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Exhibit R-2, PB 2010 Navy RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)					R-1 ITEM NOMENCLATURE PE 0603729N WARFIGHTER PROTECTION ADVANCED 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	50.670	53.766	18.609						Continuing	Continuing
2914: WARFIGHTER PROTECTION ADVANCED TECHNOLOGY	14.178	12.079	18.609						Continuing	Continuing
9999: CONGRESSIONAL PLUS-UPS	36.492	41.687	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The efforts described in this Program Element (PE) are based on investment directions as defined in the Naval S&T Strategic Plan approved by the S&T Corporate Board (Jan 2007). This strategy is based on needs and capabilities from Navy and Marine Corps guidance and input from the Naval Research Enterprise (NRE) stakeholders (including the Naval enterprises, the combatant commands, the Chief of Naval Operations (CNO), and Headquarters Marine Corps). It provides the vision and key objectives for the essential science and technology efforts that will enable the continued supremacy of U.S. Naval forces in the 21st century. The Strategy focuses and aligns Naval S&T with Naval missions and future capability needs that address the complex challenges presented by both rising peer competitors and irregular/asymmetric warfare.

This program supports the development and demonstration of field medical equipment, diagnostic capabilities and treatments; technologies to improve warfighter safety and to enhance personnel performance under adverse conditions; and systems to prevent occupational injury and disease in hazardous, deployment environments. Navy investment in these areas is essential because Navy/USMC mission needs are not adequately addressed by the civilian sector or other Federal agencies. For example, civilian emergency medicine does not address casualty stabilization during long transit times to definitive care. The National Institutes of Health (NIH) focuses on the basic science of disease processes and not product development. Programs are coordinated with other Services through the Armed Services Biomedical Research Evaluation Management (ASBREM) Committee to prevent duplication of effort. This project funds the Force Health Protection program a Future Naval Capability (FNC) that will provide technology options for future Navy and Marine Corps capabilities and supports the "Sea Warrior" component of the Naval Transformation Roadmap, medical logistics aspects of "Sea Basing" and expeditionary force medical support associated with "Sea Strike".

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

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B. Program Change Summary (\$ in Millions)

	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>
Previous President's Budget	49.418	12.129	12.641	
Current BES/President's Budget	50.670	53.766	18.609	
Total Adjustments	1.252	41.637	5.968	
Congressional Program Reductions		-0.146		
Congressional Rescissions				
Total Congressional Increases		41.800		
Total Reprogrammings	2.272			
SBIR/STTR Transfer	-1.020			
Program Adjustments			5.962	
Rate/Misc Adjustments		-0.017	0.006	

Congressional Increase Details (\$ in Millions)

Project: 9999, AMELIORATION OF HEARING LOSS

Project: 9999, C. W. BILL YOUNG BONE MARROW DONOR RECRUITMENT AND RESEARCH PROGRAM

Project: 9999, HIGH SPEED BLOOD AND FLUID TRANSFUSION EQUIPMENT

Project: 9999, INTEGRATED WARFIGHTER BIODEFENSE PROGRAM

Project: 9999, NEURAL CONTROL OF EXTERNAL DEVICES (ARTIFICIAL LIMB MOVEMENT)

Project: 9999, REPAIR OF MASSIVE TISSUE LOSS AND AMPUTATION THROUGH COMPOSITE TISSUE ALLOTRANSPLANTATION

	FY 2008	FY 2009
Project: 9999, AMELIORATION OF HEARING LOSS	0.000	0.997
Project: 9999, C. W. BILL YOUNG BONE MARROW DONOR RECRUITMENT AND RESEARCH PROGRAM	30.514	31.415
Project: 9999, HIGH SPEED BLOOD AND FLUID TRANSFUSION EQUIPMENT	0.000	3.092
Project: 9999, INTEGRATED WARFIGHTER BIODEFENSE PROGRAM	2.314	2.992
Project: 9999, NEURAL CONTROL OF EXTERNAL DEVICES (ARTIFICIAL LIMB MOVEMENT)	0.772	0.000
Project: 9999, REPAIR OF MASSIVE TISSUE LOSS AND AMPUTATION THROUGH COMPOSITE TISSUE ALLOTRANSPLANTATION	2.892	3.191

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

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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
2914: WARFIGHTER PROTECTION ADVANCED TECHNOLOGY	14.178	12.079	18.609						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program supports the development and demonstration of field medical equipment, diagnostic capabilities and treatments; technologies to improve warfighter safety and to enhance personnel performance under adverse conditions; and systems to prevent occupational injury and disease in hazardous, deployment environments. Navy investment in these areas is essential because Navy/USMC mission needs are not adequately addressed by the civilian sector or other Federal agencies. For example, civilian emergency medicine does not address casualty stabilization during long transit times to definitive care. The NIH focuses on the basic science of disease processes and not product development. Programs are coordinated with other Services through the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee to prevent duplication of effort. This project funds the Force Health Protection program a Future Naval Capability (FNC) that will provide technology options for future Navy and Marine Corps capabilities and supports the "Sea Warrior" component of the Naval Transformation Roadmap, medical logistics aspects of "Sea Basing" and expeditionary force medical support associated with "Sea Strike".

