FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2004
Exhibit R-2

BA: 03 PROGRAM ELEMENT: 0603236N
PROGRAM ELEMENT TITLE: Warfighter Sustainment 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
R2915 WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY	54,866	52,531	61,103	62,693	65,333	66,690	68,117
R3008 HIGH SPEED SEALIFT VESSEL	20,400	0	0	0	0	0	0
R9021 LOW VOLUME PRODUCTION PROGRAM	2,826	0	0	0	0	0	0
R9023 COTS CARBON FIBER QUALIFICATION PROGRAM	1,433	1,978	0	0	0	0	0
R9147 DEFENSE SYSTEMS MODERNIZATION AND READINESS INITIATIVE	3,812	1,978	0	0	0	0	0
R9148 ELECTRONIC INTERCONNECTION RESEARCH AND DEVELOPMENT PROGRAM	952	3,461	0	0	0	0	0
R9149 ENERGY AND ENVIRONMENTAL TECHNOLOGY	3,255	4,203	0	0	0	0	0
R9150 INTEGRATED AIRCRAFT HEALTH / ON-LINE ELECTRO-HYDRODYNAMIC FILTER	1,625	7,132	0	0	0	0	0
R9151 WIRE CHAFFING DETECTION TECHNOLOGY	1,332	0	0	0	0	0	0
R9318 AUTOGEN	0	2,967	0	0	0	0	0
R9319 AUTOMATED CONTAINER AND CARGO HANDLING SYSTEM	0	1,978	0	0	0	0	0
R9320 EXPEDITIONARY LOGISTICS SOFTWARE DEVELOPMENT	0	989	0	0	0	0	0
R9321 EXTREME ENVIRONMENT URBAN WARFARE RESEARCH/FLIGHT HANGER DECK CLEANER IMPROVEMENTS	0	3,511	0	0	0	0	0

BA: 03 PROGRAM ELEMENT: 0603236N
PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R9323 IMPRINT	0	989	0	0	0	0	0
R9324 NAVAL MAINTENANCE MANAGEMENT	0	989	0	0	0	0	0
R9326 PHOTONIC MACHINING APPLICATIONS	0	989	0	0	0	0	0
R9327 REDUCTION OF CATAPULT POST-RETRACTION EXHAUST DISCHARGE	0	989	0	0	0	0	0
R9328 TITANIUM MATRIX COMPOSITES PROGRAM	0	1,780	0	0	0	0	0
Totals	90,501	86,464	61,103	62,693	65,333	66,690	68,117

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Warfighter Sustainment Advanced Technology supports: a) Manpower and Personnel, Training, and Readiness; b) the Future Joint Warfighting Capabilities identified by the Joint Chiefs of Staff; and c) the Future Naval Capabilities (FNC) for Total Ownership Cost, and Littoral Combat/Power Projection. It develops technologies that enable the Navy to recruit, select, classify, assign and manage its people; to train effectively and affordably in classroom settings, in simulated and actual environments and while deployed; and to effect human systems integration into weapon systems. Other technologies developed in this PE enable reduced operating costs through life-extension of legacy systems, increased efficiency of future propulsion systems and improved diagnostic tools. The Expeditionary Logistics investment addresses transformational Naval surface distribution/replenishment techniques, and improves the situational awareness of readiness and operating logistics status.

Within the Naval Transformation Roadmap, this investment supports the achievement of all the transformational capabilities of Sea Warrior and the transformational capabilities of: Ship to Objective Maneuver and Time Sensitive Strike required by Sea Strike; Littoral Sea Control and Anti-Sub Warfare required by Sea Shield; Compressed Deployment and Employment Times and Enhanced Sea-Borne Positioning of Assets required by Sea Basing; and Battlespace Integration required by FORCEnet.

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:

	FY 2003	FY 2004	FY 2005
FY 2004-2005 President's Budget Submission	96,320	54,794	56,053
Cong. Rescissions/Adjustments/Undist.Reductions	0	-971	0
Congressional Actions	0	32,650	0
Execution Adjustments	-3,954	0	0
Inflation Savings	0	0	-181
Rate Adjustments	0	-9	111
SBIR Assessment	-1,865	0	0
Technical Adjustments	0	0	5,120
FY 2005 President's Budget Submission	90,501	86,464	61,103

PROGRAM CHANGE SUMMARY EXPLANATION:
Technical: Budget change FY 2003 to FY 2004 due to completion of High Speed Sealift Vessel project. Change from FY 2004 to FY2005 due to increased core effort in Total Ownership Costs, Expeditionary Logistics, Capable Manpower, and Littoral Combat/Power Projection.

