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FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2

DATE: Feb 2004

BA: 03 PROGRAM ELEMENT: 0603729N
PROGRAM ELEMENT TITLE: Warfighter Protection Advanced Technology

COST: (Dollars in Thousands)

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R2715 DISTRIBUTED SIMULATION WARFIGHTING CONCEPTS	3,238	0	0	0	0	0	0
R2914 WARFIGHTER PROTECTION ADVANCED TECHNOLOGY	12,769	11,308	16,719	18,637	19,812	20,240	20,673
R9030 ORGAN TRANSFER TECHNOLOGY	2,896	2,472	0	0	0	0	0
R9031 DAMAGE CONTROL OPERATIONAL CONCEPTS	0	1,682	0	0	0	0	0
R9161 MEDICAL DATA MINING TOOL (MDMT)	5,163	0	0	0	0	0	0
R9162 NAVY MEDICAL SYSTEM CONFIGURATION AND TESTBED/NURSING TELEHEALTH RESEARCH PROGRAM	7,739	8,406	0	0	0	0	0
R9163 PORTABLE STERILE WATER PRODUCTION DEVICE	952	2,967	0	0	0	0	0
R9335 CENTER FOR COLLABORATION IN MEDICAL MODELING & SIMULATION	0	1,483	0	0	0	0	0
Totals	32,757	28,318	16,719	18,637	19,812	20,240	20,673

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, or the logistics of providing self/buddy-carried, life saving technologies for massive battlefield wounds. The National Institute of Health (NIH) focuses on disease processes, not product demonstration. The Army fights linearly, with echeloned health support in trace, and has dedicated medevac

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platforms. Naval forces operate asymmetrically, evacuate casualties using multi-role platforms (not pre-configured or supplied for medical use), and fight up to 200 nautical miles from their support bases. This project funds the Warfighter Protection Future Naval Capability (WPFNC) 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.

PROGRAM CHANGE SUMMARY:

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
FY 2004-2005 President's Budget Submission	39,058	11,435	12,362
Cong. Resciissions/Adjustments/Undist.Reductions	0	-317	0
Congressional Actions	0	17,200	0
Execution Adjustments	-5,478	0	0
Inflation Savings	0	0	-40
SBIR Assessment	-823	0	0
Technical Adjustments	0	0	4,397
FY 2005 President's Budget Submission	32,757	28,318	16,719

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not Applicable
Schedule: Not Applicable

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BA: 03 PROGRAM ELEMENT: 0603729N PROGRAM ELEMENT TITLE: Warfighter Protection Advanced Technology
PROJECT NUMBER: R2914 PROJECT TITLE: Warfighter Protection Advanced Technology

COST: (Dollars in Thousands)

Project & Title	FY 2003 Number Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R2914 Warfighter Protection Adv Tech	12,769	11,308	16,719	18,637	19,812	20,240	20,673

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the development and demonstration of advanced technologies for improved warfighter protection medical equipment, techniques, technologies and systems. These technologies enhance Navy and Marine Corps capabilities in Casualty Care and Management, Casualty Prevention, and maintenance of a Healthy and Fit Force. Within the Naval Transformation Roadmap, this investment protects the critical "Sea Warrior" component of the overarching "FORCEnet" operating architecture. Additionally, this project supports the transformational capability, Enhanced Sea-borne Positioning of Assets (medical logistics) within "Sea Basing" and the Ship-To-Objective Maneuver capability (expeditionary force medical support) within "Sea Strike".

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2003	FY 2004	FY 2005
Casualty Care and Management	5,746	5,088	7,523

The goal of Casualty Care and Management is to maximize the continuum of care with lifesaving interventions as far forward as possible, in an increasingly lethal battlespace, with reduced infrastructure and logistics.

FY 2003 Accomplishments:

- Completed development of a portable hand-held ultrasound device to be used for diagnostic application by the corpsman in the field. This device was fielded (COMSIXTHFLT) and purchased for clinical use by USAF Special Forces Command.
- Terminated development of a device utilizing high intensity focused ultrasound (HIFU) technology for hemostasis (control of bleeding).
- Terminated development of a dressing that controls bleeding and incorporates an antimicrobial agent.
- Transferred testing and evaluation of the shipboard medical grade water system under field conditions to

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project R9163 (Congressional add).

