FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2006
Exhibit R-2

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N
PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

COST: (Dollars in Thousands)

Project Number & Title	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
WARFIGHTER SUSTAINMENT APPLIED RESEARCH	118,949	110,056	89,964	77,398	82,173	79,727	83,946

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This PE supports the Future Naval Capabilities (FNCs) of Expeditionary Logistics, Littoral Combat/Power Projection, and Total Ownership Cost (TOC) Reduction; and innovation-based efforts that will provide technology options for future Navy and Marine Corps capabilities. Efforts focus on manpower and personnel; naval systems training; expeditionary logistics; littoral combat and power projection capabilities; advanced naval materials; medical technologies; environmental quality; biocentric technologies; high speed sealift; cost reduction technologies; and seabasing technologies. Within the Naval Transformation Roadmap, this investment supports eight transformational capabilities within the "Sea Strike", "Sea Shield", and "Sea Basing" operational concepts; the critical human system, "Sea Warrior"; and Naval business efficiencies within "Sea Enterprise."

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

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N
PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

B. PROGRAM CHANGE SUMMARY:

	FY 2005	FY 2006	FY 2007
FY 2006 President's Budget Submission	131,030	82,856	97,000
Congressional Action	0	28,450	0
Congressional Undistributed Reductions/Rescissions	-101	-1,250	0
Execution Adjustments	-9,649	0	0
FY 2005 SBIR	-2,333	0	0
Program Adjustments	2	0	-5,069
Program Realignment	0	0	-2,335
Rate Adjustments	0	0	368
FY 2007 President's Budget Submission	118,949	110,056	89,964

PROGRAM CHANGE SUMMARY EXPLANATION:
Technical: Not applicable.

Schedule: Not applicable.

C. OTHER PROGRAM FUNDING SUMMARY:
Not applicable.

D. ACQUISITION STRATEGY:
Not applicable.

E. PERFORMANCE METRICS:
As discussed in Section A, there are a significant number of varied efforts within this PE. For the most part these efforts support the Future Naval Capabilities (FNC) program of the Office of Naval Research. As such, each is monitored at two levels. At the lowest level each is measured against both technical and financial milestones on a monthly basis. Annually each FNC and its projects are reviewed in depth for technical and transition performance by the Chief of Naval Research against goals which have been approved by the Navy’s senior flag level Technical Oversight Group.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N
PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

The FNC managers conduct routine site visits to performing organizations to assess programmatic and technical progress and most projects conduct an annual or bi-annual review by an independent board of visitors who assess the level and quality of the Science and Technology (S&T) basis for the project.

Additionally, most of these projects support specific Defense Technology Objectives (DTO) established by the Director, Defense Research and Engineering (DDR&E). These receive a bi-annual technical and programmatic review under the Technology Area Review Assessment program conducted by DDR&E.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

COST: (Dollars in Thousands)

Project Number & Title	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
WARFIGHTER SUSTAINMENT APPLIED RESEARCH	52,621	71,106	89,964	77,398	82,173	79,727	83,946

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the Future Naval Capabilities (FNCs) of Expeditionary Logistics, Littoral Combat/Power Projection, and Total Ownership Cost (TOC) Reduction; and innovation-based efforts that will provide technology options for future Navy and Marine Corps capabilities. Efforts focus on manpower and personnel; naval systems training; expeditionary logistics; littoral combat and power projection capabilities; advanced naval materials; medical technologies; environmental quality; biocentric technologies; high speed sealift; cost reduction technologies; and Sea Basing technologies. Within the Naval Transformation Roadmap, this investment supports eight transformational capabilities within the "Sea Strike", "Sea Shield", and "Sea Basing" operational concepts; the critical human system, "Sea Warrior"; and Naval business efficiencies within "Sea Enterprise."

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2005	FY 2006	FY 2007
MANPOWER/PERSONNEL	2,273	2,247	2,435

These technologies enhance the Navy's ability to select, assign, and manage its people by responding to a variety of requirements, including: managing the force efficiently and maintaining readiness with fewer people and smaller budgets; providing warfighting capabilities optimized for low-intensity conflict and littoral warfare; and operating and maintaining increasingly sophisticated weapons systems while managing individual workload and supporting optimal manning.

The increase in funding from FY 2006 to FY 2007 is due to integration of products that complete in FY 2007.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

FY 2005 Accomplishments:

- Completed Cognitive Agents Technologies reliability testing and optimization of member/command agents.
- Completed Land Attack Training Tool analysis and design.
- Completed delivery of optimized microfluidic components for miniaturizing and automating medical diagnostic procedures for personnel protection. (NRL)
- Initiated applicant cultures and values program to test the practicality and predictive validity of socialization measures for selection into the military.
- Initiated modeling integration of forecasting/trend analysis models across the personnel enterprise.

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Complete modeling of forecasting/trend analysis models within functions of the personnel enterprise.
- Initiate modeling integration methodologies for sailor/marine members’ cognitive agents and distribution and assignment system portal.
- Initiate low-velocity impact and shaker table dynamic internal response mapping with new anatomical features and sensor suite GelMan thoracic surrogate. (NRL)

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete applicant cultures and values program to assess the practicality and predictive validity of socialization measures for selection into the military.
- Complete modeling integration methodologies for sailor/marine members’ cognitive agents and distribution and assignment system portal.