Schedule: Not applicable.

FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2004
Exhibit R-2a

BA: 03 PROGRAM ELEMENT: 0603236N PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology
PROJECT NUMBER: R2915 PROJECT TITLE: Warfighter Sustainment 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
R2915 Warfighter Sustainment Advanced Technology	54,866	52,531	61,103	62,693	65,333	66,690	68,117

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Warfighter Sustainment Advanced Technology supports: a) Manpower and Personnel, Training, and Readiness; b) the Future Joint Warfighting Capabilities identified by the Joint Chiefs of Staff; and c) the Future Naval Capabilities (FNC) Total Ownership Cost, and Littoral Combat/Power Projection. It develops technologies that enable the Navy to recruit, select, classify, assign and manage its people; to train effectively and affordably in classroom settings, in simulated and actual environments and while deployed; and to effect human systems integration into weapon systems. Other technologies developed in this project enable reduced operating costs through life-extension of legacy systems, increased efficiency of future propulsion systems and improved diagnostic tools. The Expeditionary Logistics investment addresses transformational Naval surface distribution/replenishment techniques, and improves the situational awareness of readiness and operating logistics status.

Within the Naval Transformation Roadmap, this investment supports the achievement of all the transformational capabilities of Sea Warrior and the transformational capabilities of: Ship to Objective Maneuver and Time Sensitive Strike required by Sea Strike; Littoral Sea Control and Anti-Sub Warfare required by Sea Shield; Compressed Deployment and Employment Times and Enhanced Sea-Borne Positioning of Assets required by Sea Basing; and Battlespace Integration required by FORCEnet.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2003	FY 2004	FY 2005
Manpower and Personnel Development	4,091	4,569	3,233

This activity provides Navy personnel system managers with the ability to attract and retain the right people and to place them in jobs that best use their skills, training, and experience. Application of modeling and simulation, mathematical optimization, advanced testing, statistical forecasting, information visualization, data warehousing, data cleansing, web-based knowledge management, and human performance measurement

technologies enhances Fleet readiness and reduces personnel costs.

FY 2003 Accomplishments:

• Completed Rating Identification Engine (RIDE) algorithms for matching applicant skills to jobs and Jobs and Occupational Interest in the Navy (JOIN) interest profiles which measure interests in various jobs.
• Continued Attrition Reduction Technologies, which demonstrate the use of attrition, cultural, and organizational measures between applicants/Sailors and the Navy that can be mitigated.
• Continued Distribution Incentive System, which incorporates the economic methods, business rules, and incentive structures to incentivize traditionally difficult-to-fill assignments or locations.
• Continued the Enlisted Manpower and Personnel Integrated Planning System (EMPIPS), an integration of compensation models into a decision support system and database for enlisted manpower and personnel planning.
• Initiated Non-Cognitive Measures of Personality and Social Competency related to teamwork, Navy adaptability, leadership, and job performance to be applied in personnel selection and classification.
• Initiated Career Case Manager Technologies, which integrates intelligent agents, simulation models, and statistical methods to support Sailors/Marines' career planning and decision making.
• Initiated Web Based Marketplace for Sailors and Jobs, the computational operating environment in which the command, broker, and Sailor cognitive agents will interface to distribute and assign military personnel.
• Initiated Enterprise Management System that provides near-term decision support for personnel policy and resource allocation and long-range personnel enterprise strategic planning "executive simulation."

FY 2004 Plans:

• Complete Enlisted Manpower & Personnel Integrated Planning system (EMPIPS).
• Continue focus on manpower selection and classification, career management, and personnel planning programs.

FY 2005 Plans:

• Complete Attrition Reduction Technologies metrics for screening applications at high risk of attrition.
• Complete Enterprise Management System decision tool and strategic planning "executive simulator."
• Continue focus on manpower selection and classification, career management, and personnel planning programs.

	FY 2003	FY 2004	FY 2005
Training Systems	18,547	10,778	14,397

This activity improves mission effectiveness and safety by applying both simulation and instructional technology to the design of affordable education and training methods and systems. Improved training efficiency and cost-effectiveness is achieved by applying operations research, modeling and simulation, and instructional, cognitive, and computer sciences to the logistics, development, delivery, evaluation, and execution of training.

