and stressors. This investigation supports the development of human systems design concepts for Soldier equipment and enhances Soldier and small unit physical and cognitive performance. This work is collaborative with the Army Research Laboratory PE 0602716A/H70 and the Medical Research and Materiel Command PE 0602787A/Project FH2, PE 0602787A/Project VB3, and PE 0602787A/Project 874. This effort supports the Force Protection Soldier & Small Unit capability research and addresses the Army top challenge of easing overburdened Soldiers in small units.</p> <p>FY 2015 Accomplishments: Designed a concept development for a suite of human systems performance measurements, approaches, and field analytical tools to support the human systems component of a Soldier Systems Engineering Architecture (SSEA); developed and evaluated metrics and optimization strategies for human physical, psychological, cognitive, and emotional performance parameters as inputs for modeling and analysis of Soldier and Small Unit combat performance; conducted trade analyses between mobility, lethality, survivability, and mission performance; investigated anthropometric approaches for developing improved fidelity models that address vital organ size and informed Soldier equipment engineering designs about location, fit, and coverage area; investigated potential for human performance applications through emerging fields such as non-medical synthetic biology.</p> <p>FY 2016 Plans: Continue the SSEA development by verifying and initiating validation of the suite of human systems performance measurements, approaches, and field analytical tools that comprise the human systems building blocks of this framework; investigate the psychological, anthropometric, and biomechanical impacts on modifications to Soldier system components and sub-systems on survivability and combat effectiveness; investigate the concept of leveraging and linking existing Soldier capabilities with</p>		4.074	8.668	9.459	

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<p>emerging modeling and analytical techniques to increase scientific rigor of Soldier system experiments that reduce risk and cost of system development while increasing Soldier and small unit performance; design standard assessment methodologies, based on operational tasks, that define the relationship between Soldier performance and his/her equipment and configurations; design population-level analysis design tool for creating human model of Soldier's size and shape based on statistical methods; define a repeatable standard method for obtaining accurate three-dimensional (3D) models of equipped Warfighters to develop the ability to model any Warfighter size/shape, in any pose, with 3D gear and casualty estimation.</p> <p>FY 2017 Plans: Will study the effects of incorporating physical, cognitive, and social performance metrics into the SSEA human performance tools to identify their impacts on equipment and mission tasks; investigate emerging human science measures and metrics such as load mitigation, encumbered movement impact to mission performance, and assessment of physical and cognitive augmentation to increase understanding of human performance in a military environment; conduct experiments to increase understanding of factors that optimize human performance in biomechanics, anthropometry, and cognition measures; validate predictive data with Soldier performance tools and simulations.</p>				
<p>Title: Advancements in Fibers, Textiles, and Materials for Soldier Protection</p> <p>Description: This effort focuses on the investigation of technologies that aid in the design and development of multifunctional protective materials and concealment concepts for Soldier clothing, equipment, and shelters. This effort supports the Force Protection Soldier and Small Unit capability research. This effort is fully coordinated with PE0602105A/Project H84, PE0602716A/Project H70, and PE 0603001A/Project J50.</p> <p>FY 2015 Accomplishments: Matured novel textile and fiber-based technologies to provide protection against multiple environmental threats to Soldiers and Small Units; investigated use of electrotiles for providing protection to personnel and equipment against electromagnetic threats; investigated methods of incorporating anti-pathogenic functionality into textiles; investigated properties and methods of making novel multi-component fibers, nanofibers, and finished fabrics for use as Soldier protection against cuts/abrasion, cold weather environments, and pathogens; performed experimental proof of concept for thermal signature reduction technology concepts; developed predictive models for thermal signature performance of emerging materials; matured technologies and methods to improve visual signature management/camouflage; investigated inherently flame resistant fiber and novel coating technologies that provide significant performance improvements over Flame Resistant-Army Combat Uniform (FR-ACU) fabrics; investigated alternative fiber technologies for durable, wearable combat identification systems that enable improved visibility to friendly forces; characterized novel thermoelectric textile materials for wearable power generation and personal cooling applications.</p> <p>FY 2016 Plans:</p>		7.094	8.925	7.154

