Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research					R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	181.540	188.210	99.027						Continuing	Continuing
FH2: FORCE HEALTH PROTECTION - APPLIED RESEARCH	8.177	8.717	8.321						Continuing	Continuing
OA3: CENTER FOR ADV SURGICAL & INTERVENTIONAL TECH (CA)	.965	.000	.000						Continuing	Continuing
PA4: WOUND HEALING PROJECT (CA)	1.158	.000	.000						Continuing	Continuing
PA5: NANOFABRICATED BIOARTIFICIAL KIDNEY (CA)	.965	2.492	.000						Continuing	Continuing
UA8: PROTEIN HYDROGEL (CA)	1.932	.000	.000						Continuing	Continuing
VB3: MEDICAL TECHNOLOGY INITIATIVES (CA)	94.576	105.589	.000						Continuing	Continuing
VB4: SYSTEM BIOLOGY AND NETWORK SCIENCE TECHNOLOGY	.000	.000	1.175						Continuing	Continuing
VJ4: Suicide Prevention/ Mitigation	.000	.000	10.000						Continuing	Continuing
X06: HIBERNATION GENOMICS	1.545	.000	.000						Continuing	Continuing
	.773	.000	.000						Continuing	Continuing

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research					R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					
845: BONE DISEASE RESEARCH PROGRAM										
869: Warfighter Health Prot & Perf Stnds	2.970	3.130	35.282						Continuing	Continuing
870: DOD MED DEF AG INF DIS	14.848	15.465	17.190						Continuing	Continuing
873: HIV EXPLORATORY RSCH	10.953	11.351	9.248						Continuing	Continuing
874: CBT CASUALTY CARE TECH	16.139	11.936	17.811						Continuing	Continuing
878: HLTH HAZ MIL MATERIEL	11.857	14.264	.000						Continuing	Continuing
879: MED FACT ENH SOLD EFF	9.851	10.282	.000						Continuing	Continuing
968: SYNCH BASED HI ENERGY RADIATION BEAM CANCER DETECT	4.831	4.984	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) supports application of knowledge gained through basic research to develop drugs, vaccines, medical devices, diagnostics, doctrine, and other preventive measures essential to the protection and sustainment of Soldier health. Research is conducted in five principal areas: Combat Casualty Care; Military Operational Medicine; Military Relevant Infectious Diseases, including Human Immunodeficiency Virus (HIV); Clinical and Rehabilitative Medicine; and Systems Biology/Network Sciences.

Project (874) supports identification and evaluation of drugs, biologics (products derived from living organisms), medical devices, and diagnostics for resuscitation and life support, as well as trauma care systems for use by field medics and surgeons. Research focus is on identifying more effective critical care technologies and protocols to treat severe bleeding, traumatic brain injury, and other blast related injuries as well as laboratory and animal studies of regenerating skin, muscle, and bone tissue for the care and treatment of battle-injured casualties.

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification	DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY

Project (869) supports matures knowledge and technologies, such as screening tools and preventive measures for Post Traumatic Stress Disorder and mild Traumatic Brain Injuries, physiological monitors to protect Soldiers from injuries due to exposure to hazardous environments and materials, and medically valid testing devices and predictive models used for the development of Soldier protective equipment.

Project (870) supports designing and developing medical protection and treatment against naturally occurring diseases and wound infections of military importance, as identified by worldwide medical surveillance and military threat analysis.

All medical applied research is conducted in compliance with US Food and Drug Administration (FDA) regulations. The FDA requires thorough testing in animals (referred to as preclinical testing) to assure safety and, where possible, effectiveness (i.e., efficacy) prior to approving controlled clinical trials where these early (previously unproven in humans) drugs, vaccines, and medical devices are tested in humans. Subsequent clinical trials are conducted in three phases (Phase 1, 2, and 3) to prove safety and effectiveness of the drug/ vaccine/device for the targeted disease/condition. Each successive clinical trial includes more study subjects as volunteers. This PE focuses on identifying candidate solutions and on completing preclinical technology maturation activities that involves pre-clinical and early human clinical testing.

Program development and execution is externally peer-reviewed and fully coordinated with all Services and other agencies through the Joint Technology Coordinating Groups to prevent unnecessary duplication.

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. In FY10, projects 878 and 879 will be consolidated into project 869.

Work in this PE is performed by the Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD; US Army Medical Research Institute of Infectious Diseases (USAMRIID), Fort Detrick, MD; US Army Research Institute of Environmental Medicine (USARIEM), Natick, MA; US Army Institute of Surgical Research (USAISR), Fort Sam Houston, TX; US Army Aeromedical Research Laboratory (USAARL), Fort Rucker, AL; the Naval Medical Research Center (NMRC), Silver Spring, MD; and the Armed Forces Institute of Regenerative Medicine (AFIRM), Fort Detrick, MD.

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification	DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	184.214	75.395	73.639	
Current BES/President's Budget	181.540	188.210	99.027	
Total Adjustments	-2.674	112.815	25.388	
Congressional Program Reductions	.000	-.625		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	113.440		
Total Reprogrammings	1.641	.000		
SBIR/STTR Transfer	-4.315	.000		

Change Summary Explanation

FY09 funding increase is due to congressional adds.

FY10 funds were increased for Medical Blast Trauma Research and Suicide Prevention Study.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER FH2	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
FH2: FORCE HEALTH PROTECTION - APPLIED RESEARCH	8.177	8.717	8.321						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project funds research to support applied research directed toward the sustainment of a healthy force of Warfighters from accession through retirement. The program has the following three major thrust areas: (1) Physiological Response and Blast and Blunt Trauma Models of Thoracic (chest) and Pulmonary (lung) Injuries; (2) Millennium Cohort Research; and (3) Biomarkers of Exposure and Environmental Biomonitoring. This research focuses on enhanced protection of Soldiers against health threats in military operations and training. Stressors that adversely affect individual Soldier health readiness are identified and studied to develop interventions that will protect Soldiers and improve their health and performance in stressful environments. This is follow-on research that extends and applies findings from over a decade of research on Gulf War Illnesses and other chronic multi-symptom illnesses that have suspected nerve and behavioral alterations due to environmental contaminants and deployment stressors. Key databases include the Millennium Cohort Study and the Total Army Injury and Health Outcomes Database. These databases allow us to evaluate interactions of psychological stress and other deployment and occupational stressors that affect Warfighter health behaviors. Force Health Protection applied research is conducted in close coordination with the Department of Veterans Affairs. This project contains no duplication with any effort within the Military Departments and includes direct participation by other Services working on Army projects.

Promising efforts identified in this project are further matured under PE 0603002A, project FH4.