- Continued development of drugs and devices for treatment of uncontrolled hemorrhage in the far forward battlefield. Provided to Naval forces, QuikClot, which is a hemorrhage-stopping agent credited with saving multiple lives during Operation Iraqi Freedom. Blood loss is the leading cause of preventable death in combat.
- Continued development of resuscitation fluids that enhance cardiovascular function and tissue perfusion. Improved resuscitation fluids are needed to prevent casualty deaths from shock and associated tissue/organ damage.
- Continued development of medical devices to monitor patient status and identify casualties in danger of progressing into hemorrhagic shock.
- Continued identification of Food and Drug Administration (FDA) approved or novel therapeutics that protect against the induction of hemorrhagic shock and thereby alleviate the need for resuscitative fluids. A reduced need for resuscitative fluids would significantly reduce the medical logistical burden for Naval forces.
- Continued development of the casualty management coordination system. These 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.

FY 2004 Plans:

- Continue development of drugs and devices for treatment of uncontrolled hemorrhage in the far forward battlefield.
- Continue development of resuscitation fluids that enhance cardiovascular function and tissue perfusion.
- Continue development of medical devices to monitor patient status and identify casualties in danger of progressing into hemorrhagic shock.
- Continue identification of Food and Drug Administration (FDA) approved or novel therapeutics that protect against the induction of hemorrhagic shock.
- Continue development of the casualty management coordination system.
- Initiate 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.

FY 2005 Plans:

- Continue development of drugs and devices for treatment of uncontrolled hemorrhage in the far forward battlefield.
- Continue development of resuscitation fluids that enhance cardiovascular function and tissue perfusion.

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- Continue development of medical devices to monitor patient status and identify casualties in danger of progressing into hemorrhagic shock.
- Continue identification of FDA approved or novel therapeutics that protect against the induction of hemorrhagic shock.
- Continue development of the casualty management coordination system.
- Continue development of an effective analgesic for controlling severe pain.
- Initiate development of a joint services resuscitation fluid. This coordinated Army/Navy project will develop a next-generation resuscitation fluid to support far forward medical care.

	FY 2003	FY 2004	FY 2005
Casualty Prevention	6,001	5,314	7,858

Casualty Prevention includes enhancing warfighter situation awareness and countering threats from disease, battle and non-battle injuries.

FY 2003 Accomplishments:

- Terminated efforts on enhanced maintenance of spatial disorientation.
- Terminated development of an environmentally controlled litter system.
- Continued development of the capability to detect laser events and provide daytime protection of aircrews from laser attacks. No laser protection or detection methods exist for daytime protection of aircrew from tunable frequency lasers.
- Continued development of protective personal gear and physiologic monitoring ensembles to reduce injury risk and enhance personnel safety in operational settings that include: shipboard firefighting and damage control operations, warm and cold water operations for Navy divers, and extreme aircraft operations (g-force, altitude and heat protection).
- Continued development of standards for personal armor systems to protect against "behind armor blunt trauma" (BABT).

FY 2004 Plans:

- Complete development of standards for personal armor systems for blunt trauma (BABT).
- Continue development of the capability to detect laser events and provide daytime protection of aircrews from laser attacks.
- Continue development of protective personal gear and physiologic monitoring ensembles to reduce injury risk and enhance personnel safety in operational settings.

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- Initiate development of tools to predict injury related to thermobaric blast.

FY 2005 Plans:

- Complete laser event detection/protection effort.
- Continue development of the capability to detect laser events and provide daytime protection of aircrews from laser attacks. Initiate laboratory testing of candidate agile laser eye protection systems.
- Continue development of protective personal gear and physiologic monitoring ensembles to reduce injury risk and enhance personnel safety in operational settings. Initiate horizontal accelerator and flight testing of Airborne Integrated Life Support System.
- Continue development of tools to predict injury related to thermobaric blast.
- Initiate effort to develop noninvasive diagnostic tests for diseases. This effort will provide a rapid test for exposure to tuberculosis and verification of the immunization status of individuals receiving the anthrax vaccine series.

	FY 2003	FY 2004	FY 2005
Healthy and Fit Force	1,022	906	1,338

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.

FY 2003 Accomplishments:

- Continued identification of factors and causes of injury in shipboard scenarios, and development of exposure guidelines and engineering specifications for preventing mechanical shock-related injury.
- Continued development of improved hearing protection systems for personnel supporting aircraft operations.

FY 2004 Plans:

- Continue identification of factors and causes of injury in shipboard scenarios, and development of exposure guidelines and engineering specifications for preventing mechanical shock-related injury.
- Continue development of improved hearing protection systems for personnel supporting aircraft operations.