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Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>	Project (Number/Name) H98 / <i>Clothing & Equipm Tech</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<p>Mature thermal signature reduction technologies and associated modeling tools for prediction of material performance in a range of simulated environments; continue to investigate incorporation of improved, low toxicity, narrow spectrum antimicrobial and insect repellent treatments into textiles appropriate for Soldier clothing and individual equipment; mature improved flame resistant and no melt/no drip fibers, coatings, and textiles for incorporation into combat clothing and individual equipment; continue development of improved combat identification technologies and electrotexiles for power generation/distribution and personal thermal management.</p> <p>FY 2017 Plans: Will develop second generation materials and combat uniform components that significantly reduce Soldier thermal signature; investigate novel textile technologies to provide protection against microbes, insect-borne diseases, climate extremes, flame/thermal threat, and microwave directed energy threats; continue maturation of improved Soldier combat identification technologies and electrotexiles for power generation/distribution and personal thermal management; investigate use of improved models and simulated skin samples for improved burn injury prediction of human skin; identify, design, and develop lightweight personal hydration and thermal management concepts to enhance dismounted Soldier performance in jungle/tropical environments.</p>				
Accomplishments/Planned Programs Subtotals		18.589	27.642	26.571
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
N/A				

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Appropriation/Budget Activity 2040 / 2					R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>				Project (Number/Name) H99 / <i>Joint Service Combat Feeding Technology</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
H99: <i>Joint Service Combat Feeding Technology</i>	-	3.029	3.310	4.919	-	4.919	5.030	5.066	5.164	5.267	-	-

A. Mission Description and Budget Item Justification

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

Efforts in this Project support the Army Science and Technology Soldier/Squad Portfolio.

Work in this PE is fully coordinated with PE 0602787A (Medical Technology) and PE 0603001A (Warfighter Advanced Technology).

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

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

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

	FY 2015	FY 2016	FY 2017
Title: Joint Combat Feeding Equipment and Food Protection Technologies	1.429	-	-
Description: This effort investigates technologies in support of the DoD Veterinary Service Activity (VSA) to enhance field detection and identification capabilities of chemical and biological threats in foods. This effort supports the design and development of new threat detection tools and sensors for food inspectors. This effort additionally investigates equipment and energy technologies to expand the capability and reduce the logistics footprint of Joint Services field feeding operations in a wide range of environmental and operational contexts.			
FY 2015 Accomplishments:			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
Explored technology for elimination/prevention of pathogens in fresh fruit and vegetables; designed methods to significantly reduce detection times for viable pathogens; investigated novel technologies to promote Joint field feeding operations and reduce field feeding logistical footprint.				
<p>Title: Ration Stabilization and Novel Nutrient Delivery Technologies</p> <p>Description: This effort designs and develops stabilization techniques and nutrient compositions to maximize the Warfighter's cognitive and physical performance while minimizing nutritional degradation in order to optimize the Warfighter's health while on the battlefield.</p> <p>FY 2015 Accomplishments: Explored nutrient delivery methods within rations to ensure optimal Warfighter nutrition and performance; investigated emerging technologies to produce lightweight, condensed, shelf-stable rations that reduce refrigeration requirements in field environments; explored novel processing and stabilization technologies to improve acceptability and increase consumption while meeting shelf-stability requirements, extending ration life-cycle, and reducing cost.</p>		1.600	-	-
<p>Title: Joint Combat Feeding Technologies</p> <p>Description: Beginning in Fiscal Year (FY) 2016, Joint Combat Feeding Equipment and Food Protection Technologies and Ration Stabilization, Packaging, Novel Nutrient Delivery, and Food Safety Technologies will be combined and named Joint Combat Feeding Technologies. This effort designs and develops stabilization techniques and nutrient compositions to maximize the Warfighter's cognitive and physical performance while minimizing nutritional degradation to optimize the Warfighter's health on the battlefield. This effort investigates technologies in support of DoD VSA to enhance field detection and identification capabilities of chemical and biological threats in foods. This effort supports the design and development of new threat detection tools and sensors for food inspectors. This effort additionally investigates equipment and energy technologies to expand the capability and reduce the logistics footprint of Joint Service field feeding operations in a wide range of environmental and operational contexts. This work is coordinated with PE 0602787A/Project 869 and PE 0603001A/Project C07.</p> <p>FY 2016 Plans: Investigate alternate refrigerant systems in support of containerized deployable refrigeration assets to address environmental concerns with current generation refrigerants; investigate nutritional countermeasures through identification and stabilization of functional nutrients, such as dietary ketone esters, into shelf stable operational rations to improve recovery time from exertion or injury as well as provide potential systemic health benefits; investigate novel food processing technologies in support of improved nutrient retention, reduced manufacturing costs, and increased consumer acceptability; investigate and develop optimized</p>		-	3.310	4.919