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 by the US Army Center for Environmental Health Research, Fort Detrick, MD; the Naval Health Research Center (NHRC), San Diego, CA; and the US Army Research Institute of Environmental Medicine (USARIEM), Natick, MA.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Millennium Cohort Research: A long-term study of Soldiers that includes psychological, physical, and spiritual impacts of military service throughout their lifetime. In FY08 and FY09, this task was conducted under the Health Behavior/ Weight Control program area. In FY10, will perform analyses of newly reported Post-Traumatic Stress Disorder (PTSD), depression, and anxiety symptoms among Millennium Cohort participants in conjunction with increased mental and physical health problems; will link Millennium Cohort data with DoD and Veteran Administration health risk databases;	.000	.000	3.233	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY		PROJECT NUMBER FH2		
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
will conduct long term studies to investigate the use of tobacco and alcohol among Service members to provide policy recommendations that enhance the long-term health of deploying forces.					
Health Behavior/Weight Control: In FY08, assessed novel military weight management programs that include food intake monitoring, meal replacement, and portion size retraining. Completed analysis of two community-based intervention programs for military weight management in active duty and reserve forces. In FY09, evaluate associations between weight and chronic medical conditions (e.g. diabetes, cardiovascular disease, metabolic syndrome), test feasibility and efficacy of new approaches to enhance nutrition in military dining facilities, evaluate community-based environmental intervention programs for weight management by reserve personnel, evaluate associations between Service member weight/weight changes with number and location of deployments and presence of Post Traumatic Stress Disorder, characterize successful and unsuccessful weight management techniques by establishment of a military weight registry database. In FY10 will programmatically realign to Millennium Cohort Research.		2.095	4.082	.000	
Nerve-based Disease Research: In FY08, completed a study of relationships between military occupation and nerve degeneration diseases. Completed comprehensive data collection on the health effects of exposure to jet fuel in a military setting. Completed examination of individual permethrin (insect repellent) exposure and dose levels in different environmental settings, designed to simulate operationally relevant scenarios; conducted assessments of military relevant chemicals and materials to identify biomarkers of exposure and effect using genomic (DNA-based) and proteomic (protein-based) analyses. Identified potential multianalyte (multiple targets) testing platforms for ready determination of identified biomarkers. In FY09, complete analyses of the association between jet fuel exposure and nervous system health outcomes. Complete studies of head trauma (i.e., head impact due to poor parachute landings and boxing as models) and neuropsychological adverse effects (mood and cognitive function). Integrate Environmental Sentinel Biomonitor (ESB) components and conduct bench testing of the composite system. In FY10, will programmatically realign to Biomarkers of Exposure and Environmental Biomonitoring.		6.082	4.391	.000	
Small Business Innovative Research/Small Business Technology Transfer Programs		.000	.244	.000	
Physiological Response and Blast and Blunt Trauma Models of Thoracic (Chest) and Pulmonary (Lung) Injury: Modeling and assessment of the combined effects of blast, impact, and ballistic trauma on the chest and lung system. In FY08 and FY09, this task was conducted under the Pulmonary Hazards and Risk Assessment Models program area in Project 878. In FY10, will conduct modeling of lung function disruption due to blunt force trauma to the chest; will combine thoracic		.000	.000	2.090	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY	PROJECT NUMBER FH2

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
(chest) blunt trauma model with performance decrement models and compare with large animal exercise data for the development of advanced survivability assessment and health hazard analysis tools.				
Biomarkers of Exposure and Environmental Biomonitoring: Development and evaluation of methods to detect environmental contamination and toxic exposure during military operations. In FY08 and FY09, this task was conducted under the Nerve-based Disease Research program area. In FY10, will review available sensor technology and conduct down-selection of sensors best suited to meet user performance requirements; will evaluate biomarkers of exposure to selected Militarily Relevant Chemicals (MRCs) and relevant toxicity pathways to develop a method to detect toxic exposure in Soldiers.	.000	.000	2.998	
Total	8.177	8.717	8.321	

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER OA3	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
OA3: CENTER FOR ADV SURGICAL & INTERVENTIONAL TECH (CA)	.965	.000	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for the Center for Advanced Surgical and Interventional Technology.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Center for Advanced Surgical and Interventional Technology (CASIT)	.965	.000	.000	
Total	.965	.000	.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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER PA4	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
PA4: WOUND HEALING PROJECT (CA)	1.158	.000	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Wound Healing applied research.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Rapid Wound Healing Technology Development	1.158	.000	.000	
Total	1.158	.000	.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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER PA5	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
PA5: NANOFABRICATED BIOARTIFICIAL KIDNEY (CA)	.965	2.492	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Nanofabricated Bioartificial Kidney applied research.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Nanofabricated Bioartificial Kidney and Bioterrorism	.965	2.422	.000	
SBIR/STTR	.000	.070	.000	
Total	.965	2.492	.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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER UA8	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
UA8: PROTEIN HYDROGEL (CA)	1.932	.000	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Protein Hydrogel applied research.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
BioFoam Protein Hydrogel for Battlefield Trauma	1.932	.000	.000	
Total	1.932	.000	.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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER VB3	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
VB3: MEDICAL TECHNOLOGY INITIATIVES (CA)	94.576	105.589	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Medical Technology applied research.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Proton Therapy	2.318	.000	.000	
New Vaccines to Fight Respiratory Infection	3.864	3.875	.000	
Orthopedic Implant Design and Manufacturing for Taumatic Injuries	1.546	.000	.000	
Extended Duration Silver Wound Dressing-Clinical Trials	.000	1.550	.000	
Prevention of Compartment Syndrome, Ultrafiltration Catheter	.000	1.550	.000	
Consortium for Bone and Tissue Repair and Regeneration	.000	.774	.000	
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	2.957	.000	
Center for Research on Integrative Medicine for the - Military (CRIMM)	.967	.000	.000	
Epigenetic Disease Research	1.546	.000	.000	
Improving Musculoskeletal Health and Function	1.160	.000	.000	
Injury Research Center-Ryder Trauma Center	2.706	5.813	.000	
Military Interoperable Digital Hospital Testbed	3.867	9.687	.000	
Storage Area Network	.967	.000	.000	
Synthetic Malaria Vaccine	2.320	.000	.000	
Fibrin Adhesive Stat (FAST) Dressing	1.933	.000	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Armed Services Gynecological Cancer Health Program	1.546	.000	.000	
Biological and Immunological Infectious Agent and Cancer Vaccine Research	.000	.775	.000	
Combat Stress Intervention Program (CSIP)	.000	2.325	.000	
Respiratory Biodefense Initiative	1.546	1.550	.000	
Advanced Bio-engineering for Enhancement of Soldier Survivability	1.546	.000	.000	
Carbon Nanotube Production	.967	1.163	.000	
Cancer Prevention Through Remote Biological Sensing	1.545	1.550	.000	
Cedars-Sinai Core Imaging Center	2.318	.000	.000	
Center for Injury Biomechanics	3.090	3.100	.000	
Center for Ophthalmic Innovation	1.932	2.325	.000	
Minimizing Health Effects of Air Toxics on Military Personnel	.000	1.550	.000	
Advanced Functional Nanomaterials for Biological Processes	.000	1.937	.000	
Plasma Technology Laboratory	.000	.775	.000	
Military Photomedicine Program	.000	2.713	.000	
Freeze Dried Blood Technology Clinical Research	.000	1.938	.000	
Battlefield Research Accelerating Virtual Environments for Mil Indiv Neuro Disorders (BRAVEMIND)	.000	.775	.000	
Battlefield Treatment of Hemorrhagic Shock	.000	.775	.000	
Control of Vector-Borne Diseases	.000	1.163	.000	
Cone Beam CT Scanners	3.090	.000	.000	
Center for Vaccine Scale-Up Process Research (Phase I)	.773	.000	.000	
Defense Against Viral Infection (DAVI)	1.545	.000	.000	
Disposable Unit Dose Drug Pumps for Anethesia and Antibiotics	1.932	1.695	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY	PROJECT NUMBER VB3