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

	FY 2008	FY 2009	FY 2010	FY 2011
BONE MARROW RESEARCH The goal of the Bone Marrow program is to test, develop and evaluate military contingency capabilities in order to improve care for casualties of marrow-toxic substances. This program will research efforts to refine and correctly identify matched marrow and matched platelets for casualties as well as military members with medical injuries including combat trauma. FY 2010 initiate and complete the Bone Marrow Research. <i>FY 2010 Plans:</i> - Initiate and complete the Bone Marrow Research.	0.000	0.000	0.986	
CASUALTY CARE AND MANAGEMENT	6.652	7.127	5.323	

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
<p>The goal of Casualty Care and Management is to maximize the continuum of care with lifesaving interventions as close to the battlespace as possible. This is in an increasingly lethal battlespace, with reduced infrastructure and logistics.</p> <p>The increase from FY 2008 to FY 2009 is due to the transition of some efforts from the Healthy and Fit Force activity (this PE) into the Casualty Care and Management activity. The decrease in funding from FY 2009 to FY 2010 is due to the completion of the Medical Planning Tools and Traumatic Brain Injury FNC efforts in this area, and the realignment of the Post Traumatic Stress Disorder Treatment FNC efforts into the Casualty Prevention activity of this PE.</p> <p><i>FY 2008 Accomplishments:</i></p> <ul style="list-style-type: none"> - Continued development of casualty management tools and data. These tools and data are required by combat, material development and medical planners to evaluate the effectiveness of personal protection systems and healthcare support services, and to project future material and training requirements. - Continued preclinical study to evaluate use of vasopressin to manage traumatic brain injury (TBI). - Continued clinical trial evaluating safety of vasopressin for treatment of trauma patients. - Continued efforts to develop a novel fibrinogen-like bandage using nanotechnology for hemorrhage control (internal and external). - Continued efforts to develop prototype technology for closed-loop resuscitation for USMC En Route Care system. - Continued remaining project to enhance medical planning tools for combat developers. - Completed development of an effective analgesic for controlling severe pain that does not have the adverse effects of morphine (cardiorespiratory depression, sedation) or the addiction potential. Naval casualties are expected to "stay in the fight" as long as possible and the use of morphine removes that capability. - Completed study to determine safety of hypotensive resuscitation in casualties in presence of hemorrhagic shock and hypothermia. - Completed identification of Food and Drug Administration (FDA) approved products as well as new development of novel therapeutics that protect against the induction of hemorrhagic shock. A reduced need for resuscitation fluids would significantly reduce the medical logistical burden for Naval forces. 				

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
<ul style="list-style-type: none"> - Initiated study to demonstrate selectivity/specificity of biomarkers for mild & moderate TBI in appropriate pre-clinical model. - Initiated efforts to develop advanced technologies for First Responders. - Initiated efforts to develop advanced technologies to support the Forward Resuscitative Surgical System/ Expeditionary Resuscitative Surgical Systems (FRSS/ERSS). - Initiated program to develop advanced technologies to support En Route Care of casualties. <p><i>FY 2009 Plans:</i></p> <ul style="list-style-type: none"> - Continue all efforts of FY 2008 less those noted as completed above. - Continue program to examine comorbidity of traumatic brain injury. (Continuation of similar effort funded in Healthy and Fit Force activity of this PE prior to FY 2009.) - Complete preclinical study to evaluate use of vasopressin to manage TBI. - Complete development of casualty management tools and data. These tools and data are required by combat, material development and medical planners to evaluate the effectiveness of personal protection systems and healthcare support services, and to project future material and training requirements. - Complete efforts to develop prototype technology for closed-loop resuscitation for USMC En Route Care system. - Complete Breacher study efforts at the Dynamic Entry School/Quantico a component of the FRSS/ERSS. - Initiate efforts to treat the psychological manifestations' of combat stress. - Initiate Non-Surgical Control of Internal Bleeding program. - Initiate pharmacologic research studies to support an FDA Investigational New Drug (IND) application. - Initiate Automated Casualty Care System Development program. <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> - Continue all efforts of FY 2009 less those noted as completed above. - Initiate research to enhance force readiness by mitigating the impact of environmental stressors. - Initiate development of emerging technologies that support delivery of approved FNC enabling capabilities structured to close operational capability gaps in warfighter sustainment. 				
CASUALTY PREVENTION	6.185	4.952	6.527	

