Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Army										DATE: February 2012	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*				R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*							
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	21.095	21.031	20.860	-	20.860	21.609	22.009	22.359	22.647	Continuing	Continuing
91A: *ILIR-AMC*	15.714	16.275	16.062	-	16.062	16.504	16.847	17.118	17.320	Continuing	Continuing
91C: *ILIR-MED R&D CMD*	3.520	2.813	2.839	-	2.839	2.886	2.935	2.984	3.032	Continuing	Continuing
91D: *ILIR-CORPS OF ENGR*	1.243	1.064	1.073	-	1.073	1.087	1.097	1.108	1.126	Continuing	Continuing
91E: *ILIR-ARI*	0.146	0.151	0.153	-	0.153	0.156	0.157	0.160	0.163	Continuing	Continuing
F16: *ILIR-SMDC*	0.472	0.728	0.733	-	0.733	0.976	0.973	0.989	1.006	Continuing	Continuing

Note

Not Applicable for this item

A. Mission Description and Budget Item Justification

This program element (PE) supports basic research at the Army laboratories through the In-House Laboratory Independent Research (ILIR) program. Basic research lays the foundation for future developmental efforts by identifying fundamental principles governing various phenomena and appropriate pathways to exploit this knowledge. The ILIR program serves as a catalyst for major technology breakthroughs by providing laboratory directors flexibility in implementing novel research ideas, by nurturing promising young scientists and engineers, and is used to attract and retain top doctoral degreed scientists and engineers. The ILIR program also provides a source of competitive funds for peer reviewed efforts at Army laboratories to stimulate high quality, innovative research with significant opportunity for payoff to Army warfighting capability.

This PE supports ILIR at the Army Materiel Command's (AMC) six Research, Development, and Engineering Centers (Project 91A); at the six Medical Research and Materiel Command (MRMC) laboratories (Project 91C); at the Corps of Engineer's seven laboratories at the US Army Engineer Research, and Development Center (ERDC) (Project 91D); at the Army Research Institute for the Behavioral and Social Sciences (ARI) (Project 91E); and at the Space and Missile Defense Command (SMDC) Technical Center (Project F16).

Work in the PE provides a foundation for applied research initiatives at the Army laboratories and research, development and engineering centers.

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 PE is performed by the AMC, Aberdeen Proving Grounds, MD, MRMC, Ft. Detrick, MD, the ERDC, Vicksburg, MS, the ARI, Arlington, VA, and the SMDC, Huntsville, AL.

Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Army					DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*				
B. Program Change Summary ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**
Previous President's Budget	21.780	21.064	20.692	-	20.692
Current President's Budget	21.095	21.031	20.860	-	20.860
Total Adjustments	-0.685	-0.033	0.168	-	0.168
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.482	-			
• Adjustments to Budget Years	-	-	0.168	-	0.168
• Other Adjustments 1	-0.203	-0.033	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91A: *ILIR-AMC*	

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
91A: *ILIR-AMC*	15.714	16.275	16.062	-	16.062	16.504	16.847	17.118	17.320	Continuing	Continuing

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This project funds basic research within the Army Materiel Command's (AMC) Research, Development, and Engineering Centers and lays the foundation for future developmental efforts by identifying the fundamental principles governing various phenomena and appropriate pathways to exploit this knowledge.