FY 2003 Accomplishments:

- Completed development of intelligent agents for real-time distributed exercise scenario modification.
- Completed Virtual Technology and Environments (VIRTE) demonstration I, Combat Vehicles and Craft for Expeditionary Warfare.
- Completed development of Deployable Sonar Operations Training (DSOT) and developed PC-IMAT.
- Completed the development of the Synthetic Cognition for Operational Team Training (SCOTT).
- Continued distributed learning guidelines and simulation-based exercise debriefing technologies.
- Continued development of collaborative network-centric visualization systems for sensor operations and training for operators and for Officers/Tacticians.
- Continued integrating existing technologies to produce advanced surface fire support training prototype.
- Began development of human performance assessment tools in support of Navy-wide distributed learning.
- Initiated Virtual Technologies and Environments (VIRTE) Demo II, Close Quarters Battle (CQB) for Military Operations in Urban Terrain (MOUT).
- Initiated development of Battle Group Level Advanced Under Sea Warfare (USW) Visualization systems.
- Initiated task to design, test and demonstrate an expendable, buoy-based acoustic scoring system and real-time transmission of scenario-based data for Virtual At-Sea Training (VAST) between platforms.

FY 2004 Plans:

- Complete distributed learning guidelines for development of Navy courseware.
- Complete integration of existing technologies to produce an advanced fire support prototype for VAST.
- Continue focus on VIRTE Demonstration II, Battle Group Level Advanced Under Sea Warfare (USW) visualization systems, VAST, collaborative network-centric visualization systems, performance assessment tools and debriefing technologies.
- Initiate advanced technologies for Interactive Electronic Technical Manuals.
- Initiate Virtual Technologies and Environments (VIRTE) Demo III, which provides integrated virtual training

across the Full Spectrum of Combat.
• Initiate task to evaluate alternative ways to display information in the cockpit to support Naval air combat training in airborne platforms, exploiting the training capabilities offered by Virtual At Sea Training (VAST).

FY 2005 Plans:

• Complete development of human performance assessment tools for Navy-wide distributed learning.
• Continue focus on VIRTE Demonstration II and III, Battle Group Level Advanced Under Sea Warfare (USW) visualization systems, VAST, collaborative network-centric visualization systems, performance assessment tools, debriefing technologies and alternate cockpit information display evaluations.
• Initiate architecture design for integrating Naval Surface Fire Support and AirVAST into a joint operations constellation that includes cross-echelon and multi-platform training.

	FY 2003	FY 2004	FY 2005
Human Systems Integration	1,073	1,316	1,293

This effort supports the warfighter by designing affordable user-centered systems that are easy to use and train. Focus is on the application of a reusable user-centered design process to design a user interface to support user tasks, extract software requirements, and develop software design models.

FY 2003 Accomplishments:

• Completed development of a transition plan to include the products of this effort into future versions of Tactical Tomahawk Weapons Control Systems (TTWCS).
• Continued integrating Land Attack and Human-Computer Interaction (HCI) designs into a rapid prototype.
• Continued software architecture design to accommodate task-based user interface for Land Attack systems.

FY 2004 Plans:

• Continue focus on integration of Land Attack and Human-Computer Interaction (HCI) designs, and software architecture designs for Land Attack systems.

FY 2005 Plans:

• Complete integration of Land Attack task and HCI designs into the rapid prototype.

• Complete software architecture design to accommodate task-based user interface for Land Attack systems.

	FY 2003	FY 2004	FY 2005
Turbine Engine Technology - Integrated High Performance Turbine Engine Technology (IHPTET)/ Versatile Affordable Advanced Turbine Engines (VAATE)	8,670	9,024	11,113

This activity provides integration and experimental engine testing of new gas turbine engine technologies to demonstrate readiness and reduce technical risk for entering engineering development. IHPTET is a Tri-Service program in which each Service contributes established shares of Advanced Technology funding and laboratory resources to meet specified goals. This activity covers the Navy's share. The objective of VAATE, which begins in FY04, is to develop and demonstrate versatile, durable, "intelligent" engine technologies for the spectrum of legacy, pipe line, and new military aircraft, rotorcraft, missiles, and unmanned air vehicles (UAVs). The VAATE goal is 10X improvement in turbine engine affordability (capability/cost) by 2017, with an interim goal of 6X by 2010.