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Electronic Technology-Infrastructure in Support of Military Missions	1.545	.000	.000	
Impact of Intensive Lifestyle Modification on Chronic Medical Conditions	1.932	1.695	.000	
Integrated Medicine, Communications, Compassion, Chronic Care Program	1.545	.000	.000	
Mass Decontamination and Biosecurity Initiative	.339	.000	.000	
Neuroscience Research Consortium to Study Spinal Cord Injury	.774	.775	.000	
Oxygen Diffusion Dressings for the Accelerated Healing of Battlefield Wounds and Burns	.483	.000	.000	
Plant-based Vaccine Research	1.932	1.937	.000	
Prevention of Radiation Injury by use of Statics	1.545	.000	.000	
Rapid Vaccine Discovery Technology	1.932	1.550	.000	
Regional Nuclear Magnetic Resonance (NMR) Facility	.965	.000	.000	
Remote Robotic Teleproctoring to Promote Rapid Surgical Skills Acquisition	.965	.000	.000	
Technological Regional Center of Excellence for PTSD	1.545	.000	.000	
West Nile Virus Vaccine	.908	.000	.000	
Wound Infection Treatment Program	1.159	2.325	.000	
Center for Resuscitation Research	2.898	.000	.000	
Cold Spring Harbor Laboratory Womens Cancer Genomics Center	3.091	2.713	.000	
Staph Vaccine	1.932	.000	.000	
MRI-DTI Technology to Improve Diagnostics and Treatment of TBI	2.415	.000	.000	
Copper Air Quality Program	1.545	1.938	.000	
Medical Image Database Holographic Archiving Library System (MIDHALS)	.966	.000	.000	
Medical Resources Conservation Technology Pilot Energy Cost Control Evaluation (PECCE)	1.159	2.325	.000	
Complementary and Alternative Medicine Research (MIL-CAM)	4.831	4.844	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Molecular Switch Vaccines for Biodefense and Cancer	1.546	.000	.000	
Orthopaedic Extremity Trauma Research Program	4.639	4.844	.000	
Pain and Neuroscience Center Research Center	5.415	.000	.000	
Neural Controlled Prosthetic Device for Amputees	.000	1.550	.000	
Neutron/Hadron Particle Therapy	1.546	1.163	.000	
Nano-Imaging Agents for Early Disease Detection	.000	1.550	.000	
Neuroimaging of Brain Disorders	.000	.775	.000	
Self-Powered Prosthetic Limb Technology	.000	2.325	.000	
Use of Drugs to Reduce Hearing Loss from Acute Acoustic Trauma	.000	1.240	.000	
Vision Integrating Strategies in Opthamology and Neurochemistry (VISION)	.000	3.100	.000	
Center for Aerospace Human Factors Research and Innovation	.000	.775	.000	
Development of Drugs for Malaria and Leishmaniasis in US Military and Civilian Personnel	.000	3.294	.000	
Engineering Replacement Tissues	.000	1.550	.000	
Expansion and Development, Upper and Lower Bionic Limbs	.000	1.938	.000	
Facilitating Use of Advanced Prosthetic Limb Technology	.000	1.550	.000	
Mosquito Borne Disease Prevention: Malaria & Dengue Fever	.000	.775	.000	
Optical Neural Techniques for Combat/Post-Trauma Healthcare	.000	1.550	.000	
Soldier Survival in Extreme Environments	.000	2.868	.000	
Behavior and Neuroscience, Functional Magnetic Resonance Imaging Research Project	.000	.775	.000	
Plug-In Architecture for DoD Medical Imaging	.000	.775	.000	
National Eye Eval & Research Network (NEER)-Clinical Trials of Orphan Retinal Degenerative Diseases	.000	.775	.000	
Total	94.576	105.589	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY	PROJECT NUMBER VB3

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER VB4	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
VB4: SYSTEM BIOLOGY AND NETWORK SCIENCE TECHNOLOGY	.000	.000	1.175						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project supports applied research in systems biology to provide a highly effective mechanism to integrate iterative biological tests, computer simulations, and animal studies. Such developmental efforts using systems biology could ultimately reduce the time and effort invested in medical product development.

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 by the US Army Medical Research and Materiel Command, Fort Detrick, MD

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Systems Biology: In FY09, this research is funded in project 878 under the Systems Biology and Network Science task. Conduct research to refine the new mathematical and computational methods that have identified gaps in network linkages (such as protein to protein networks). Explore whether protein-protein network models developed for a particular pathogen are portable to a different pathogen sharing a common set of proteins. In FY10, will apply validated models to the identification of therapeutic candidates against common targets identified.	.000	.000	1.175	
Total	.000	.000	1.175	

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER VJ4	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
VJ4: Suicide Prevention/ Mitigation	.000	.000	10.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project funds research over a planned five (5) year period to examine the mental and behavioral health of Soldiers to counter suicidal behavior. This work will focus on advancing understanding of the multiple determinants of suicidal behavior, psychopathology (study of the causes and nature of abnormal behavior), psychological resilience, and role functioning. A significant thrust area will focus on the development of better methods for preventing and mitigating suicidal behavior and to improve the overall mental health and behavioral function of Army personnel during and after their Army service.

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 on this project is performed by The National Institute of Mental Health (NIMH) through extramural cooperative research grants in collaboration with the Department of the Army.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10, conduct research to better understand the apparent increase in suicide deaths and nonfatal attempts among Active Duty Soldiers. Initiate epidemiological (population-based) studies to identify determinants of suicidal behaviors and potential modifiable risk factors. Begin the process to develop better methods for preventing suicidal behaviors based on data driven recommendations to mitigate or prevent suicidal behaviors.	.000	.000	10.000	
Total	.000	.000	10.000	

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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER X06	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
X06: HIBERNATION GENOMICS	1.545	.000	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

These are Congressional Interest Items

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Hibernation Genomics	1.545	.000	.000	
Total	1.545	.000	.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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER 845	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
845: BONE DISEASE RESEARCH PROGRAM	.773	.000	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Bone Disease applied research.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Bone Health and Military Medical Readiness Program	.773	.000	.000	
Total	.773	.000	.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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER 869	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
869: Warfighter Health Prot & Perf Stnds	2.970	3.130	35.282						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project funds research to prevent and protect Soldiers from training and operational injuries, the development of mechanisms for detection of physiological and psychological health problems, the evaluation of hazards to head, neck, spine, eyes, and ears, standards for return-to-duty, and the determination of new methods to sustain and enhance performance across the operational spectrum. This research provides medical information important to the design and operational use of military systems and forms the basis for behavioral, training, pharmacological (drug actions), and nutritional interventions.

The four main thrust areas are (1) Physiological Health (2) Environmental Health and Protection, (3) Injury Prevention and Reduction, and (4) Psychological Health.