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
sampling procedures in support of next generation diagnostic systems for food protection to increase the sensitivity and selectivity of field portable sensors for pathogenic bacteria and toxins. <i>FY 2017 Plans:</i> Will explore ration nutritional strategies for components targeted at optimizing the gut microbiome to reduce gastrointestinal distress; investigate refrigeration technologies for reduced energy consumption and modularity; investigate ration compounds to promote recovery and optimize performance; research the detection, prevention, and reduction of pathogenic bacteria and toxins in foods; investigate novel self-repairing/heating packaging materials to enhance food protection and quality; explore technologies for three-dimensional printing of ration components.				
Accomplishments/Planned Programs Subtotals		3.029	3.310	4.919
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
N/A				

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 2					R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>				Project (Number/Name) VT4 / <i>Expeditionary Mobile Base Camp Technology</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
VT4: <i>Expeditionary Mobile Base Camp Technology</i>	-	1.287	1.758	2.481	-	2.481	3.225	3.152	3.216	3.280	-	-

A. Mission Description and Budget Item Justification

This project matures and validates fully integrated holistic expeditionary base camp (EBC) capabilities with mission-specific plug and play components, subsystems, and modules designed to optimize manpower requirements, enhance situational awareness, increase Soldier readiness and survivability, optimize habitation, reduce logistics footprint, enhance supportability, and reduce cost. EBC systems provide an operational capability for small combat units (battalion and below) and Soldiers in varying environments, which are rapidly deployable and re-locatable, require no Military Construction, and need limited materiel handing support. This project matures technologies that can be combined to create mission specific lab demonstrators and develops metrics and methodologies to measure performance characteristics.

Efforts in this Project support the Army Science and Technology Soldier/Squad Portfolio.

Work in this Program Element (PE) is fully coordinated with PE 0602784A and 0603734A (Military Engineering Technology), PE 0603001A (Warfighter Advanced Technology), 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).

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

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

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

	FY 2015	FY 2016	FY 2017
Title: Expeditionary Base Camp Component Technologies	1.287	1.758	2.481
Description: This effort investigates base camp component interoperability and matures and scales component technologies for an integrated holistic base camp concept. This effort supports the basing sustainment and logistics capability investigation. This work is coordinated with PE 0603001A/Project VT5, PE 0602786A/Project H99 and is coordinated with PE 0602784A/Project T40, PE 0603734A/Project T08, PE 0603004A/Project L97, PE 0603005A/Project 497, PE 0603125A/Project DF5, and PE 0603772A/Project 101.			
FY 2015 Accomplishments: Investigated emerging technology approaches (e.g., ion-exchange) for handling and treatment of black waste to ensure a hygienic environment and protect Soldier health and readiness at combat outposts; explored self-sufficiency solutions that minimize			

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016		
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602786A / <i>Warfighter Technology</i>	Project (Number/Name) VT4 / <i>Expeditionary Mobile Base Camp Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<p>logistical needs, as well as identify opportunities for co-generation and dual-use technology approaches; investigated the benefits of nonwoven textiles for potential shelter technology applications to achieve a 20% weight reduction over current woven fabrics.</p> <p>FY 2016 Plans: Investigate increased flame resistance for shelter materials and fire safety for shelters to ensure Soldiers are provided with safe living environments; mature novel materials for power generating shelter materials to decrease logistical burden and fuel demands; research rapid expeditionary basing deployment techniques to increase efficiency and support a leaner force; investigate technologies that support self-sufficiency of basing logistics; mature components of black waste systems to ensure a hygienic environment; design lightweight novel multifunctional panel materials for rigid wall shelters; investigate multifunctional materials for basing applications that can produce increased protections for overmatch capabilities and reduce exposure to insects.</p> <p>FY 2017 Plans: Will investigate tradeoffs between base camp efficiency, scalability, and Soldier quality of life for optimal readiness and minimal degradation to missions; conduct experiments on microscale alternative field service energy technologies to enable self-sufficient base camps that decrease the logistical burden and cost; investigate novel thermal insulation material and coating technologies for rigid wall tactical shelters to enhance shelter energy efficiency; investigate and design novel solutions to characterize and mitigate emerging ballistic threats to integrated shelter basing systems including potential reactive technologies to increase overmatch.</p>				
Accomplishments/Planned Programs Subtotals		1.287	1.758	2.481
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
N/A				

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