FY 2003 Accomplishments:

• Completed Phase II Joint Turbine Advanced Gas Generator (JTAGG) component optimization and third build of Honeywell Engine and Systems (HES) demonstrator.
• Continued the Phase II Joint Technology Demonstrator Engine (JTDE) General Electric (GE)/Allison Advanced Development Company (AADC) demonstrator engine.
• Continued the Phase III JTDE (GE/AADC and Pratt & Whitney (P&W) demonstrator engines) and demonstration of P&W and GE/AADC progress toward Phase III goals.
• Continued the Phase III (JTAGG) development and initial core test of HES demonstrator.

FY 2004 Plans:

• Continue focus on the Phase II & III JTDE (GE/AADC and P&W) demonstrator engines, Phase III JTAGG development, and core test HES demonstrator.
• Initiate VAATE Phase I: Component design and technology development to meet the VAATE Phase I goals.

FY 2005 Plans:

• Complete the Phase II JTDE (GE/AADC) demonstrator engine.
• Complete the Phase III JTDE (GE/AADC and P&W) demonstrator engines.

- Complete the Phase III JTAGG development and initial core test of HES demonstrator.
- Continue VAATE Phase I: Component design and technology development to meet VAATE Phase I goals.
- Initiate VAATE Phase I: Design, component development, integration and fabrication of Phase I demonstrator engines.

	FY 2003	FY 2004	FY 2005
Airframe/Ship Corrosion	3,776	4,808	4,918

This activity includes an integrated approach for the control of the effects of external and internal corrosion in Naval weapon systems. The work develops advanced, cost effective prevention and lifecycle management technologies. This is particularly significant to life extension for the aging fleet.

FY 2003 Accomplishments:

- Completed initial demos with ship tank coatings that exhibited promising coating properties (2 Ballast tanks of USS Whidbey Island, 1 Ballast tank of USS WASP and 1 DC Void of CVN George Washington).
- Completed a test bed design for Modular Hybrid Pier (MHP) and modules and large panel tests.
- Completed a 1st generation laboratory prototype Nondestructive Inspection (NDI) system that integrates thermography and spectral imaging into one system.
- Continued Airframe Corrosion efforts and development of coating database for USMC vehicles, advanced coatings and inhibitor applied washdown system for USMC vehicles, and aircraft Corrosion and Corrosivity Monitoring System (C2MS).
- Initiated development of single coat system for ship tanks, USMC vehicle road test methodology, and modular hybrid pier.

FY 2004 Plans:

- Complete the development of single coat systems for ship tanks (ballast tank) and C2MS for aircraft.
- Continue Airframe Corrosion efforts and development of modular hybrid piers, advanced coatings and washdown system, single coat system for ship tanks, road test methodology, and coating database.
- Initiate the development of Nondestructive Inspection (NDI) Technology for aircraft structures.

FY 2005 Plans:

- Complete development of a modular hybrid pier, single coat system for ship tanks (potable water tank), Corrosion Preventive Compounds (CPCs), and NDI technology for corrosion detection for aircraft structures.

- Continue Airframe Corrosion efforts, single coat systems for ship tanks, and road test methodology.
- Initiate the development of single coat systems for Collection-Holding-Transfer (CHT) ship tanks.
- Initiate NDI technology for heat damage detection on composite materials.

	FY 2003	FY 2004	FY 2005
Smart Wiring	2,061	526	0

Smart Wiring is a subset of the Total Ownership Cost (TOC) Future Naval Capability (FNC). Smart Wiring develops flight-qualified smart aircraft wiring system hardware and performs required flight demonstrations. Smart wiring reduces wiring maintenance man-hours, reduces wiring induced mission aborts and non-mission capable hours, and reduces in-flight electrical fires and subsequent loss of aircraft.

FY 2003 Accomplishments:

- Completed transition of Total Oil Monitoring System (TOMS) Oil Condition Monitor to Tech Solution prototype for Portable Fluid Analyzer and smart wires aircraft suitability/requirements analysis.
- Continued smart wiring hardware and software development, lab/bench test analysis, and flight test planning/hardware assessment.

FY 2004 Plans:

- Complete Smart wires flight development/test/certification. Program completes in FY04.