	FY 2005	FY 2006	FY 2007
TRAINING TECHNOLOGIES	8,703	9,428	14,491

Training technologies enhance the Navy's ability to train effectively and affordably in classroom settings, in simulated environments, and while deployed, and to operate effectively in the complex, high-stress, information-rich and ambiguous environments of modern warfare. Technology development responds to a variety of requirements, including providing more affordable approaches to training and skill maintenance.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

The increase in funding from FY 2005 to FY 2006 is due to rebalancing of funds and intiation of planned projects. The increase from FY 2006 to FY 2007 is due to work necessary to successfully complete research efforts that were delayed in FY 2006.

FY 2005 Accomplishments:

- Continued development of optimized strategies for performance aiding and training.
- Continued training aid research for Close Quarters Battle (team training), immersive interaction applications, and Computer Generated Forces (CGF) for improving training effectiveness in Virtual Environments.
- Continued task to develop multi-agent based architectures for modeling human behavior.
- Continued program on intelligent agents for objective-based training.
- Continued CGF task aimed at improved techniques for human cognitive and behavioral modeling.
- Continued work on effective feedback in artificially intelligent tutoring for dynamic task environments such as anti-air warfare, instrument flying and other characteristic military tasks.
– Completed task to improve the capability of CGF as instructional agents.
- Completed physics tutor project, including associated studies of tutoring strategies.
- Completed development of measures to link shared cognition with team performance.
- Completed research to support students (of intelligence analysis) in becoming independent users of broad-based information.
- Initiated a systematic program of applied research addressing unanswered questions regarding effective instructional strategies in artificially intelligent tutoring.
- Initiated work on software tools to facilitate building natural language tutorial dialogs for artificially intelligent tutoring.
- Initiated task to apply recently developed learning techniques that can be used in a model interacting with its application environment to extend or refine its knowledge base and behavioral competence.
- Initiated and completed development of user design guidelines related to mobile computing for maintenance and report detailing hardware tools to support mobile maintenance.
- Initiated and completed development of Super Manual related tools and interim report on Super Manual progress and testing results.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

FY 2006 Plans:

- Continue development of immersive interaction technologies for team training application
- Continue research in Computer Generated Forces (CGF) for improving training effectiveness in Virtual Environments.
- Continue task to develop multi-agent based architectures for modeling human behavior, improve techniques for human cognitive and behavioral modeling, and create highly realistic simulated teammates.
- Complete training aid research for Close Quarters Battle (team training).
- Complete program in intelligent agents for objective-based training
- Initiate field studies and user tests evaluating new features and job aiding tools.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete development of optimized strategies for performance aiding and training.
- Complete development of immersive interaction technologies for team training application
- Complete research in Computer Generated Forces (CGF) for improving training effectiveness in Virtual Environments.
- Complete task to develop multi-agent based architectures for modeling human behavior, improve techniques for human cognitive and behavioral modeling, and create highly realistic simulated teammates.
- Complete modeling of the integration of different military domains into a distributed Virtual Technologies and Environments Full Spectrum Combat simulation.

	FY 2005	FY 2006	FY 2007
LITTORAL COMBAT / POWER PROJECTION	6,062	10,738	9,977

This activity provides technologies which enhance the ability of the Navy-Marine Corps team to assure access and sustained operations in the littorals. The Littoral Combat/Power Projection FNC considers all the critical functions of warfighting: command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR); fires; maneuver; sustainment; and force protection. This activity includes Urban, Asymmetric Operations-related to FNC Enabling Capabilities, such as advanced fires coordination and interoperability, hostile fire detection/response, and network monitoring, management and secure wireless technology.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

FY 2006 funding level reflects the alignment of funding to continue and complete FNC efforts previously funded in other PEs.

FY 2005 Accomplishments:

- Continued efforts for laser safety testing of Streak Tube Imaging Light Detection and Ranging (LIDAR) technology being developed as part of the obstacle avoidance system for the Expeditionary Fighting Vehicle (EFV). (FY 05 funded by PE 0602131M)
- Continued development of advanced weapons materials technology for use in artillery and mortar systems. (Concurrently funded by PE 0602131M).
- Continued development of Organic Light Emitting Diode (OLED) display technology for shipboard and Marine use. (Previous effort funded by PE 0602131M; concurrent effort funded by PE 0602782N; FY 2006 funding by PE 0602782N)
- Initiated development of improved lightweight fire control systems interface technologies.
- Initiated development of landmine countermeasure insensitive munitions technology. (Concurrent effort funded by PE 0602131M)
- Initiated program to develop oxygen, water vapor and temperature measurement capability for safety during littoral combat (NRL).

FY 2006 Plans:

- Continue all efforts of FY 2005.
- Continue development of advanced weapons materials technology for use in artillery and mortar systems. (FY 2007 effort funded by PE 0602131M)
- Continue development of light weight fire control systems interface technologies. (FY 2007 effort funded by PE 0603640M)
- Continue development of advanced fires coordination and interoperability to enable MAGTF/Joint fires. (Previous effort funded by PE 0602131M)
- Continue development of network monitoring and management tools technology. (Previous efforts funded by PE 0602131M)
- Continue development of secure mobile network/secure wireless LAN technology. (Previous efforts funded by PE 0602131M)
- Complete development and transition innovative relays Beyond-Line-of-Sight (BLOS) in the areas of wideband

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

communications and advanced modular systems. (Previous efforts funded by PE 0602131M)

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Continue development of hostile fire detection and counterfire technology (Gunslinger). (Previous efforts funded by PE 0602131M)
- Initiate development of advanced naval fires technology spiral 1.
- Initiate development of improvised explosive device (IED) mitigation technology spiral 2.