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
<p>Casualty Prevention includes protecting the warfighter from environmental, occupational and battlefield threats.</p> <p>The increase in funding from FY 2009 to FY 2010 is due to the initiation of emerging technologies that support delivery of approved FNC enabling capabilities and to increased investments for Post Traumatic Stress Disorder Treatment FNC efforts in this activity.</p> <p><i>FY 2008 Accomplishments:</i></p> <ul style="list-style-type: none"> - Completed development of improved hearing protection systems, educational tools, and pharmacological treatment paradigms to protect and restore hearing in Warfighters exposed to high-noise environments. - Completed research into understanding neurological and cognitive effects of blast injuries. There is an increasing amount of information related to the correlation of closed-head blast injury with cognitive and motor deficits as well as long term emotional problems such as Post-Traumatic Stress Disorder (PTSD). - Initiated efforts to mitigate the effects of environmental and other threats to health. - Initiated efforts to reduce operational injuries. <p><i>FY 2009 Plans:</i></p> <ul style="list-style-type: none"> - Continue all efforts of FY 2008 less those noted as completed above. - Continue research to determine the safety and efficacy of perfluorocarbons in treating decompression sickness and arterial gas embolism. (Realigned from Healthy and Fit Force activity of this PE after 2008.) - Initiate development of tools to prevent psychological stress and PTSD. (Continuation of similar effort funded in Healthy and Fit Force activity of this PE prior to FY 2009.) <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> - Continue all efforts of FY 2009. - Complete research to determine the safety and efficacy of perfluorocarbons in treating decompression sickness and arterial gas embolism. - Initiate research to enhance force readiness by mitigating the impact of environmental stressors. 				

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Initiate development of Human Injury and Treatment (HIT) model to assess personnel survivability, optimal personnel treatment, and restoration of ship operational capabilities.				
<p>HEALTHY AND FIT FORCE</p> <p>Healthy and Fit Force efforts preserve health and enhance fitness of ready forces against physical and psychological threats through the continuum of peace and war.</p> <p>This effort moves to Casualty Care and Management and Casualty Prevention activities in this PE in FY 2009.</p> <p><i>FY 2008 Accomplishments:</i></p> <ul style="list-style-type: none"> - Completed evaluations of pharmacological compounds to combat motion-sickness in aviators without causing fatigue or cognitive deficit. - Completed program for creating strategies to “inoculate” Warfighters against the effects of combat related stressors. - Completed Virtual Reality Therapy Tools for acute PTSD. - Completed development of decision support tools for controlling disease and non-battle injuries on Navy vessels. - Initiated program to examine comorbidity of traumatic brain injury. (This effort moves to Casualty Care and Management activity in this PE in FY 2009.) - Initiated research to determine the safety and efficacy of perfluorocarbons in treating decompression sickness and arterial gas embolism. (This effort moves to Casualty Prevention activity in this PE in FY 2009) 	1.341	0.000	0.000	
<p>NAVAL NOISE-INDUCED HEARING LOSS (NIHL)</p> <p>The goal of this program is to reduce the incidence of NIHL by nearly 100%. This program employs a total systems engineering approach that includes advancements in medical technology, jet engine physics, personal protective equipments, and mitigation analyses. Similar/related research was previously funded within this PE.</p>	0.000	0.000	5.773	

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
<p>The increase of funds in FY 2010 are in support of applied research efforts.</p> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> - Initiate advanced research in medical prevention and treatment of NIHL and tinnitus (ringing in the ears). - Initiate advanced research to reduce noise at the source, i.e. jet engine quieting and flight deck noise reduction. - Initiate advanced research to improve personal protective equipment technology. - Initiate advanced research to study the incidence and susceptibility of NIHL and tinnitus, and to evaluate mitigation strategies. 				

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C. Other Program Funding Summary (\$ in Millions)										
	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014</u>	<u>FY 2015</u>	Cost To Complete	Total Cost
PE 0601153N/Defense Research Sciences									Continuing	Continuing
PE 0602202F/Human Effectiveness Applied Research									Continuing	Continuing
PE 0602235N/Common Picture Applied Research									Continuing	Continuing
PE 0602236N/Warfighter Sustainment Applied Research									Continuing	Continuing
PE 0602716A/Human Factors Engineering Technology									Continuing	Continuing
PE 0602785A/Manpower/ Personnel/Training Technology									Continuing	Continuing
PE 0602787A/Medical Technology									Continuing	Continuing
PE 0603002A/Medical Advanced Technology									Continuing	Continuing
PE 0603231F/Crew Systems and Personnel Protection Technology									Continuing	Continuing
PE 0603236N/Warfighter Sustainment Advanced Technology									Continuing	Continuing
PE 0604771N/Medical Development									Continuing	Continuing

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D. Acquisition Strategy Not applicable.		
E. Performance Metrics Efforts within this PE are measured at two levels. At the lower level, each is measured against technical and financial milestones on a monthly basis. Annually, each project is reviewed in depth for technical and transition performance by the Chief of Naval Research (CNR).		

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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
9999: CONGRESSIONAL PLUS-UPS	36.492	41.687	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

N/A

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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