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 by the Edgewood Chemical and Biological Center, Aberdeen Proving Grounds, MD within AMC, the Armaments Research, Development, and Engineering Center, Picatinny, NJ, the Tank and Automotive Research, Development, and Engineering Center, Warren, MI, the Natick Soldier Research, Development, and Engineering Center, Natick, MA, the Aviation and Missile Research, Development, and Engineering Center, Huntsville, AL, and the Communications and Electronics Research, Development, and Engineering Center, Ft. Monmouth, NJ.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Edgewood Chemical Biological Center	2.913	0.836	0.956
Description: Funds basic research in chemistry, biology, biotechnology, and aerosol for counter improvised explosive devices (IEDs), obscurants, and/or target defeat. ***FY 2011 Accomplishments:*** Conducted fundamental studies in surface science, specifically furthering the characterization of chemical and biochemical phenomena occurring at or near solid surfaces and interfaces; molecular programming techniques for bio-energy production; rational design of nano- biomolecular, abiotic structures; the interaction of matter and transfer of energy at the nanoscale and interfacial phenomena of particulate matter; and the controlled synthesis of nanomaterials to enable the controlled propagation of electromagnetic energy or to drive photonic behavior. ***FY 2012 Plans:*** Continue basic research efforts in the areas of rational molecular and nano-system design for the design of functional abiotic structures, reconfigurable self-organizing systems, novel nanoparticles and supramolecular self-assembly; Continue			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91A: *ILIR-AMC*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
investigations in synthetic biology using new molecular programming techniques for creating biofuels and materials. Will continue fundamental research in surface science in PE 0601102A, Project VR9, Surface Science Research. ***FY 2013 Plans:*** Will continue to solicit on a yearly basis new efforts to further basic research in areas such as advanced materials and nanotechnologies, more powerful energetics including those with IM properties, counter terrorism technologies, power and energy systems, smaller more lethal warheads and composite materials.			
Title: Armaments Research, Development and Engineering Center ***Description:*** Funds basic research in weapons component development, explosives synthesis/detection and area denial. ***FY 2011 Accomplishments:*** Conducted further basic research into synthesizing more powerful explosives with insensitive munition (IM) properties, technologies for detection and neutralization of IEDs/explosives, sensors/sensor fusion for area denial, smaller more lethal warheads and composite materials. ***FY 2012 Plans:*** Soliciting new efforts to further basic research in areas such as advanced materials and nanotechnologies, more powerful energetics including those with IM properties, counter terrorism technologies, power and energy systems, smaller more lethal warheads and composite materials. ***FY 2013 Plans:*** Will continue to solicit on a yearly basis new efforts to further basic research in areas such as advanced materials and nanotechnologies, more powerful energetic including those with IM properties, counter terrorism technologies, power and energy systems, smaller more lethal warheads and composite materials.	1.739	1.680	1.682
Title: Tank-Automotive Research, Development and Engineering Center ***Description:*** Funds basic research in ground vehicle technologies to include power, mobility, and unmanned systems. ***FY 2011 Accomplishments:*** Developed reinforcement-based Learning and Control for Robots Using Ethical Behavior Frameworks; investigated photophysical response measurements for directed energy carbon-60 colloid materials; and used event-driven control strategies to couple remote dynamical systems. ***FY 2012 Plans:***	1.238	1.207	1.199

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91A: *ILIR-AMC*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Develop and investigate models for nanofluid coolants and lubricants; develop and investigate durability and blast models for composite materials, including carbon nanotube reinforced composite; and develop algorithms for bio-inspired object recognition for unmanned systems. ***FY 2013 Plans:*** Will continue to research models for nanofluid coolants and lubricants, will research functionally graded structures exposed to shock, will investigate statistical theories and algorithms for reliability based design optimization, and will research the combustion properties of JP-8, diesel and other fuels.			
Title: Natick Soldier Research, Development and Engineering Center ***Description:*** Funds basic research in food sciences, textiles, and lightweight materials with potential for individual protection. ***FY 2011 Accomplishments:*** Continued fundamental research of nanoelectronics that has the potential to provide new nanomaterials and nanoarchitectures that could help revolutionize the performance and miniaturization of optoelectronic devices; furthered the understanding of fundamental principles, which govern Botulinim Neurotoxin catalytic activity and binding of peptide and aptamers to this catalytic domain that may lead to new technologies, which couple toxin capture and inactivation. ***FY 2012 Plans:*** Create zwitterionic 3-dimensional nanofibrous architectures for antifouling and food pathogen sensing; conduct fundamental studies on novel metal oxides for tuned optical response; and explore understanding of the lysis mechanisms of peptides for antimicrobial protection. ***FY 2013 Plans:*** Will develop novel biochemical functionalization strategies to tether bio-recognition elements and antibodies onto graphene; will investigate covalent and non-covalent methods for attachment of antibodies to native grapheme; will measure physical and transport properties as well as demonstrate a functionalized graphene FET for analyte detection to identify visual information derived from the movements of individuals in crowds that specifies threatening or suspicious behaviors; will validate experimental paradigms; will conduct experiments to refine the use of immersive virtual reality technologies for use with Soldier-volunteers.	1.366	1.363	1.321
Title: Aviation and Missile Research, Development and Engineering Center: Missile Efforts ***Description:*** Funds basic research in guided missile and rocket systems, directed energy weapons, unmanned vehicles, and related components. ***FY 2011 Accomplishments:***	2.317	2.246	2.241