	FY 2005	FY 2006	FY 2007
ADVANCED NAVAL MATERIALS	6,983	11,693	7,237

Advanced Naval Materials efforts include: advanced, high-performance materials; processes to reduce weight and cost; and enhanced sonar transducers.

FY 2005 Accomplishments:

– Continued development of ultra light, blast resistant composite structural materials.
– Continued low cost phthalonitrile based organic resin material and hybrid composite development with improved fire resistance; and process development of fiber reinforced foam material.
- Continued development of fiber-optic Bragg grating demodulation system for structural health monitoring of ships and submarines.
– Continued development of friction stir welding of steels; high strength, high toughness, affordable ship steels for weight reduction; weld processing of stainless steel; and improved welding consumables for affordable construction of reduced weight, survivable ships.
– Continued development of multifunctional transducer material, high-force high-strain actuators; and evaluation of advanced transducer single crystal high strain materials.
– Continued multi-laser-processing technique development for the fabrication of ultra hard materials for wear resistance applications.
- Continued development of advanced, cost-efficient joining of titanium for >25% weight reduction of large seaborne structures.
- Continued development of advanced composites and polymers with fire resistance for ship structures

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

– Continued development of nanotube reinforced composite materials for the improvement of their out-of-plane mechanical properties.
– Continued development of acceptance testing methodologies for advanced transducer single-crystal high-strain materials and definition of standardized materials properties and composition ranges.
– Continued fabrication studies of pultruded sandwich structures for low cost ship structural applications.
– Completed development of modeling and process control for reduced weld distortion and residual stresses.
– Completed development of weld processing of stainless steel for non-magnetic, damage tolerant ships.
– Completed development of multifunctional transducer materials.
– Completed development of phthalonitrile based organic resin material and hybrid composite with improved fire resistance.
- Initiated friction stir welding development for control of residual stresses and elimination of distortion in naval steels.
– Initiated development of cellular metal blast resistant panels.
– Initiated development of cellular metal ballistic armor.
- Initiated development of compositional tuning of single-crystal, high-strain transducer materials, for specialized naval system applications.
– Initiated development of cavitation resistant ship rudder coatings based on FY 2004 shipboard coating study.
- Initiated catalyst development and grew vertically aligned carbon nanotubes in existing gated silicon post structures in a DC plasma CVD reactor, obtaining stable field emission and 1 ampere/cm2 current densities. (NRL)
- Initiated program to optimize a-c loss and mechanical reliability of second generation high temperature superconductors for future naval power applications. (NRL)

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Initiate marine titanium alloy design and development, exploiting anticipated cost reductions for high performance, reduced maintenance naval applications.
- Initiate development of continuous single wall carbon nanotube composite materials for next generation air and naval platforms.

FY 2007 Plans:

- Continue all efforts of FY 2006.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

– Complete development of high-force, high-strain actuators.
– Complete fabrication studies of pultruded sandwich for low cost, high performance ship structural applications.
– Complete cellular metal blast resistant materials with full section ship hull blast evaluation.
– Initiate development of innovative sonar transducers based on high-strain, high-coupling piezoelectric single crystals.
– Initiate development of integrated structural composites with blast resistance, manufacturing technologies, and low-cost organic resins with improved fire resistance.
- Initiate development of novel processing technologies for increasing the fatigue strength and corrosion resistance of weldments for ship structures with reduced weight and maintenance requirements.
- Initiate development of solid-state growth methods for making high-strain, high-coupling piezoelectric single crystals.

	FY 2005	FY 2006	FY 2007
MEDICAL TECHNOLOGIES	10,483	7,867	9,991

This program supports the development 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 Institutes of Health (NIH) focuses on the basic science of disease processes, not applied research related to development. Programs are complementary with those of the Army and are coordinated through the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee to prevent duplication of effort. This project funds the Force Health Protection Future Capability (FHPFC) Program (formerly titled Warfighter Protection Future Naval Capability) 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".

FY 2005 Accomplishments:

- Continued developing tests for confirmation of vaccination and diagnosis of diseases and toxin exposure.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

Goal is to create noninvasive tests that produce results in minutes, not hours or days.
- Continued work on shipboard injury, exposure guidelines, and engineering specifications for preventing shock-related injury. Reducing neck, spine and musculoskeletal injury will increase force readiness.
- Continued work on hearing protection systems and on improved treatment for restoring Noise-Induced Hearing Loss (NIHL). Compensation for hearing loss currently costs DoN over $70M per year.
- Continued studies on decompression sickness, to include novel approaches to the prevention, detection and treatment of decompression sickness, particularly by non-recompressive methods.
- Continued efforts to develop prophylactic agents preventing hyperbaric oxygen toxicity. Prolonged exposure to hyperbaric oxygen can be toxic to lungs, nervous system and eyes.
- Continued work on predictive measures for oxygen-induced seizures in Navy and Marine Corps divers. Real-time prediction of hyperbaric oxygen-induced seizures will improve operational capability.
- Continued efforts to assess the impact of thermal (i.e., heat and cold) stress on operational performance. Underwater thermal extremes can affect diver performance and alter risk of incurring decompression sickness.
- Completed study of drugs and devices for uncontrolled hemorrhage.
- Completed characterization of therapeutics to protect against hemorrhagic shock. Such protection would reduce the need for resuscitative fluids and relieve the logistical burden for Naval forces.
- Completed study of analgesics without adverse effects.
- Completed efforts on resuscitative fluids to increase cardiovascular function and tissue perfusion in combat casualties.
- Completed applied research into medical devices for casualty monitoring.
- Completed validation of microbial array at the Centers for Disease Control and transition to an advanced concept technology demonstration (NRL).
- Initiated study to characterize therapeutic interventions in wound management. Focus is to reduce morbidity resulting in a quicker return to duty and a reduction in medical resource requirements.
- Initiated studies related to optimization of diver performance. Operational performance in the undersea environment can be hampered by a variety of environmental stressors.
- Initiated research to treat and prevent attrition due to combat related psychological stress and acute Post-Traumatic Stress Disorder (PTSD).