(1) Physiological Health - develop and evaluate applied predictive modeling and simulation to support improvements in training doctrine and individual equipment; evaluate new methods of monitoring fluid consumption; demonstrate remote real-time prediction and management of thermal strain in physically active Soldiers; and evaluate methods for managing and controlling the effects of nutrition and fatigue on Soldier operational performance.

(2) Environmental Health and Protection -- evaluate remote monitoring of Soldier physiological status and mitigating/eliminating the effects of heat, cold, altitude and other environmental stressors on Soldier performance.

(3) Injury Prevention and Reduction - Musculoskeletal Injury Prevention: evaluate the effects of repetitive motion and military operations and training on the human body; analyze and model the effects of mechanical and operational stressors on Soldier performance, to include acoustic and impact trauma, vision, vibration and jolt to model the effects of these stressors on the brain, spine, eyes, and hearing. Evaluate standards and methods for the rapid return to duty of Soldiers following injury.

(4) Psychological Health & Resilience - develop and evaluate methods to detect and treat concussion and identify and evaluate the effects of cognitive deficits in Soldiers during operations; assess psychological resilience factors and investigate methods of preventing or reducing the risk of psychological trauma in operational environments; investigate methods to treat PTSD in a military population and identify causative and preventative factors in military suicides.

Beginning in FY10, projects 878 and 879 will be consolidated into project 869. Promising efforts identified in this project are further matured under PE 0603002A, project MM3.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY	PROJECT NUMBER 869

Work in this project is performed by the Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD; US Army Research Institute of Environmental Medicine (USARIEM), Natick, MA; and the US Army Aeromedical Research Laboratory (USAARL), Fort Rucker, AL.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Physiological Health - Nutritional Sustainment and Fatigue Interventions: In FY08 and FY09, research efforts were/ are funded in project 879. In FY10, will demonstrate efficacy of nutritional supplements for sustaining cognition during military operational stress; will determine impact of nutritional supplements on enhancing post-exercise recovery; will determine efficacy of zinc supplements for reducing the incidence of diarrhea; will develop models to study the relationship of hormonal regulation and eating behavior; will evaluate individualized alertness and performance prediction model software for the Sleep Management System.	.000	.000	2.569	
Environmental Health and Protection - Physiological Awareness Tools and Warrior Sustainment in Extreme Environments: In FY08 and FY09, research efforts were/are funded in task Physiological Health - Life Sign Monitoring, in projects 878 and 879. In FY10, will employ hydration sensor technologies to conduct early device evaluations; will determine the efficacy of a 7 to 8 hour nighttime exposure to a normal altitude, low oxygen environment for high altitude pre-acclimatization; will evaluate current heat strain decision aid capabilities for potential future enhancement.	.000	.000	2.129	
Injury Prevention and Reduction - Neurosensory Injury Prevention: In FY08 and FY09, research efforts were/are funded in project 878. In FY10, will characterize blunt impact protection capabilities of current and future helmet designs to develop biomedically valid criteria for US Army Test and Evaluation Command (ATEC) to use in materiel development will develop realistic visual headforms and will model eye injury vulnerabilities for candidate protection solutions; will develop auditory test fixtures/headforms for model hearing protection solutions; will conduct assessment of candidate drugs to prevent hearing loss.	.000	.000	10.252	
Injury Prevention and Reduction - Musculoskeletal Injury Prevention: Evaluate and assess the effects of repetitive motion and military operations and training on the human body. In FY08 and FY09, research efforts were/are funded in project 878. In FY10, will characterize performance deficits from Warfighter injury and identify promising interventions for rapid return to duty following musculoskeletal injury; will provide high resolution musculoskeletal injury data for use in the training and overuse injury prediction model; will evaluate physical impact forces on the lower leg associated with prolonged running and fatigue; and will evaluate musculoskeletal adaptations in response to military-relevant training and injuries to assess mechanisms of skeletal muscle repair, regeneration, and adaptation.	.000	.000	4.793	
	.000	.000	2.622	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY			PROJECT NUMBER 869	
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Injury Prevention and Reduction - Injury Return to Duty Standards: In FY08 and FY09, research efforts were/are funded in project 879. In FY10, will characterize specific performance deficits from Warfighter brain, eye, and hearing injury and develop promising interventions for rapid return to duty; develop Return to Duty Standards for mission-critical occupations following brain, eye, and hearing injury; and determine appropriate clinical and physical health assessment tools to enable early return to duty.					
Psychological Health - Psychological Resilience: In FY08 and FY09, research efforts were/are funded in project 879. In FY10, will develop initial Advanced Battlemind Training to reduce symptoms associated with Post-Traumatic Stress Disorder (PTSD), post concussive symptoms and other post-deployment problems; will evaluate stigma related to seeking mental health care and barriers to care; will complete study of behavioral health providers to determine current status of diagnostic decision-making, treatment trends, and standards of care.		.000	.000	5.472	
Psychological Health & Resilience - Suicide Prevention and Treatment of PTSD: In FY10, will initiate a new research effort that will evaluate PTSD risk factors, including co-occurring mild Traumatic Brain Injury (mTBI) and mental health problems, and other factors (i.e. deployment, combat, multiple deployments) to improve diagnostic capabilities; will conduct a laboratory study to compare sensitivity of existing neurocognitive tests for PTSD; will collect and evaluate all data on the suicide intervention programs.		.000	.000	5.201	
Psychological Health & Resilience - Concussion/Mild Traumatic Brain Injury (mTBI) Interventions: In FY09, research efforts are funded in project S15. In FY10, will compare initial sensitivity and practicality of neuropsychological performance tests/batteries for diagnosis of concussion in Soldiers and civilians; will conduct a study to determine susceptibility to concussion based upon baseline psychological and neurological functioning; will determine short term effects of concussion on sleep patterns and neurocognitive performance.		.000	.000	2.244	
Small Business Innovative Research/Small Business Technology Transfer Programs		.000	.062	.000	
Physiological Health - Life Sign Monitoring: In FY08, developed and evaluated Spartan network (SPARNET) and next-generation Heat Strain Decision Aid (HSDA) model with Ranger Training Brigade; tracked Ranger student hydration and geo-location; demonstrated HSDA value in reducing likelihood of heat injury; applied predictive modeling and simulation to support improvements in training doctrine and individual equipment; evaluated new method of monitoring fluid consumption; demonstrated remote real-time prediction and management of thermal strain in physically active Soldiers. In FY09, demonstrate remote medical monitoring capability in mountain and swamp phases of Ranger training; evaluate models predicting thermal status and water requirements for missions in rugged terrain, swamps, and cold weather. In		2.970	3.068	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY	PROJECT NUMBER 869

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY10 these efforts are funded in Environmental Health and Protection - Physiological Awareness Tools and Warrior Sustainment in Extreme Environments.				
Total	2.970	3.130	35.282	

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER 870	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
870: DOD MED DEF AG INF DIS	14.848	15.465	17.190						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project funds applied research for medical countermeasures to naturally occurring infectious diseases that pose a significant threat to the operational effectiveness of forces deployed outside the United States. Effective preventive countermeasures (protective/therapeutic drugs and vaccines, insect repellent and traps) protect the force from disease and sustain operations by avoiding the need for evacuations from the theater of operations. Diseases of military importance are malaria, bacterial diarrhea, and viral diseases (e.g., dengue fever and hantavirus). In addition to countermeasures, this project funds development of improved diagnostic tools to facilitate early identification of infectious threats in an operational environment-informing Commanders of the need to institute preventive actions and improved medical care. Major goals are to integrate genomics (DNA-based) and proteomics (protein-based) and other new biotechnologies into the development of new concepts for new vaccine, drug and diagnostics candidates.