FY 2005 Plans:

- Continue identification of factors and causes of injury in shipboard scenarios, and development of exposure guidelines and engineering specifications for preventing mechanical shock-related injury. Initiate human

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centrifuge testing to validate guidelines and specifications.

- Continue development of improved hearing protection systems for personnel supporting aircraft operations.
Initiate flight testing of hearing protection systems.

C. OTHER PROGRAM FUNDING SUMMARY:

RDT&E:

NAVY RELATED RDT&E:

PE 0601153N Defense Research Sciences
PE 0602235N Common Picture Applied Research
PE 0602236N Warfighter Sustainment Applied Research
PE 0603236N Warfighter Sustainment Advanced Technology
PE 0604771N Medical Development

NON-NAVY RELATED RDT&E:

PE 0602716A Human Factors Engineering Technology
PE 0602785A Manpower, Personnel and Training Technology
PE 0602787A Medical Technology
PE 0603002A Medical Advanced Technology
PE 0602202F Human Effectiveness Applied Research
PE 0603231F Crew Systems and Personnel Protection Technology

D. ACQUISITION STRATEGY: Not applicable.

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PROJECT NUMBER: Various PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

R2715	FY 2003	FY 2004
DISTRIBUTED SIMULATION WARFIGHTING CONCEPTS	3,238	0

This effort examined warfighting concepts and weapon system design concepts and their relationship to future aircraft carrier designs.

R9030	FY 2003	FY 2004
ORGAN TRANSFER TECHNOLOGY	2,896	2,472

This effort addresses the induction of immune tolerance to transplanted foreign tissues through the use of immunological reagents. If the technology is effective, the transplant patient would not require subsequent immunosuppressive drug therapy, in contrast to the currently required life-long immunosuppressive drug therapy, nor would the patient's immune system be impaired.

R9031	FY 2003	FY 2004
DAMAGE CONTROL OPERATIONAL CONCEPTS	0	1,682

This effort develops and demonstrates a brassboard prototype of the Prognostics Framework (PF) approach to supplement, enhance and improve the Automated Hull Damage and Stability Monitoring System (AHDSMS). The enhanced AHDSMS provides visibility of real-time assessment of ship hull damage and compartment flooding which allows for optimization and prioritization of flooding control and stability response strategies.

R9161	FY 2003	FY 2004
MEDICAL DATA MINING TOOL	5,163	0

This effort initiated the development of medical data mining tools to advance the Navy's medical surveillance capability. The work focused on integrating the Medical Data Surveillance System (MDSS) with the DoD Health Care enterprise system, Theater Medical Information Project (TMIP).

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R9162	FY 2003	FY 2004
NAVY MEDICAL SYSTEM CONFIGURATION AND TESTBED	7,739	5,885

This effort establishes a capability for expediting the delivery of emerging technologies from Navy Medical R&D efforts to DoD healthcare. Specifically, force health protection technologies developed by the Naval Health Research Center are undergoing further development and systems integration prior to actual field-testing.

R9162	FY 2003	FY 2004
NURSING TELEHEALTH RESEARCH PROGRAM	0 *	2,521

This effort establishes an international consortium of military medical technicians, educators, researchers, and domestic rural health care providers working to design and deliver a nurse training curriculum to remote international locations with special emphasis on emergency medical training and humanitarian relief. (*Appropriated in FY03 in Defense Health Program RDT&E, \$2,550).

R9163	FY 2003	FY 2004
PORTABLE STERILE WATER PRODUCTION DEVICE	952	2,967

This effort focuses on advanced testing of a lightweight, man-portable, disposable device for producing water suitable for injection from potable water in the field.

R9335	FY 2003	FY 2004
CENTER FOR COLLABORATION IN MEDICAL MODELING AND SIMULATION	0	1,483

This project focuses on establishing a National Center for Medical Modeling and Simulation to integrate military, government, and industrial modeling and simulation technologies for use in medical and surgical training and in the delivery of medical services. Efforts include: integrating simulations into medical and surgical training; developing medical preparedness and response simulations; developing methods for on-site and distributed continuing education for medical and health professionals; determining paths for more rapid transition of medical modeling and simulation research into commercial products and programs; developing pre-operative and operative assistance for surgeons performing tissue and organ reconstruction; and facilitating civilian and military cooperation in the application of medical simulations to improve both routine and

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emergency response capabilities.

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