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91A: *ILIR-AMC*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Experimentally demonstrated and evaluated performance of chaotic antenna arrays and electronic steering based on lag synchronization in chaotic circuits; experimentally demonstrated inhibition of absorption in opaque materials through a phase locking dynamic and theoretical and experimental investigations of nanoplasmonic switches. ***FY 2012 Plans:*** Soliciting new concepts for basic research efforts with broad applicability to science and technology that support exploratory and advanced development for guided missile and rocket systems, directed energy weapons, unmanned vehicles, and related components. ***FY 2013 Plans:*** Will experimentally explore infrared emissivity / absorptivity enhancement of polar materials by surface phonon coupling; will analyze nonlinear effects in nanostructure devices; will experimentally investigate excitation.			
Title: Aviation and Missile Research, Development and Engineering Center: Aviation Efforts ***Description:*** Funds basic research for aviation enabling technologies in the areas of aerodynamics, structural dynamics, and material science. ***FY 2011 Accomplishments:*** Investigated the effectiveness of fluidic oscillators to control separation for bluff body flow and also initiated computational fluid dynamics and computational structural dynamics methods for accurate rotor stability analysis. ***FY 2012 Plans:*** Investigate inflow dynamics and wake physics at high advance ratios and investigate dielectric barrier discharge plasma devices for reduced bluff body drag. ***FY 2013 Plans:*** Will complete initial testing on trailed wake vorticity and spanwise loading; will complete Particle Image Velocimetry (PIV) data analysis for dynamic stall test case; and will complete project on high advance ratio theory including all reporting.	1.677	1.628	1.623
Title: Communications-Electronics Research, Development, and Engineering Center ***Description:*** Funds basic research for communication and network enabling technologies in the areas of antenna design, network management, power generation and storage, and also sensors. ***FY 2011 Accomplishments:*** Investigated new anode and cathode materials for electrochemical couples with increased kinetic properties; performed research on developing cost-effective metamaterial antenna fabrication concept; performed research and experimental validation of the derived theoretical limits of explosive ordnance interference cancelation systems intended to enable communications	1.536	1.481	1.485

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91A: *ILIR-AMC*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
during jamming; performed experimental validation of new cognitive radio techniques for blind signal interception; investigated fundamental parameters affecting Shockley-Reed-Hall defect centers in narrow gap infrared (IR) semiconductors (e.g., III-V and II-VI epitaxial compounds); researched and investigated novel conducting polymers for use as explosive specific sensors and as low power displays; and explored new measurement methodologies (e.g., catholuminescence) for studying IR detector defects at the atomic level. ***FY 2012 Plans:*** Perform research for developing cognitive algorithm and intelligent cognitive network with optimized managed resources, and flexible and reconfigurable radio frequency (RF) technologies; explore RF interaction of nano-tubes and metamaterial for wideband signal amplification and also electromagnetic radiation; explore control theory in addressing the uncertainty and latency in the cognitive ad-hoc network; perform research on sensor network scenarios that can perform blind signal sensing and classification of weak signals; investigate alternative separator and electrolytes for high energy/power electrochemical couples; concentrate on reducing the parasitic (non-electrochemical) reactions between synthesized separator and electrolyte and high energy electrode components; and investigate new metallic polymers for next generation infrared sensors. ***FY 2013 Plans:*** Will perform research in III-V component detector materials, advanced non-contact biometrics, nano engineered methods for explosive detection, and novel semiconductor growth processes and process monitoring; will investigate novel electromagnetic polymer nanocomposites to gain a fundamental understanding of the underlying physics for potential antenna applications; will continue investigations into alternative separator and electrolytes for high energy/power electrochemical couples by concentrating on reducing the parasitic (non-electrochemical) reactions between synthesized separator and electrolyte and high energy electrode components and will initiate research into halogenated mixed metal oxides cathode material for advanced lithium electrochemical systems.			
Title: Peer Reviewed Proposal Efforts ***Description:*** Funds peer reviewed proposals in basic research to provide increased quality and responsiveness in exploring new technological concepts that are highly relevant to Army needs. This funding also enhances recruitment, development, and retention of outstanding scientists and engineers engaged in high quality basic research for the Army, which provides a constant flow of new knowledge to Army laboratories. ***FY 2011 Accomplishments:*** Conducted basic research efforts to develop and maintain a cadre of active research scientists who can distill and extend results from worldwide research in areas of interest to the Army. ***FY 2012 Plans:***	2.928	5.834	5.555

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91A: *ILIR-AMC*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Conducting basic research efforts aimed at developing and maintaining a cadre of active research scientists who can distill and extend results from worldwide research in areas of interest to the Army. ***FY 2013 Plans:*** Will solicit new basic research efforts aimed at developing and maintaining a cadre of active research scientists who can distill and extend results from worldwide research in areas of interest to the Army.			
Accomplishments/Planned Programs Subtotals	15.714	16.275	16.062

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 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91C: *ILIR-MED R&D CMD*	

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
91C: *ILIR-MED R&D CMD*	3.520	2.813	2.839	-	2.839	2.886	2.935	2.984	3.032	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project fosters investigator-driven medical and force-health protection basic research initiatives performed at the six U.S. Army Medical Research and Materiel Command laboratories. Research areas address countermeasures against infectious diseases, defense against environmental extremes and operational hazards to health, mechanisms of combat trauma and innovative treatment and surgical procedures, and medical chemical/biological warfare threats.