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Complete work on predictive measures for oxygen-induced seizures in Navy and Marine Corps divers.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete studies related to optimization of diver performance.
- Complete work on shipboard injury, exposure guidelines, and engineering specifications for preventing shock-related injury. Reducing neck, spine and musculoskeletal injury will increase force readiness.

	FY 2005	FY 2006	FY 2007
ENVIRONMENTAL QUALITY	2,358	3,213	3,308

Environmental Quality technologies enable sustained world-wide Navy operations in compliance with all local, state, regional, national and international laws, regulations and agreements, and support the Navy Transformational Roadmap in the areas of Sea Basing, Sea Strike and Sea Warrior. Compliant operations enable training evolutions and exercises that are critical for maintaining readiness.

FY 2005 Accomplishments:

- Continued efforts in evaluation of novel membranes, development and testing of environmentally benign marine antifouling (AF) coatings, air and noise pollution abatement technologies, automated underwater hull surface preparation, development and testing of new aqueous film forming foam (AFFF) formulations (without perfluoroctanylsulfonates, PFOS), studies to accurately determine input of copper into harbor environments from Navy ship hull coatings, preliminary studies for development of robotic hull bug technology for prevention of fouling.
- Completed development of non-chlorofluorocarbon/hydrochlorofluorocarbon (CFC/HCFC) cooling methodologies, Navy ship ballast water exchange efficacy evaluation, and feasibility study of bioreactor startup package.
- Completed natural product biofouling repellent synthesis task, completed initial environmental dynamic marine exposure testing for coating, completed coatings formulation task. (NRL)

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Complete evaluation of porous inserts for noise and air emissions reduction from gas turbine engines and emission control technologies for control of emissions from marine diesels.
– Initiate development of new, advanced, environmentally benign AF/AC coating systems for Navy platforms, far-

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

term noise and air pollution emissions abatement technology for unrestricted operations, and alternative torch technologies for shipboard plasma waste treatment, and multiple aqueous metal ion sensor to incorporate copper sensor developed in SERDP program for planned combined transition to ESTCP.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete evaluation of AFFF without PFOS and studies to determine copper input into harbors from Navy ship hull coatings.
– Initiate development of advanced environmentally sound technologies for shipboard waste treatment and pollution abatement systems.

	FY 2005	FY 2006	FY 2007
BIOCENTRIC TECHNOLOGIES	0	1,062	1,055

Biocentric technologies provide novel solutions for naval needs based upon the applications of biosensors, biomaterials, and bioprocesses. This program brings the power of modern biotechnology methods to bear on naval problems and reduces the technical risk associated with basic research advances by conducting demo-centric technology development programs. Topic areas include development of acoustic sensors based on biomimetics; microbial engineering to produce high-value naval materials such as energetic compounds, and marine mammal vaccines and immunodiagnostics.

This effort initiates in FY 2006.

FY 2005 Accomplishments:

- Continued small aperture biomimetic bidirectional acoustic sensor effort, but transfer from Code 341 Biocentric Technology (PE 0602236N) to Code 321 Maritime Sensing (PE0602747N) in FY06.
- Continued development of reagentless sensors for weapons of mass destruction/explosives, using engineered protein based sensors for detection of toxins (e.g., ricin, domoic acid) and explosives (e.g., TNT, RDX). (Funded in PE 0602435N in FY05 because of lack of funding in 0602236N; will move to PE 0602123N in FY06 after realignment of activities in PE 0602123N as this presents the best match for this program’s activity)

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

FY 2006 Plans:

- Continue efforts in marine mammal vaccine and immunobiological diagnostics development (originally funded in FY 2004 in PE 0602123N; Congressional funding used in FY 2005; best suited to 0602236N given scope of work)
- Continue engineered microbial synthesis and processing of energetic materials (moved from PE 0602435N in FY 2006 because of realignment of activities within that PE in FY 2006)
-Initiate development of innovative naval biosensors, biomaterials, and bioprocess technology.

FY 2007 Plans:

- Continue all efforts of FY 2006.
- Continue efforts on marine mammal diagnostics (detection of viruses, fungi and bacteria).
- Continue effort on naval biosensor to detect brain structures and blood vessels through skull bones.

	FY 2005	FY 2006	FY 2007
HIGH SPEED SEALIFT	9,150	10,455	12,474

Fast sealift continues to be a military priority. However, friction drag reduction is increasingly essential for long-range, large-payload Navy ships to travel at high speeds (50+ knots). The High Speed Sealift effort focuses on the design of a hydrodynamic experimentation capability to resolve questions pertaining to full-scale implementation of friction drag reduction procedures.