Research conducted in this project focuses on the following five areas:

(1) Drugs to Prevent/Treat Parasitic (symbiotic relationship between two organisms) Diseases: Conduct assessments and improve candidate drugs coming from the DoD discovery program and from other collaborations for prevention and treatment of malaria to counter continuing spread of drug resistance to current drugs. Assess in animal models currently available drugs for use against cutaneous leishmaniasis (a skin-based disease transmitted by sand flies that is restricted to the skin). This program selects the most effective and safe candidates for continued development and possible clinical testing.
(2) Vaccines for Preventing Malaria: Conduct studies to investigate new candidate vaccines for preventing malaria, and select the best candidate(s) for continued development. A highly effective vaccine would reduce or eliminate the use of anti-malarial drugs and would minimize the progression of drug resistance to current/future drugs.
(3) Bacterial Threats: Conduct studies to develop antibacterial countermeasures including vaccine candidates to prevent diarrhea (a common disease in deployed troops), meningitis (a threat to trainee and deployed troops and military families), wound infection, and scrub typhus (a debilitating mite-borne disease that is developing resistance to currently available antibiotics).
(4) Diagnostics and Disease Transmission Control: Design and prototype new medical diagnostic and surveillance tools for the field, focusing on bedside and fieldable diagnostic systems. Develop interventions that protect Warfighters from biting insects that transmit diseases-sand flies can transmit leishmaniasis, and mosquitoes can transmit a variety of diseases including dengue fever, Japanese encephalitis, and malaria.
(5) Viral Threats Research: Design and laboratory test new vaccine candidates against dengue and other hemorrhagic fever viruses such as hantaviruses (cause of Korean hemorrhagic fever) and other lethal viruses (i.e., Lassa fever and Crimean-Congo hemorrhagic fever), and assess other non-vaccine technologies to protect against such lethal viral diseases.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY	PROJECT NUMBER 870

For the development of drugs and biological products, studies in the laboratory and in animal models provide a proof of concept for these candidate products including safety, toxicity, and effectiveness, and are necessary to provide evidence to the US Food and Drug Administration (FDA) to justify approval for a product to enter into future human subject testing. Additional non-clinical studies are often needed in Applied Research even after candidate products enter into human testing during Advanced Technology Development, usually at the direction of the FDA, to assess potential safety issues. Drug and vaccine development bears high technical risk. Of those candidates identified as promising in initial screens, the vast majority are eliminated after additional safety, toxicity, and/or effectiveness testing. Similarly, vaccine candidates have a high failure rate, as animal testing may not be a good predictor of human response, and therefore candidate technologies/products are often eliminated after going into human trials. Because of this high failure rate, a continuing effort to identify other potential candidates to sustain a working pipeline of countermeasures is needed to replace the products that fail in testing.

Work is managed by the US Army Medical Research and Materiel Command. The Army is responsible for programming and funding all DoD naturally occurring infectious disease research requirements, thereby precluding duplication of effort within the Military Departments.

Promising medical countermeasures identified in this project are further matured under PE 0603002A, project 810.

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 by the Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD, and its overseas laboratories; the US Army Medical Research Institute of Infectious Diseases (USAMRIID), Fort Detrick, MD; and the Naval Medical Research Center (NMRC), Silver Spring, MD, and its overseas laboratories.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Bacterial Threats: In FY08, refined antidiarrheal vaccine candidates and assessed a potential vaccine made from bacterial proteins that are involved in allowing the bacteria to adhere to the gut, established a model of dysentery (bloody diarrhea caused by Campylobacter) in nonhuman primates that can be used to assess/demonstrate new candidate vaccines before taking into expensive human clinical trials, and completed preclinical evaluation of new candidate diarrheal and meningitis vaccines. In FY09, examine potential bacterial proteins as new vaccine candidates against major strains of diarrheal disease (E. coli, Campylobacter and Shigella). Manufacture E. coli candidate vaccine and prepare for human testing. Select best Campylobacter vaccine candidate. Prepare for initial human testing of Shigella vaccine. Modify the meningitis bacteria to manufacture and test a multicomponent (to broaden protection) Group B vaccine in preparation for testing in humans. Test new scrub typhus (a debilitating mite-borne disease that is developing resistance to currently available antibiotics) proteins as potential vaccine candidate against multiple strains.	2.739	2.496	.000	
Diagnostics and Disease Transmission Control: In FY08, focused effort to reduce disease threat from insects other than sand flies, tested insect-based pathogen detection assays, down-selected a new insect repellent for final formulation.	1.973	2.152	2.167	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY		PROJECT NUMBER 870		
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Continued to improve medical diagnostic capability in the field. Assessed individual and combined components of diagnostic tests for selected naturally occurring infectious disease agents and began design of next-generation diagnostic assays. In FY09, test new intervention methods that prevent or reduce biting by disease-transmitting insects, including use of an improved bed net, and prepare for insect repellent testing to replace Diethylmetatoluamide or DEET (current ingredient in military insect repellent). Design and evaluate five new medical diagnostic tests and surveillance tools for disease-carrying insects (sand flies, mosquitoes) to improve the medical responses in the field. Develop field deployable point-of-care and hospital-based diagnostic devices for infectious diseases. In FY10, will develop passive insect repellent systems that do not require application of chemicals to skin or clothing; will evaluate new tests for detecting infectious organisms within insects that transmit diseases; will validate field deployable point-of-care diagnostic devices to prepare for FDA review; and will develop a repository of standardized critical reagents for producing consistent reproducible results in both laboratory and field-based diagnostic devices.					
Viral Threats Research: In FY08, evaluated new antiviral vaccines against emerging viral threats, and assessed potential of a combined DNA vaccine against several highly lethal viruses including Rift Valley fever, Crimean-Congo hemorrhagic fever, and tick-borne encephalitis. In FY09, assess and evaluate new antiviral vaccines in animals and support the hantaviral vaccine development effort. Examine new vaccine delivery approaches in animals to enhance effectiveness of DNA-based vaccine in humans. Prepare field site for human testing of candidate dengue vaccine. Manufacture proof-of-concept candidate vaccines (Inactivated, molecular and attenuated) to protect against dengue. In FY10, will develop reagents, assays, and animal models to test medical countermeasures for hantaviruses; will develop molecular vaccines and antibody-based countermeasures for flaviviruses (Dengue); and will explore the feasibility of combining inactivated, molecular and attenuated vaccines into a single vaccine that is effective against four dengue strains.		2.313	1.877	3.477	
Vaccines for Prevention of Malaria: In FY08, assessed potential malaria vaccine subcomponents in animal testing. Took into concept exploration new proteins and gene-based vaccines identified from animal malaria models or malaria in humans. Used molecular biological approaches to produce sufficient material to formulate into a vaccine candidate and to test in animal studies. In FY09, manufacture pilot lots of candidate vaccines (both DNA - and protein-based) against a severe form of malaria (Plasmodium falciparum) to maintain a pipeline of new technologies and to mitigate risk if lead technologies fail. Test protein-based candidate vaccines in small animals for proof-of-concept for eventual down selection. In FY10, will manufacture and test in animal models a DNA based P. falciparum vaccine candidates to support		3.117	3.082	3.353	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY	PROJECT NUMBER 870