	FY 2003	FY 2004	FY 2005
Littoral Combat	2,997	3,564	4,901

The goal of Littoral Combat is the application of technologies to enhance the ability of the Navy/Marine Corps team to execute the naval portion of a joint campaign in the littorals. This activity considers all the critical functions of warfighting: command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR), fires, maneuver, sustainment, force protection, and training.

FY 2003 Accomplishments:

- Completed four axis stabilization algorithms enabling EX-45 Stable Gun Mount for smaller USMC craft.
- Continued development and integration of the Position Location Information (PLI) and range instrumentation

system to include After Action Review (AAR) capability.

FY 2004 Plans:

• Continue PLI update, including capability to collect azimuth.
• Initiate development of innovative relays in the areas of wideband communications between command posts and narrowband communications between maneuver elements and their headquarters.

FY 2005 Plans:

• Finalize the PLI system and demonstrate in a scheduled training exercise. Transition to acquisition.
• Complete development of innovative relays in the areas of wideband communications.
• Complete testing of the advanced weapon materials technology efforts on the Expeditionary Fires Support System (EFSS) and the light weight 155mm artillery system.
• Initiate development of a capability to rapidly generate a terrain database for use in simulations for evaluation of maneuver plans.
• Initiate testing of the advanced weapon materials technology efforts on the Expeditionary Fires Support System (EFSS) and the light weight 155mm artillery system.

	FY 2003	FY 2004	FY 2005
Strike Up/Strike Down Selective Offload Systems	3,278	7,047	5,017

This activity produces new techniques and systems to automate transfer of cargo from shipboard unload point to stowage spaces (strike down), and from stowage to offload point for ship-to-ship or shore transit (strike up) during high sea states. New technologies include linear electric drive induction motors, high-strength composites, ship-motion compensation for force control-based systems, intelligent systems, and robotics.

FY 2003 Accomplishments:

• Continued down-selection of promising technologies for carrier/logistics shipboard strike up/strike down.
• Continued mature technology transition plan with Program Executive Office (PEO) Carriers and National Defense Sealift Fund.

FY 2004 Plans:

• Continue focus on maturing technology for automated storage and retrieval for linear electric drive and

maturation of blast mitigation packaging.
• Initiate technology demonstration and testing, linked with Seapower 21 seabasing demonstrations and CVN21 aircraft carrier, for first group of matured capabilities.

FY 2005 Plans:

• Complete technology demo and testing, possibly linked with Seapower 21 seabasing demos.
• Continue technology maturation in linear electric drive with scaled demo in a lab environment.
• Begin 1/4 scale shipboard automated storage and retrieval demo in simulated relevant environment.

	FY 2003	FY 2004	FY 2005
Seabase to Shore Surface Craft	1,873	2,155	3,355

This activity improves the capability for transfer of personnel and cargo between sea base/logistics vessels and unimproved beaches during high sea states. Capabilities being developed include propulsion technologies, cargo stabilization technologies, advanced hull form technologies and fabrication of lightweight robust structures needed for sustained operations at high speed in a moderate seaway.

FY 2003 Accomplishments:

• Completed air flow studies and computational fluid dynamic studies.
• Initiated program; provided hydrodynamic modeling of a new propulsion system for the Heavy Landing Craft Air Cushioned (LCAC), addressing a 50% propulsion plant power increase in the same space.

FY 2004 Plans:

• Continue heavy lift surface transport development and the study of beachable heavy lift surface transport.

FY 2005 Plans:

• Complete design studies and conduct limited prototyping and model basin testing.
• Continue design space trade studies of speed, range, payload, beaching, and at-sea interfaces.
• Initiate technology exploration in hydrodynamic impacts and design space trade studies.

	FY 2003	FY 2004	FY 2005
Underway Replenishment/Material Transfer	937	0	0

These activities were targeted to improve current Underway Replenishment capability for the transfer of cargo between sea base/logistics vessels during high sea states, while increasing ship separation for safety. This is a key capability for indefinite sustainment of the seabase, and interoperability of the Naval task force.

FY 2003 Accomplishments:

• Completed the development of a 12K underway connected replenishment capability with focused investment in algorithm development (mathematical modeling), and responsive controls for heavy loads. Program completed in FY03.

	FY 2003	FY 2004	FY 2005
High Speed Vessel Experiments	281	0	0

This effort is for short term participation in the Joint experimentation with the High Speed Vessel. Seakeeping and Structural data were collected and analyzed.

FY 2003 Accomplishments:

• Completed data collection and analysis. Program completed in FY03.