FY 2005 Accomplishments:

- Initiated procurement of major components required to modify the existing flow facility at the William B. Morgan Large Cavitation Channel (LCC) operated by Naval Surface Warfare Center-Carderock Division in Memphis, Tennessee. These components will be used to provide increased flows and pressures within the LCC to meet the goals of high-speed drag reduction experimentation.
- Initiated development of experimentation test plans, management procedures, and system requirements.
- Initiated high-speed sea lift system studies.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

FY 2006 Plans:

- Continue all efforts of FY 2005.
- Complete procurement of major components required to modify the existing flow facility (LCC)in Memphis, TN.
- Initiate and complete installation of major components in the LCC.
- Initiate and complete testing and certification of performance.
- Initiate designs for large-scale testing of technologies, concepts, and systems.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete development of experimentation test plans, management procedures, and system requirements.
- Complete high-speed sealift system studies.
- Complete designs for large-scale testing of technologies, concepts, and systems.
- Initiate and complete large-scale assembly and testing of technologies, concepts, and systems.
- Initiate and complete experiments for technologies, concepts and systems.

	FY 2005	FY 2006	FY 2007
COST REDUCTION TECHNOLOGIES	6,609	8,129	10,181

Cost Reduction Technology efforts include: ultrareliable materials and sensors to reduce cost by enabling condition-based and zero maintenance capabilities; and airframe and ship corrosion efforts for advanced cost effective prevention and life cycle management technologies. This activity includes the Navy's share of the Versatile, Affordable, Advanced Turbine Engine (VAATE) program. Investments under this activity were previously reported under Advanced Naval Materials. This new activity breakout provides improved clarification of the overall investment scope.

The increase in funding from FY 2005 to FY 2006 is due to an increased scope of efforts. The increase in funding between FY 2006 and FY 2007 is due to completion of various efforts.

FY 2005 Accomplishments:

- Continued development of durable new materials and thermal barrier coatings for naval gas turbine hot

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

sections; environmental barrier coatings for ceramics/composites for gas turbine engines; new thermal barrier technology; materials and processes for high temperature turbine disks; and higher temperature aluminum alloys for propulsion.
- Continued development of road test methodology and coating test metrics for the USMC vehicles; longer-life, enhanced-performance self-priming topcoat and corrosion preventive compounds (CPC) for aircraft; and spectral imaging/thermography technology.
- Continued the development of single coat corrosion control coatings for fuel tanks.
- Continued the development of single coat corrosion control coatings for collect/hold/transfer (CHT) tanks.
- Continued development of ultrasonic imaging NDI for aircraft.
_ Continued development of magneto resistive NDI for aircraft.
- Completed development of a next generation composite propeller distributed structural health monitoring system.
- Completed longer-life, enhanced-performance, self-priming top coat and CPC.
- Completed the development of single coat corrosion control coatings for potable water tanks.
- Completed development of spectral imaging/thermographic (Nondestructive Inspection) NDI for aircraft.
- Initiated development of ceramic matrix composite turbine blades for gas turbine engines.
- Initiated development of calcium magnesium aluminum-silicate (CMAS) resistant thermal barrier coatings.
- Initiated development of portable, real-time, NDE(non-destructive examination)/NDI technology for heat damage detection in composite materials.
- Initiated development of nickel-aluminized thermal barrier coating which will be phase compatible with turbine blade alloys.

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Continue development of cavitation resistant ship rudder coatings transitioned from FY 2005 Advanced Naval Materials.
- Continue NDE/NDI technologies for damage detection in composite materials
- Complete the development of single coat corrosion control coatings for fuel tanks.
- Complete development of magneto resistive NDI for aircraft.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

- Complete development of durable new materials and thermal barrier coatings for naval gas turbine hot sections; environmental barrier coatings for ceramics/composites for gas turbine engines; new thermal barrier technology; materials and processes for high temperature turbine disks; and higher temperature aluminum alloys for propulsion.
- Complete development of calcium magnesium aluminum-silicate (CMAS) resistant thermal barrier coatings.
- Complete development of nickel-aluminized thermal barrier coating which will be phase compatible with turbine blade alloys.
- Complete development of standardized road test methodology and coating test metrics for the USMC vehicles.
- Complete development of single coat corrosion control coatings for CHT ship tank.
- Complete development of ultrasonic imaging NDI for aircraft.
- Complete NDE/NDI technologies for damage detection in composite materials.
- Initiate development of a revolutionary new thermal spray technology for repair and refurbishment of worn and/or corroded components on ships, aircraft and combat vehicles.

	FY 2005	FY 2006	FY 2007
SEA BASING TECHNOLOGIES	0	6,274	18,815

This activity includes development and advancement of technologies to support Seabasing Future Navy Capabiliy enablers and the future development of Sea Basing innovative naval prototypes. Areas include: advanced hull forms, propulsion, and materials to support high speed, shallow draft, and beachable connectors; innovative connector interface and transfer technologies; advanced wave and position sensors and autonomous controls to support vessel to vessel interfaces; and autonomous conveyance systems to support automated and integrated warehousing.

This effort initiates in FY 2006. The increase from FY 2006 and FY 2007 is due to the continuation of FY 2006 efforts for an entire year as well as initiation of new Seabasing efforts.

FY 2005 Accomplishments:

- No funds were budgeted for this activity in FY 2005.