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
a new vaccine application with the FDA. Will file the application for approval to test these candidates in humans. Will evaluate the safety and effectiveness in animals of DNA-based candidate falciparum vaccines.				
Drugs to Prevent/Treat Parasitic Diseases (harmful effects on host by an infecting organism): In FY08, continued studies to design, assess, and qualify candidate chemical compounds in search of more promising candidate drug classes to maintain pipeline of potential compounds for optimization. In FY09, assess new chemical compounds that have shown the greatest potential for effective in cell-based testing against malaria and/or leishmaniasis (a skin-based disease transmitted by sand flies). Assess in animal models a new formulation of amphotericin B, an FDA-approved drug as an oral treatment against cutaneous Leishmania. Develop bioluminescent (the production and emission of light by a living organism as the result of a chemical reaction) parasite animal model to assess drug effectiveness. Modify the current lead drugs to improve safety, effectiveness in animal models. In FY10, will optimize chemical compounds that have potential to be effective drugs against malaria and/or leishmaniasis, including new candidate(s). will complete optimization of one lead malaria drug to test in animals, and if successful, prepare for initial testing in humans.	4.706	5.858	4.585	
Bacterial Threats (cont'd FY10 and FY11): In FY10, will complete evaluation of E. coli subunit vaccine in monkeys. Will evaluate alternative Shigella constituents, as potential vaccine candidates in animals. Will manufacture lead candidate Campylobacter vaccine. Will transition a multicomponent Group B meningococcal vaccine to next phase of development. Will evaluate scrub typhus for drug resistance, will identify new proteins as candidate vaccine components, and will evaluate vaccine delivery methods in animals. Will evaluate new therapeutic approaches to accelerate wound healing such as vacuum-assisted closure of wounds using binding agents to kill bacteria.	.000	.000	3.608	
Total	14.848	15.465	17.190	

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER 873	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
873: HIV EXPLORATORY RSCH	10.953	11.351	9.248						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project funds research on the human immunodeficiency virus (HIV), which causes Acquired Immunodeficiency Syndrome (AIDS). Work in this area includes developing improved identification methods to determine genetic diversity of the virus, and evaluating and preparing overseas sites for future vaccine trials. Additional activities include developing candidate vaccines for preventing HIV, undertaking preclinical studies (studies required before testing in humans) to assess vaccine for potential to protect and/or manage the disease in infected individuals. This program is jointly managed through an Interagency Agreement between the US Army Medical Research and Materiel Command and the National Institute of Allergy and Infectious Diseases of the National Institutes of Health. This project contains no duplication of effort within the Military Departments or other government organizations.

Work is related to and fully coordinated with work funded in PE 0603105A, project H29.

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 by the Walter Reed Army Institute of Research (WRAIR) and the Naval Medical Research Center (NMRC), Silver Spring, MD, and their overseas laboratories. The Henry M. Jackson Foundation (HMJF), located in Rockville, MD provides support for FDA testing and other research under cooperative agreement.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
HIV Research Program: Conduct projects assessing new HIV vaccine candidates, vaccine test site development worldwide, HIV disease outbreaks, and genetic attributes of HIV threat. In FY08, continued ongoing long-term candidate vaccine refinement based on studies of globally prevalent Human Immunodeficiency Virus (HIV) viral subtypes, continued to improve methodologies for medical monitoring of Department of Defense (DoD) personnel's viral exposure and infection, and continued to improve and integrate new methods to assess the effectiveness of candidate vaccines in support of clinical research (initial assessment for safety in humans). In FY09, continue long-term efforts to find solutions to the HIV threat to DoD personnel with ongoing studies directed at assessing HIV vaccine candidates, assessing vaccine test sites in Africa and Asia, and identifying changes in global risk and genetic makeup of HIV threat to US forces to help direct future research and intervention programs. In FY10, will define the potential threat posed by HIV to the US military by continuing to identify and characterize different subtypes involved with the global epidemic of HIV-infected populations; will develop new human study test sites in Uganda to expand testing facilities, including production of new	10.953	11.053	9.248	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY	PROJECT NUMBER 873

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
vaccine candidates against selected HIV subtypes found in East Africa; and will control production quality of new vaccine candidates to be used in humans.				
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.298	.000	
Total	10.953	11.351	9.248	

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER 874	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
874: CBT CASUALTY CARE TECH	16.139	11.936	17.811						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project funds the development and assessment of concepts, techniques, and materiel that improve survivability and ensure better medical treatment outcomes for Warfighters wounded in combat and other military operations. Combat casualty care research addresses: control of severe bleeding, revival and stabilization, prognostics and diagnostics for life support systems (predictive indicators and decision aids), tissue repair including transplant technologies, and treatment of burns, Traumatic Brain Injury (TBI), eye injuries and face trauma. Research involves extensive collaboration with multiple academic institutions to develop treatments for combat wounds through the Armed Forces Institute of Regenerative Medicine.

Research conducted in this project focuses on the following seven areas:

(1) Hemorrhage (bleeding) Control, Blood, and Resuscitative Fluids: Includes materials and systems for minimizing the effects of traumatic blood loss, preserving blood and blood products, and resuscitation following trauma: Beginning in FY10, funding shifts to the Damage Control Resuscitation area.
(2) Damage Control Resuscitation: Includes knowledge products, materials and systems for control of internal bleeding, minimizing the effects of traumatic blood loss, preserving blood, blood products, and resuscitation following trauma; the research area starts in FY10.
(3) Combat Trauma Therapies: Includes identification and development of candidate drugs and medical procedures to minimize the effects of combat injuries.
(4) Far-Forward Medical Systems: Includes diagnostic and therapeutic medical devices and associated algorithms, software, and data-processing systems for resuscitation, stabilization, life support, surgical support, and dental care treatments that can be applied in a pre-hospital, operational field setting. Beginning in FY10, dental efforts move to oral/facial surgery under Combat Trauma Therapies and the remaining efforts shift to the Combat Critical Care Engineering area.
(5) Combat Casualty Bioinformatics and Simulation: Focuses on a data management system to capture and analyze data (such as heart and respiration rates) over time and the development of casualty simulations and durable, realistic simulators for initial and reinforcement training of medical care providers. Beginning FY10, will discontinue in-house simulation research and leverage Program Executive Office, Simulation, Training, and Instrumentation (PEO-STRI) medical simulation research. Bioinformatics research will be funded with the Combat Critical Care Engineering research area in FY10.
(6) Combat Critical Care Engineering: Includes development of diagnostic and therapeutic medical devices and associated algorithms, software, and data-processing systems for resuscitation, stabilization, life support, and surgical support that can be applied across the pre-hospital, operational field setting and initial definitive care facilities; this research area starts in FY10.