	FY 2003	FY 2004	FY 2005
At Sea Arrival And Assembly	1,873	4,988	6,676

This effort supports the seabasing mission of marrying troops to equipment, and providing support to seaborne forces via surface distribution interfaces.

FY 2003 Accomplishments:

• Continued modeling and conducted wargame on transition process of new concept into seabasing construction.
• Initiated technology studies through hydrodynamic modeling and seaway motion analysis.

FY 2004 Plans:

• Continue investment and technology development in ship to ship securing systems and seaway cargo handling technologies.
• Initiate work in station keeping for two platforms at sea.

FY 2005 Plans:

• Complete work in station keeping and scale demonstrations in a relevant environment.
• Continue development in ship to ship securing systems and seaway cargo handling technologies.

	FY 2003	FY 2004	FY 2005
Consumption Reduction	0	1,204	4,000

This effort will provide technologies and processes for managing shipboard logistics across the spectrum of the seabased forces, to Navy and Marine Corps logistics needs. Energy production and storage, and advanced materials will form the technology foundation. Intermediate support base activities for rapid runway repair, rapid pier upgrades, and expeditionary gap crossing will be reviewed for technology enhancement opportunities.

FY 2004 Plans:

• Initiate and complete blast mitigation packaging modeling, development, testing, and evaluation.

FY 2005 Plans:

• Initiate technology exploration in advanced basing with reduced lift and manpower demands.

	FY 2003	FY 2004	FY 2005
Logistics Command and Control (C2)	4,712	2,552	2,200

Seabasing will require more robust afloat command and control for sustainment activities. Logistics must integrate with the joint task force common operating picture, and provide awareness of mission supportability and readiness at an operational and tactical level.

FY 2003 Accomplishments:

• Completed Version 2.0 of a beta software system capable of providing ashore based sustainment situational awareness, and project the status onto the legacy common operating picture.
• Continued development of Combat Service Support Tool Kit modules for Logistics Commander ashore.

FY 2004 Plans:

• Complete Combat Service Support Tool Kit software modules for the Logistics Commander ashore.
• Continue planning for software development (FY05) of the afloat component of Naval Sustainment Command and Control.

FY 2005 Plans:

• Complete Version 1.0 of a software product and conduct Beta Testing.
• Continue afloat command and control software for the joint task force command sustainment component.
• Initiate effort to address seaborne asset visibility, lift scheduling, and sustainment component.

	FY 2003	FY 2004	FY 2005
Advanced Shipboard Crane Motion System ATD	697	0	0

The Advanced Shipboard Crane Motion Control System Advanced Technology Demonstration demonstrates a crane control system that combines recent advances in nonlinear control system technologies with existing strategic Auxiliary Crane Ship electro-hydraulic cranes. This technology extends the capability for ship to lighterage transfer of expeditionary warfare logistics to at least 300 containers per day in sea state three.

FY 2003 Accomplishments:

• Completed effort and conducted at sea demonstration, during military exercises, funded by NAVSEA. Program completed in FY03.

C. OTHER PROGRAM FUNDING SUMMARY:
RDT&E:

NAVY RELATED RDT&E:
- PE 0206624M - Marine Corps Combat Services 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 0602236N - Warfighter Sustainment Applied Research
- PE 0603512N - Carrier System Development
- PE 0604703N - Manpower, Personnel, Training, Simulation, and Human Factors
- PE 0605013M – Marine Corps Information Technology Development/MOD
- PE 0605152N - Studies and Analysis Support – Navy

NON NAVY RELATED RDT&E:
- PE 0601102A - Defense Research Sciences
- PE 0602211A - Aviation Technology
- PE 0603003A - Aviation Advanced Technology
- PE 0603007A - Manpower, Personnel and Training Advanced Technology
- PE 0601102F - Defense Research Sciences
- PE 0602203F - Aerospace Propulsion
- PE 0603216F - Aerospace Propulsion and Power Technology

D. ACQUISITION STRATEGY: Not applicable.

FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2004
Exhibit R-2a
BA: 03 PROGRAM ELEMENT: 0603236N PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology
PROJECT NUMBER: R3008 PROJECT TITLE: High Speed Sealift Vessel

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R3008 High Speed Sealift Vessel	20,400	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFCATION:
The High Speed Vessel project develops technology to enable a future generation of fast ships for rapid movement of military payloads from Continental United States (CONUS) to theater as well as within theater. Speeds of up to 70 knots will be considered in the design. Increased payload fraction and reduced friction drag are key technical objectives. Technologies to be demonstrated include advanced hull forms, drag reduction, power dense propulsion, and high strength-to-weight ratio structural materials.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2003	FY 2004	FY 2005
High Speed Vessel	20,400	0	0

Within the Naval Transformation Roadmap, this investment will support the achievement of Compressed Deployment and Employment Times and Enhanced Sea-Borne Positioning of Assets required by Sea Basing.