FY 2006 Plans:

- Initiate evaluation of seabasing technologies that may include predictive, wave motion mitigation &

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

compensation systems; advanced lightweight materials (cellular, inflatable, composite, etc); automated contamination sensing, wash-down, collection, and processing systems; automated cargo tracking, storage, and movement technologies; advanced wave and position sensors coupled to autonomous controls to support vessel to vessel interfaces.
- Initiate multiple innovative naval prototype projects for preliminary designs, simulations, and model tests for prototype proof-of-concept with potential topics of: Personnel transfer At-sea, Sea Base Intermediate Transfer Station, Sea Base Connector Test Craft (T-CRAFT)), Automated Cargo and Weapons Transfer, and other novel concepts.
- Initiate process for awards lasting less than 12 months, design reviews/evaluations resulting in down-selection for Phase II awards for detailed prototype designs and head-to-head model testing.

FY 2007 Plans:

- Continue all efforts of FY2006 less those completed in FY2006.
- Complete evaluation of potential new Seabasing INP efforts.
- Initiate scale-up efforts of FY 2006 programs for detailed design, construction, and land-based testing of the selected prototypes.
- Initiate research of emerging technologies in the area of Skin Friction Drag Reduction.

CONGRESSIONAL PLUS-UPS:

	FY 2005	FY 2006
ADVANCED FOULING AND CORROSION CONTROL COATINGS	5,403	5,600

FY 2005 - In this effort, combinatorial research techniques were used to synthesize new polymers and formulated libraries of coatings to be evaluated for ship hull antifouling, fouling release, or anticorrosion coatings.

FY 2006 - This effort supports advanced fouling and corrosion control coatings research.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

	FY 2005	FY 2006
ADVANCED MAGNETIC RESONANCE IMAGING	0	500

This effort supports advanced magnetic resonance imaging research.

	FY 2005	FY 2006
ADVANCED MATERIALS AND INTELLIGENT PROCESSING CENTER	2,033	0

This effort developed the underlying science of Liquid Injection Processing when a multitude of material constituents are present.

	FY 2005	FY 2006
ADVANCED REINFORCED MATERIALS AND NEW MATERIALS RESEARCH FOR AIRCRAFT TIRES	963	0

This effort supported Advanced Reinforced Materials and New Materials Research for aircraft tires.

	FY 2005	FY 2006
AGILE VACCINOLOGY	2,970	0

This effort explored different genetic vaccine modalities (e.g., viral vectored, viral replicons, plasmid) for response in vitro and in animal models of infection for anthrax, plague, malaria, and dengue. Emphasis was on discovery of novel antigenic sequences in the pathogens and rapid, flexible deign of corresponding vaccines which ultimately enabled DOD to rapidly respond to threats posed by emerging pathogens or biowarfare agents.

	FY 2005	FY 2006
ALUMINUM FABRICATION UTILIZING THREE-DIMENSIONAL PRINTING	1,350	0

This effort defined, developed and demonstrated a three dimensional printing (3DP) system on specific DOD applications. This effort advanced the potential use of the 3DP process and its unique capabilities for the manufacture of components in an e-manufacturing environment.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

	FY 2005	FY 2006
ATMOSPHERIC WATER HARVESTING	963	1,000

FY 2005 - This effort developed and delivered prototype water harvesting device(s) to condense water from the air. The device is self-powered, using photovoltaics to gather power from the sun and store it in batteries. The battery power was used to operate various mechanical and/or solid state cooling devices to condense vapor from the air. This device could have dual use (commercial) applicability.

FY 2006 - This effort supports atmospheric water harvesting research.

	FY 2005	FY 2006
AUTOMATED LANGUAGE TRANSLATION TOOLS FOR INTELLIGENCE COMMUNITY	0	1,000

This effort supports automatic language translation tools for intelligence community research.

	FY 2005	FY 2006
AUTOMATED VIDEO THREAT RECOGNITION	0	1,800

This effort supports automated video threat recognition research.

	FY 2005	FY 2006
BIOSENSOR FOR DEFENSE APPLICATIONS	1,928	1,500

FY 2005 - This effort developed advanced technology for autonomous sensor platforms in marine environments.

FY 2006 - This effort supports biosensor for defense applications research.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

	FY 2005	FY 2006
COATING AND POLYMERIC FILMS FOR NAVAL APPLICATIONS	965	0

This effort included the development of natural polymers based on filled soybean protein/vegetable oil derivatives for possible use in a chaff cartridge; the preparation of polylactic acid/cellulose acetate blends that optimize softening point and biodegradability considerations; and the development of novel exfoliated clay reinforcements to provide physical and thermal reinforcement and a mechanism to encourage biodegradation in high salt environments.

	FY 2005	FY 2006
CONTINUATION OF HYDRATE DESALINATION TECHNOLOGY	2,027	1,700

FY 2005 - This effort developed a novel method to desalinate seawater using gas hydrate crystals.

FY 2006 - This effort supports the continuation of hydrate desalination technology research.

	FY 2005	FY 2006
CUTTING TOOLS FOR AEROSPACE MATERIALS	3,278	0

This effort created a virtual, collaborative environment connecting the military, industrial, and academic materials communities to support state-of-the-art aerospace materials research focused on Naval aviation issues. The primary focus was to develop and construct the user base and to integrate a consortium of partners into an electronic web-based portal.

	FY 2005	FY 2006
DURABILITY OF COMPOSITE MATERIALS AND STRUCTURES	1,254	1,250

FY 2005 - This effort established the durability characteristics of composite materials used in Naval structures in the severe marine environment.

FY 2006 - This effort supports durability of composite materials and structures research.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

	FY 2005	FY 2006
ENVIRONMENTAL MICRO-BIOLOGICAL ENERGY HARVESTING	0	1,200

This effort supports environmental micro-biological energy harvesting research.