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(7) Clinical and Rehabilitative Medicine: Includes laboratory and animal studies of regenerating skin, muscle, and bone tissue for the care and treatment of battle-injured casualties; this research area starts in FY10.

All drugs, biological products, and medical devices, are developed in accordance with US Food and Drug Administration regulations, which governs testing in animals to assess safety, toxicity, and effectiveness prior to conducting human subject clinical trials.

Promising efforts identified in this project are further matured under PE 0603002A, project 840.

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 on this project is performed by the US Army Institute of Surgical Research (ISR), Fort Sam Houston, TX; and the Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD; and the Armed Forces Institute of Regenerative Medicine (AFIRM), Fort Detrick, MD.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.148	.000	
Hemorrhage Control, Blood, and Resuscitative Fluids: In FY08, began preparation for initial safety study of freeze-dried plasma (FDP), identified new strategies to treat the abnormal blood-clotting response that occurs in severely injured patients, established the effects of resuscitation treatments for combined blast-trauma-hemorrhage injuries on the brain and lungs; and determined if stored red blood cells lose efficacy near the end of their shelf life. Also, tested products and methods of using a foam blood clotting agent to stop internal bleeding. In FY09, identify candidate diagnostic and therapeutic interventions for abnormal blood clotting; using a small animal model, continue investigation into use of resuscitative fluids to improve outcomes for combined blast-trauma-hemorrhage on brain and lung. Evaluate freeze-dried fibrinogen (a blood component), for improving blood clotting. In FY10, this work will be funded under the Damage Control Resuscitation area.	8.329	1.689	.000	
Combat Trauma Therapies: In FY08, awarded contracts to Armed Forces Institute of Regenerative Medicine (AFIRM) and began to assess emerging therapeutics (stem cell therapy and growth factors for tissue and bone regeneration) in animal models and new methods to repair areas with major injuries caused by projectiles; developed selective brain cooling and neuroregeneration for early intervention and treatment of traumatic brain injury; established neuroprotection/ neuroregeneration methods to reduce death and illness resulting from brain trauma including stem cell therapies, tissue grafts, and a drug to improve new learning and memory; completed initial efficacy studies of FDA-licensed drugs that are candidate anti-seizure therapies for silent brain seizure; and continued biomarker clinical trials and designed	4.568	7.725	3.267	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
a device for brain injury diagnostics. In FY09, focus AFIRM tissue regeneration activities on most promising clinical treatments for blood vessel grafts, muscle regeneration, regeneration of bones in the head and face, and assessment of long-bone regeneration using an animal model; continue to refine selective brain cooling and neuroregeneration for early intervention and treatment of brain injury; conduct drug combination studies for treatment of acute brain trauma; and expand biomarker clinical feasibility trial to include diagnosis of mild Traumatic Brain Injury. In FY10, will begin several injury studies of Penetrating Ballistic-type Brain Injury (PBBI) in large animals; will conduct animal study of oral surgical dressing; and will begin studies into the nature of eye injuries and evaluate promising repair methods in laboratory and animal models.				
Far-Forward Medical Systems: In FY08, completed preclinical evaluation of algorithms for simultaneous operation of closed-loop control of ventilation, oxygen administration, and fluid administration, and identified a hardware platform for this system: completed toxicity and formulation studies on an antimicrobial, antiplaque compound. In FY09, begin laboratory-based evaluation of fluid resuscitation algorithms in an integrated hardware platform (either the Army's integrated litter or the Navy's lightweight trauma module) for casualty transport; and transition oral protective, antiplaque compound to commercial partner. In FY10, dental efforts will move to oral/facial surgery under Combat Trauma Therapies and the remaining efforts will shift to the Combat Critical Care Engineering area.	1.294	1.174	.000	
Damage Control Resuscitation: In FY08 and FY09, funding was within the Hemorrhage Control, Blood, and Resuscitation Fluids program area. In FY10, will continue animal studies of freeze dried plasma; will develop and evaluate performance of candidate blood substitutes and expanders (e.g. frozen and freeze dried platelets); will test treatment interventions to stop internal bleeding in an animal model; will characterize the body's blood clotting mechanism associated with head injury bleeding and other trauma to identify ways to better control clotting and determine effects on resuscitation; will continue evaluation using animal models of various combinations of plasma, clotting factors, and Complement Inhibitors (CI's) as therapies to stop severe bleeding and treat trauma.	.000	.000	7.754	
Combat Critical Care Engineering: In FY10, will conduct large animal studies evaluating change in electrical signals in the brain as non-invasive resuscitative end-points in shock from blood loss.	.000	.000	1.679	
Clinical and Rehabilitative Medicine: In FY10, will conduct studies of compounds to reduce cellular damage during compartment syndrome (nerve or tendon constriction in an enclosed space) in laboratory and animal models; will test a tissue-engineered functional human facial expression muscle; will evaluate a biodegradable tissue-lined stent; will test	.000	.000	5.111	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
reconstruction of a facial defect in the skull by using synthetic bone scaffold material; and will test a dressing that mimics the fetal skin structure to prevent wound scarring.				
Combat Casualty Bioinformatics and Simulation: In FY08, completed patient trauma simulations with advances in material sciences that depict realistic skin, flesh, blood, bone, organs, and loss of fluids; and improved sensors that detect and provide feedback on interventions by medics. In FY09, support testing and evaluation of trauma simulation component for training assessments developed jointly with the Research, Development and Engineering Command. Bioinformatics research will merge into the Combat Critical Care Engineering research area in FY10.	1.948	1.200	.000	
Total	16.139	11.936	17.811	

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER 878	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
878: HLTH HAZ MIL MATERIEL	11.857	14.264	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The objective of this project is to support the Medical and Survivability technology areas with a focus on providing Soldier protection from health hazards associated with materiel and operational environments. Emphasis is on identifying health hazards inherent to the engineering design and operational use of equipment, systems, and materiel used in Army combat operations and training. Areas of emphasis include battlefield lasers, ballistic, and mechanical injury (e.g., models of protection by soft body armor), health hazards of operations in environmental extremes, and toxic environments. Hazards addressed include blast overpressure generated by weapons systems, toxic chemical hazards associated with deployment into environments contaminated with industrial and agricultural chemicals (effort complements ongoing Defense Threat Reduction Agency initiatives for chemical/biological threat agent detection), directed energy sources (laser), and environmental stressors (heat, cold, and high altitude). Specific research tasks include characterizing the extent of exposure to potential hazards; delineating exposure thresholds for illness, injury, and performance degradation; establishing biomedical databases to support protection criteria; and developing and validating models for hazard assessment, injury prediction, and health and performance protection. In FY10, project 878 will be consolidated into project 869.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Mater Plan.