FY 2003 Accomplishments:

• Completed hydrodynamic testing system for high speed vessels which can conduct hydrodynamic drag and lift testing at appropriate fluid velocities and evaluate potential drag reduction approaches. Program completed in FY03.

C. OTHER PROGRAM FUNDING SUMMARY:
RDT&E:

NAVY RELATED RDT&E:
PE 0601153N - Defense Research Sciences
PE 0602123N - Force Protection Applied Research
PE 0603123N - Force Protection Advanced Technology

PE 0603758N - Navy Warfighting Experiments and Demonstrations

D. ACQUISITION STRATEGY: Not applicable.

FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2004

Exhibit R-2a

BA: 03 PROGRAM ELEMENT: 0603236N PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology

PROJECT NUMBER: R9150 PROJECT TITLE:Integrated Aircraft Health/On-Line Electro-Hydrodynamic Filter

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R9150 Integrated Aircraft Health / On-Line Electro-Hydrodynamic Filter	1,625	7,132	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFCATION:

The Interactive Multisensor Analysis Training (IMAT) project is aimed at improving the preparation of operational users of undersea-warfare sensor systems. IMAT provides exploratory environments in which operators and tacticians examine the effects of change in any of the variables involved in the end-to-end sequence of emission, transmission, reflection, and detection. Sensor settings, environmental conditions and target characteristics can all be modified through a "what-if" simulation approach. The effort focuses on training technology at the battlegroup, fleet and theater level.

Note: Integrated Aircraft Health (FY 2003 $1,625, FY 2004 $2,521) and On-line Electro-Hydrodynamic Filter (FY 2004 $2,967) are discussed in the Congressional Plus-Up section.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2003	FY 2004	FY 2005
Interactive Multisensor Analysis Training (IMAT)	0	1,644	0

Interactive Multisensor Analysis Training (IMAT) project will develop improved training technologies for anti-submarine warfare (ASW) in support of Sea-Warrior, Sea-Shield, and Pacific Fleet requirements.

FY 2004 Plans:

• Initiate and complete the development and application of IMAT techniques for visualization-based training (VISTRA).

C. OTHER PROGRAM FUNDING SUMMARY:
RDT&E:

NAVY RELATED RDT&E:
PE 0206624M - Marine Corps Combat Services Support
PE 0601103N - University Research Initiatives
PE 0601152N - In-House Laboratory Independent Research
PE 0601153N - Defense Research Sciences
PE 0602236N - Warfighter Sustainment Applied Research
PE 0604703N - Manpower, Personnel, Training, Simulation, and Human Factors
PE 0605152N - Studies and Analysis Support – Navy

NON NAVY RELATED RDT&E:
PE 0601102A - Defense Research Sciences
PE 0603007A - Manpower, Personnel and Training Advanced Technology
PE 0601102F - Defense Research Sciences

D. ACQUISITION STRATEGY: Not applicable.

BA: 03 PROGRAM ELEMENT: 0603236N PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology
PROJECT NUMBER: Various PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

R9021	FY 2003	FY 2004
LOW VOLUME PRODUCTION PROGRAM	2,826	0

Developed the capability to repair massive defective parts (possibly no longer manufactured or available as spares) without the need for expensive and time-consuming reverse engineering. This could increase the life cycle and performance of expensive new parts via protective claddings using laser weld technology.

R9023	FY 2003	FY 2004
COMMERCIAL OFF THE SHELF (COTS) CARBON FIBER QUALIFICATION PROGRAM	1,433	1,978

This effort is developing a high volume manufacturing technique for production of intermediate modulus (IM) carbon fibers that will be incorporated into strong lightweight polymer composites. This material will enable the development of advanced, lightweight, long-range Navy aircraft such as the Joint Strike Fighter.