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 Walter Reed Army Institute of Research, Silver Spring, MD; U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD; US Army Medical Research Institute of Infectious Diseases, Fort Detrick, MD; U.S. Army Institute of Environmental Medicine, Natick, MA; U.S. Army Institute of Surgical Research, Fort Sam Houston, TX; U.S. Aeromedical Research Laboratory, Fort Rucker, AL; and the Telemedicine and Advanced Technology Research Center, Fort Detrick, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Independent Research Efforts	3.520	2.813	2.839
Description: Funds basic research in medical and force health protection.			
FY 2011 Accomplishments: Evaluated blocking transmission of leishmaniasis using paratransgenesis (introduction of a non-harmful organism that carries and introduces the genes to block transmission of leishmania to humans); Identified and characterized Shigella metabolism; Evaluated new approaches for bias correction in epidemiological studies; Evaluated host and wound adaptations in Acinetobacter baumannii, a cause of wound bacterial infections; Evaluated the effect of energy deprivation on molecular regulation and biomarkers of skeletal muscle degradation; Evaluated diminishing post-burn contracture (tightening of skin around a burn) using anti-complement and anti-inflammatory strategies; Evaluated epithelial cell induction of vasculogenesis (blood vessel formation); Evaluated Acute Respiratory Distress Syndrome due to bilateral pulmonary contusion (bruising of the lung caused by trauma to the chest with shock due to bleeding; Evaluated recombinant reovirus particles as environmentally stable oral vaccine vectors (capable of carrying genes of other organisms to illicit a protective immune response) against bioweapons; Evaluated engineered human blood vessels to study vascular leakage (increased blood vessel permeability) caused by hantaviruses; Studied host-derived therapeutic targets (destructive host responses to infection) during filovirus infection; Evaluated the efficacy effectiveness) of potential therapeutics for chemical warfare agent-induced airway epithelial cell damage and edema			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91C: *ILIR-MED R&D CMD*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
using an in vitro screening model; Evaluated a systems biology platform for understanding host-pathogen interactions. ***FY 2012 Plans:*** Investigate an in vitro and in vivo model systems to examine nutritional countermeasures for enhanced neuroprotection and stress resilience; Study the evolution of RNA genome viruses under immune system selective pressure to improve vaccine design: Theory, modeling, and validation; Investigate the use of recombinant reovirus particles as environmentally stable oral vaccine vectors against bioweapon threat agents; Enhance understanding the role of the Sap proteins (particular type of proteinase protein) in disease causing capability of microorganisms (pathogenesis); Investigate genetic determinants which contribute to the intracellular survival and replication of Burkholderia pseudomallei (a gram negative bacterium often associated with infections); Evaluate the basic science of filovirus (includes Ebola and Marburg viruses which cause serious often fatal hemorrhagic disease) neutralization and peptide entry inhibitors (proteins which inhibit infection; Study an in vitro screening model for evaluating the efficacy of potential therapeutics for chemical warfare agent-induced airway epithelial cell damage and edema. ***FY 2013 Plans:*** The program will fund innovative in-house basic research proposals that will focus on research to explore treatments and countermeasures against militarily relevant infectious diseases; defense against environmental extremes and operational hazards to health; mechanisms of combat trauma and innovative treatment and surgical procedures; and medical chemical/biological warfare threats.			
Accomplishments/Planned Programs Subtotals	3.520	2.813	2.839

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 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91D: *ILIR-CORPS OF ENGR*	

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
91D: *ILIR-CORPS OF ENGR*	1.243	1.064	1.073	-	1.073	1.087	1.097	1.108	1.126	Continuing	Continuing

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This project funds In-house Laboratory Independent Research (ILIR) in the areas of geospatial research and engineering, military engineering, and environmental quality/installations at the seven laboratories within the Corps of Engineer's US Army Engineer Research and Development Center (ERDC).