	FY 2005	FY 2006
FRICTION STIR WELDING	0	1,200

This effort supports friction stir welding research.

	FY 2005	FY 2006
HIGH PERFORMANCE LONG LASTING LO MATERIALS FOR NAVY STEALTH APPLICATIONS	2,893	0

This project developed high performance, long lasting conductive polymeric materials for Naval aircraft gap sealants for stealth applications. Conductive gap sealants based on polymers loaded with carbon nanotube offered the potential for significant improvements over current technology, specifically in weight-savings, increased absorption/deflection potential, service life, and cost.

	FY 2005	FY 2006
HUMAN SYSTEMS TECHNOLOGY	963	0

This effort supported research on advanced visual displays, advanced tactile displays, and improved algorithms for knowledge discovery and data mining from large data sets.

	FY 2005	FY 2006
INTEGRATED WMD DETECTION AND COLLECTION SYSTEM	968	0

This effort supported Integrated WMD Detection and Collection System.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

	FY 2005	FY 2006
INTELLIGENT PROCESSING OF MULTIFUNCTIONAL COMPOSITE MATERIALS	0	1,500

This effort supports intelligent processing of multifunctional composite materials research.

	FY 2005	FY 2006
MARINE MAMMAL RESEARCH PROGRAM	1,063	0

An assessment of dolphin hearing sensitivity using electrophysiological measurements was conducted.

	FY 2005	FY 2006
MAST-MOUNTED IN PORT VIDEO FORCE PROTECTION SURVEILANCE SYSTEM	0	3,400

This effort supports Smast-mounted in port video force protection surveilance system research.

	FY 2005	FY 2006
METHANE DESALINATION SYSTEMS	0	1,000

This effort supports methane desalinations systems research research.

	FY 2005	FY 2006
MICROSYSTEM FUZE/SAFE AND ARM DEVICES	964	0

This effort developed and implemented advanced micro-system testing, characterization, and modeling and design to establish and ensure reliability standards specifically for application in Micro Electrical Mechanical Systems (MEMS) based fuzing, safety, and arming components and packaging.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

	FY 2005	FY 2006
MOTION COUPLED VISUAL ENVIRONMENT (MOCOVE) FOR MOTION SICKNESS RELIEF	963	0

This effort supported Motion Coupled Visual Environment (MOCOVE) for motion Sickness Relief (transferred from Title IV-DHP). It also initiated a study to test technologies for reducing the impact of motion sickness on performance in environments such as land-based Command and Control vehicles and shipboard Command Information Centers.

	FY 2005	FY 2006
MULTIFUNCTION COMPOSITES FOR NEXT NAVY SEAFRAMES	0	2,500

This effort supports multifunction composites for nexy Navy seaframes research.

	FY 2005	FY 2006
NATIONAL CENTER FOR ADVANCED SECURE SYSTEMS RESEARCH	0	2,800

This effort supports National Center for Advanced Secure Systems Research.

	FY 2005	FY 2006
NATIONAL UNMANNED UNDERSEA VEHICLE (UUV) TEST AND EVALUATION CENTER (NUTEC)	5,766	0

This effort provided UUV test capability upgrades, for use by all Navy UUV programs, in four areas: (1) UUV ground-truth measurement and sensor stimulation upgrades, including tracking and target systems; (2) UUV test data management and communication systems, including remote site testing capabilities and UUV analysis systems; (3) UUV launch and recovery support systems and portable in-water test support equipment; and (4) environmental monitoring systems and upgrades to the NUTEC Test Environment Assessment Laboratory and to support UUV testing in mission-specific environments.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

	FY 2005	FY 2006
NAVAL TRAINING, PERFORMANCE, AND EXPERTISE	963	0

The primary objectives were: 1) disseminate current and create new state-of the-art "how to" handbooks to train and educate sailors and Marines, and 2) continue research on the use of expertise models to enhance situational awareness of combat pilots under stress.

	FY 2005	FY 2006
NONLINEAR SYSTEMS RESEARCH CENTER	1,260	1,000

FY 2005 - This effort supported damage detection which developed a novel device to detect damage in materials using chaotic forcing and fiber optic readout to discover changes in a material’s response. The MEMS gyros array effort was a working on-chip surface emitting laser technology for displacement sensing of a MEMS gyro array.

FY 2006- This effort supports the Nonlinear Systems Research Center.

	FY 2005	FY 2006
NOVEL MATERIALS SYNTHESIS AND CHARACTERIZATION	3,376	0

This effort supported complete assembly and integration of pulse power device; established and integrated time-resolved instrumentation, including multipoint visar and spectroscopic capabilities, to the pulsed power device; conducted and implemented target chamber design; developed analytical methods to analyze wave profile data obtained from experimental measurements; conducted material characterization experiments to determine the time scales and loading conditions associated with the initiation of mechanically stimulated metal/polymer reactions, material properties of novel structural and reactive materials; and extended the characterization capabilities to very high dynamic loading regimes.

	FY 2005	FY 2006
OPTIMIZING ADAPTIVE WARRIOR PERFORMANCE	2,026	1,700

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

FY 2005 - This effort procured dedicated magnetic resonance imaging system and conducted training and initial studies.

FY 2006 - This effort supports optimizing adaptive warrior performance research.

	FY 2005	FY 2006
PARTNERSHIP SIMULATION LABORATORY FOR MILITARY HEALTH PROFESSIONS AND FIRST RESPONDER EDUCATION	2,412	1,000

FY 2005 - This effort delivered an entire authoring system for subject matter experts to create high-fidelity and persistent world simulation content that was pedagogically structured for deep and rapid experience-based learning.