Work in this project is performed by the Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD; the US Army Research Institute of Environmental Medicine (USARIEM), Natick, MA; the US Army Center for Environmental Health Research, Fort Detrick, MD; and the US Army Aeromedical Research Laboratory, Fort Rucker, AL.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Pulmonary Hazards and Risk Assessment Models: In FY08, developed an integrated model that will predict lung injury and performance outcomes from exposures to combined insults of blast over-pressure and blunt trauma. Collected test data required to expand the scope of the Toxic Gas Assessment Software - Performance Evaluator (TGAS-PE) model to predict the impact of inhaled fire gas exposures on physical performance. In FY09, use new and existing animal injury and performance data to validate the integrated blast overpressure/blunt trauma lung injury and performance model. Use large-animal performance data to validate the TGAS-PE model for performance impacts from exposure to inhaled toxic fire gases and release TGAS-PE1 (performance) to survivability assessors for live-fire vehicle testing.	3.595	4.377	.000	

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APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY		PROJECT NUMBER 878		
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
In FY10 and FY11, this effort will be realigned to Neurosensory Injury Protection (project 869). Physiological response and blast and blunt trauma models of thoracic and pulmonary injury will be realigned to project FH2.					
Laser Protection Research: In FY08, completed functional assessment of visual acuity recovery in a behavioral model based on emerging laser injury research to determine the best eye injury treatment approach and refine a strategy for combined drug therapies in treatment of laser and trauma-induced eye injuries (blast, fragments). In FY09, utilize animal testing to assess laser eye injury hazards from advanced military systems. Evaluate a combination of drugs for treatment of laser-induced eye injury. In FY10 and FY11, this effort will be realigned to Injury Return to Duty Standards (project 869).		1.824	2.403	.000	
Injury Protection (face/eye): In FY08, validated and transitioned physical model and face/eye injury dose-response models to Army materiel developers. In FY09, design an impact test methodology for assessing face shield performance. In FY10 and FY11, this effort will be realigned to Neurosensory Injury Protection (project 869).		3.061	2.873	.000	
Small Business Innovative Research/Small Business Technology Transfer Programs		.000	.272	.000	
Biomonitor System and Dehydration Research: n FY08, conducted laboratory testing of the environmental sentinel biomonitor system to demonstrate capability of the integrated platform and sensors to rapidly assess drinking water quality and provide relevant health risk information to decision makers regarding toxic hazards in water. Also, conducted laboratory studies using human subjects data to assess the effects of nutritional countermeasures (such as caffeine) on fluid balance and performance when working in hot environments. In FY09, assess technologies for rapidly identifying chemical contamination by toxic industrial chemicals and that are appropriate for use with field water production equipment. Conduct field test to evaluate on-the-move enhanced fluid and nutrient delivery systems to enhance fluid and electrolyte delivery to Soldiers. Demonstrate efficacy of inducing acquired thermal tolerance (cellular protection) coincident with heat acclimatization in Soldiers. In FY10 and FY11, this effort will be realigned to Physiological Awareness Tools and Warrior Sustainment in Extreme Environments (project 869).		3.377	3.131	.000	
Systems Biology and Network Science:		.000	1.208	.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY09, conduct applied research to investigate whether protein-protein network models, developed for a particular pathogen, are portable to a different pathogen sharing a common set of proteins. Develop mathematical models to predict host-pathogen protein-protein interaction networks, and metabolic network models to predict phenotypical (genetically and environmentally determined physical appearance of an organism) responses induced by external stimuli. In FY10, this effort will be moved to the new project VB4.				
Total	11.857	14.264	.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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER 879	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
879: MED FACT ENH SOLD EFF	9.851	10.282	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The objective of this project is to support applied research with a focus on sustaining and enhancing Soldier health and performance during military operations in the full spectrum of military environments. Emphasis is on identification of baseline physiological performance and assessment of degradations produced by operational stressors. The resulting databases and collection of rules and algorithms for performance degradation in multi-stressor environments form the basis for the development of behavioral, training, pharmacological, and nutritional interventions, including psychological debriefing to prevent degradation in Soldier health and sustain Soldier performance. Key stressors include psychological stress from isolation; new operational roles; frequent deployments; inadequate restorative sleep; prolonged physical effort; and inadequate hydration in extreme environments. Will also assess the adverse effect of shifting biological rhythms during deployments across multiple time zones (extreme jet lag), night operations, and thermal and altitude stress. In FY10, project 879 will be consolidated into project 869.

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 by the Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD; the US Army Research Institute of Environmental Medicine, Natick, MD; and the US Army Aeromedical Research Laboratory, Fort Rucker, AL.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Vision and Auditory Research: In FY08, conducted evaluations of animal database for the effects of impulse noise/blast waves on hearing; conducted clinical and animal evaluations of a noise immune electronic stethoscope directed toward future Food and Drug Administration approval; developed the concept of solar protection compatible with rapid transition into darkened environments. In FY09, conduct comparative analysis of six eye damage risk criteria identified by NATO countries and provide recommendations of optimum health risk assessment criteria; transition a noise immune electronic stethoscope into advanced development with the United States Army Medical Research and Material Command Developmental Activity; conduct assessments of integrated solar protection device eye protection systems. In FY10 and FY11, this effort will be realigned to Neurosensory and Musculoskeletal Injury Return to Duty Standards (project 869).	2.546	2.359	.000	

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Mental Health Research: In FY08, assessed individual intervention strategies such as DoD post-deployment health assessment and post-deployment health reassessments; assessed leader development tools such as pre-deployment battlemind training, and Soldier and leader training modules including post-deployment battlemind training and spouse battlemind training. In FY09, develop unit-level intervention tools for military-wide implementation to improve Warfighter resiliency, health, and performance. In FY10 and FY11, this effort will be realigned to Psychological Resilience (project 869).		2.785	3.548	.000	
Small Business Innovative Research/Small Business Technology Transfer Programs		.000	.083	.000	
High Altitude Research: In FY08, integrated doctrinal and technological components into the prototype Altitude Readiness Management System (ARMS), a personalized digital assistant device designed to use altitude and physiological modeling data to monitor individual susceptibility to adverse health and performance at high altitudes. ARMS provide an enhanced planning and prediction capability. In FY09, examine use of Food and Drug Administration (FDA) approved drug (erythropoietin) to prevent neuropsychological deficits and acute mountain sickness. Provide critical information to the Army Medical Department Combat Developer for the development of new Army doctrine related to high altitude deployments. In FY10 and FY11, this effort will be realigned to Physiological Awareness Tools and Warrior Sustainment in Extreme Environments (project 869).		2.791	2.634	.000	
Fatigue/Sleep Research: In FY08, conducted laboratory studies to assess predictions of performance effectiveness and efficacy of drug interventions for individual Soldiers. In FY09, further integrate components of the next-generation Fatigue Intervention and Recovery Model/Sleep Activity, Fatigue, and Task Effectiveness (FIRM/SAFTE) which will include enhanced capability for prediction of the effects of stimulants, into the Sleep History and Readiness Predictor (SHARP). SHARP is a program that facilitates interpretation and usefulness of the FIRM/SAFTE model by providing summary information on the relative predicted efficacy of each individual Soldier within a unit. In FY10 and FY11, this effort will be realigned to Nutritional Sustainment and Fatigue Interventions (project 869).		1.729	1.658	.000	
Total		9.851	10.282	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602787A MEDICAL TECHNOLOGY					PROJECT NUMBER 968	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
968: SYNCH BASED HI ENERGY RADIATION BEAM CANCER DETECT	4.831	4.984	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Cancer Detection applied research.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
SBIR/STTR	.000	.139	.000	
Synchrotron-Based Scanning Research Neuroscience and Proton Institute	4.831	4.845	.000	
Total	4.831	4.984	.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.