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 U.S. Army ERDC, Vicksburg, MS.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Geospatial Research and Engineering/Military Engineering/Environmental Quality and Installations	1.243	1.064	1.073
Description: Funds basic research in the areas of geospatial research and military engineering as well as environmental quality and installations.			
FY 2011 Accomplishments: Investigated a set of theoretical algorithms for poly-disperse soil packings based upon historical granular research and using simulations to validate performance; and continued basic research efforts focused on fundamental questions in science relevant to military application such as signature physics, next generation remote sensing, and ecological risk of military unique emerging contaminates in the environment.			
FY 2012 Plans: Complete basic research efforts for ultra-compact soils for soil mechanics systems; investigate vegetation photopigment decay for remote sensing of hazardous materials; and investigate DNA pattern formation upon non-directed assembly at a functionalized surface for Army relevant compounds.			
FY 2013 Plans: Will create a numerical physics-based model of dynamic geologic-material contact behavior with buried sensors; will create a methodology to rapidly characterize the near-ground atmospheric and instantaneous sound field between sensor nodes for a large			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91D: *ILIR-CORPS OF ENGR*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
region; and will compare experimental ground-penetrating radar data with models of the Maxwell Wagner process to understand if Maxwell Wagner processes are responsible for the variety of dielectric constants that appear in any soil at any water content.			
Accomplishments/Planned Programs Subtotals	1.243	1.064	1.073

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 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT 91E: *ILIR-ARI*	

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
91E: *ILIR-ARI*	0.146	0.151	0.153	-	0.153	0.156	0.157	0.160	0.163	Continuing	Continuing

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This project provides funding for In-house Laboratory Independent Research (ILIR) in the Army Research Institute for Behavioral and Social Sciences (ARI). This project supports basic research in the Cognitive Sciences and is focused on theories, approaches, and models from the Behavioral and Social Sciences that have the highest potential to improve human performance. Improved recruiting, selection, assignment, training, leader development, performance, performance assessment, organizational dynamics, and retention are the goals.

Work in this project is performed by the Army Research Institute, Arlington, VA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Army Research Institute	0.146	0.151	0.153
Description: Funds basic research in cognitive, behavioral, and social sciences to improve Soldier recruiting, assignment and retention and providing fundamental knowledge for human performance and organizational behavioral research. ***FY 2011 Accomplishments:*** Identified key training aspects of synthetic teammates in virtual worlds that promote training transfer to a team performance setting. ***FY 2012 Plans:*** Research focus on topics such as improving training in complex environments, leader and team performance, identifying attributes critical to Soldier recruiting, assignment and retention and providing fundamental knowledge for human performance and organizational behavioral research. ***FY 2013 Plans:*** Research will focus on topics such as improving classification & assignment mechanisms (right person, right job, right time), identifying innovative metrics for leader and teams performance, as well as contributing empirically based knowledge for human performance and behavioral research.			
Accomplishments/Planned Programs Subtotals	0.146	0.151	0.153

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 1: *Basic Research*	**R-1 ITEM NOMENCLATURE** PE 0601101A: *In-House Laboratory Independent Research*	**PROJECT** 91E: *ILIR-ARI*

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 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT F16: *ILIR-SMDC*	

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
F16: *ILIR-SMDC*	0.472	0.728	0.733	-	0.733	0.976	0.973	0.989	1.006	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project provides In-house Laboratory Independent Research (ILIR) at the Space and Missile Defense Command (SMDC) Technical Center. This basic research on lasers and directed energy lays the foundation for future developmental efforts on high energy lasers and directed energy systems by identifying the fundamental principles governing various directed energy phenomena.

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 SMDC, Huntsville, AL.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: SMDC In-house Laboratory Independent Research (ILIR)	0.472	0.728	0.733
Description: Funds basic research to investigate laser propagation phenomenology for application in modeling and simulation and future directed energy weapons design. ***FY 2011 Accomplishments:*** Used prior year data to develop more complex beam propagation experimentation to improve the beam propagation knowledge, codes, and algorithms for Adaptive Optics systems for directed energy weapons. ***FY 2012 Plans:*** Conduct modeling and simulation studies and experiments for new laser technology and beam propagation concepts to enable understanding of next generation high energy laser systems. ***FY 2013 Plans:*** Will continue to conduct laser beam propagation experiments and spectroscopic research to improve modeling and simulation capabilities and improve high energy laser systems design.			
Accomplishments/Planned Programs Subtotals	0.472	0.728	0.733

C. Other Program Funding Summary ($ in Millions)

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 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601101A: *In-House Laboratory Independent Research*	PROJECT F16: *ILIR-SMDC*

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.