FY 2006 - This effort supports the Partnership Simulation Laboratory for Military Health Professions and First Responder Education.

	FY 2005	FY 2006
POSS BIOFILM PACKAGING MATERIALS	0	1,000

This effort supports POSS biofilm packaging materials research.

	FY 2005	FY 2006
RAPID AND HIGHLY SENSITIVE DETECTION OF BIOWARFARE AGENTS	1,156	0

This effort supported semi-conducting metal oxide (SMO)-based sensors that were modified to increase sensitivity and reduce power requirements. These portable, low cost sensors were evaluated with toxicant stimulants to assess their theoretical parts-per-billion sensitivity.

	FY 2005	FY 2006
RAPID DETECTION OF BIOWARFARE AGENTS IN WATER	2,026	1,500

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

FY 2005 - This effort developed technologies for rapid detection of, and response to, airborne biological and chemical agents in battlefield and key urban environments. This work supported the development of antibody-based and DNA-based detection systems in a ChemArray Chip (impedance imaging sensing system), and of data/models to predict the proper placement of real-time sensors in indoor environments for antiterrorism applications.

FY 2006 - This effort supports rapid detection of biowarefare agents in water research.

	FY 2005	FY 2006
SENSORNET	11,574	0

This effort supported the continued design and development of an information technology infrastructure toward realization of a national comprehensive incident management system. The ultimate goal of this incident management system, called SensorNet, was to provide near-real-time, reliable and secure, collection, processing, management, and dissemination of sensor data (weather, radiological, chemical and video).

	FY 2005	FY 2006
TITANIUM MATRIX COMPOSITES	1,543	0

This effort identified bulk amorphous titanium alloy compositions with high glass formability and developed melting, casting and processing techniques to optimize alloy microstructure.

	FY 2005	FY 2006
TITANIUM-BASED ALLOY FOR ADVANCED AEROSPACE APPLICATIONS	1,350	1,300

FY 2005 - This effort identified bulk amorphous titanium alloy compositions with high glass formability and developed melting, casting and processing techniques to optimize alloy microstructure. Microstructural optimization required controlled devitrification of crystalline regions within an amorphous matrix and processing to achieve the balance of microstructural features required for the increased ductility necessary in naval aircraft applications. This class of alloys could offer very high strength to weight ratios for use as structural members in naval aircraft, if the damage tolerance of these materials can be improved significantly.

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

FY 2006 - This effort supports titanium-based alloy for advance aerospace applications research.

	FY 2005	FY 2006
TRANSPORTABLE TRANSPONDER LANDING SYSTEM	0	1,500

This effort supports transportable transponder landing system research.

	FY 2005	FY 2006
VIRTUAL CLINICAL LEARNING LAB (VCLL)	1,928	2,000

FY 2005 - This effort supported construction of an active virtual environment infrastructure using game-based technologies and development techniques to serve as the organizing framework of a platform for post/co-didactic learning and training simulations where students and practitioners in the healthcare disciplines acquire and practice critical experiential skills.

FY 2006 - This effort supports the Virtual Clinical Learning Lab.

C. OTHER PROGRAM FUNDING SUMMARY:
NAVY RELATED RDT&E:

PE 0308601N Modeling and Simulation Support
PE 0601103N University Research Initiatives
PE 0601152N In-House Laboratory Independent Research
PE 0601153N Defense Research Sciences
PE 0602123N Force Protection Applied Research
PE 0602747N Undersea Warfare Applied Research
PE 0603236N Warfighter Sustainment Advanced Technology
PE 0603512N Carrier Systems Development
PE 0603640M USMC Advanced Technology Demonstration (ATD)
PE 0603721N Environmental Protection
PE 0603724N Navy Energy Program

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

PE 0604561N SSN-21 Developments
PE 0604703N Personnel, Training, Simulation, and Human Factors
PE 0604771N Medical Development
PE 0605152N Studies and Analysis Support, Navy
PE 0708011N Industrial Preparedness

NON-NAVY RELATED RDT&E:

PE 0408042N.SEA National Defense Sealift Fund
PE 0601102A Defense Research Sciences
PE 0602105A Materials Technology
PE 0602211A Aviation Technology
PE 0602303A Missile Technology
PE 0602601A Combat Vehicle and Automotive Technology
PE 0602705A Electronics and Electronic Devices
PE 0602709A Night Vision Technology
PE 0602716A Human Factors Engineering Technology
PE 0602785A Manpower/Personnel/Training Technology
PE 0602786A Warfighter Technology
PE 0602787A Medical Technology
PE 0603002A Medical Advanced Technology
PE 0603003A Aviation Advanced Technology
PE 0601102F Defense Research Sciences
PE 0602102F Materials
PE 0602202F Human Effectiveness Applied Research
PE 0602203F Aerospace Propulsion
PE 0602204F Aerospace Sensors
PE 0602702F Command Control and Communications
PE 0603216F Aerospace Propulsion and Power Technology
PE 0603716D8Z Strategic Environmental Research Program
PE 0602712E Materials and Electronics Technology
PE 0603851D8Z Environmental Security Technical Certification Program

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602236N PROGRAM ELEMENT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH
PROJECT TITLE: WARFIGHTER SUSTAINMENT APPLIED RESEARCH

D. ACQUISITION STRATEGY:

Not applicable.