R9147	FY 2003	FY 2004
DEFENSE SYSTEMS MODERNIZATION AND READINESS INITIATIVE	3,812	1,978

Conduct systems modernization, readiness assessment and tracking in four specific focus areas Material Aging; Life Cycle Engineering & Economic Decision System; Asset Health Management; and Reliability, Availability & Maintainability Initiative. The efforts will improve the longevity of the Navy's EA6B and F14 programs, as well as the Marine Corps Light Armored Vehicle (LAV). Additionally, ONR will leverage this work as part of an ongoing conversion of an advanced seaborne craft and the forthcoming design of a fast catamaran.

R9148	FY 2003	FY 2004
FOR EMERGING/CRITICAL INTERCONNECTION TECHNOLOGIES PROGRAM (E/CIT)	952	3,461

The E/CIT serves as a focus for DoD to work with the U.S. electronic interconnection industry. The E/CIT facilitates solutions to current military problem areas as well as evaluating new leading edge design and manufacturing technologies for both future military and commercial requirements prior to adoption by printed circuit board manufacturers.

R9149	FY 2003	FY 2004
ENERGY AND ENVIRONMENTAL TECHNOLOGY	3,255	4,203

This effort conducts research into fuel cell technologies and methane hydrates. The research is conducted in partnership with the Hawaii Energy and Environmental Technology Initiative (HNEI). The design, development and application of fuel cell systems and the exploration of sea-floor mehane hydrate resources will benefit Navy specific transportation needs such as undersea sensors and remotely operated vehicle power requirements.

R9150	FY 2003	FY 2004
INTEGRATED AIRCRAFT HEALTH	1,625	2,521

This add develops data interoperability software tools, diagnostic algorithms, and processes to ensure improved affordability and safety through the application of Integrated Aircraft Health Management (IAHM) practices, applicable to both manned and unmanned aircraft.

R9150	FY 2003	FY 2004
ON-LINE ELECTRO-HYDRODYNAMIC FILTER	0	2,967

This add supports the On-line Electro-hydrodynamic filter.

R9151	FY 2003	FY 2004
WIRE CHAFFING DETECTION TECHNOLOGY	1,332	0

Decaying, aged wiring is an insidious and usually unseen problem to aircraft maintainers and operators. With most aircraft wiring hidden from view, an enabling technology to detect wiring faults prior to electrical malfunction is urgently needed. Wiring defects are most often initially manifested by chaffing, followed by cumbersome, costly and time consuming repair. To counter this reality, this program investigated, developed, demonstrated and transitioned technology to detect the onset of wire chaffing in aircraft wiring and wiring harnesses.

R9318	FY 2003	FY 2004
AUTOGEN	0	2,967

This add is to support the commercialization phase to parallelize multi-processor driven applications for next generation shipbuilding.

R9319	FY 2003	FY 2004
AUTOMATIC CONTAINER AND CARGO HANDLING SYSTEM	0	1,978

This add is to produce a scaled demonstration of a multi-point control system and mast system for cargo transfer of containers at sea, in up to sea state 5.

R9320	FY 2003	FY 2004
EXPEDITIONARY LOGISTICS SOFTWARE DEVELOPMENT	0	989

This add is to produce a working prototype of a software prognostic vehicle health monitoring system, focused on the engine and drive train, and accurately forecast readiness posture.

R9321	FY 2003	FY 2004
EXTREME ENVIRONMENT URBAN WARFARE RESEARCH	0	989

This add is to support Extreme Environment Urban Warfare Research.

R9321	FY 2003	FY 2004
FLIGHT/HANGER DECK CLEANER IMPROVEMENTS	0	2,522

This add is to develop a full scale prototype of a deck scrubber for Naval platform flight decks, suited for removing oils and exhaust without damage to the non-skid deck plate and with low environmental disposal impact.

R9323	FY 2003	FY 2004
IMPRINT	0	989

This add continues work to enhance an Army-developed IMPRINT system to support human factors engineering in large-scale Navy platforms and applications. Navy-unique stressors such as ship motion and sea sickness will be added and case studies undertaken to address application of the Navy's Systems Engineering, Acquisition and Personnel Integration (SEAPRINT) in an ongoing acquisition program.

R9324	FY 2003	FY 2004
NAVAL MAINTENANCE MANAGEMENT	0	989

The focus of this add is to streamline required maintenance and predict failures so prevention maintenance can be performed.

R9326	FY 2003	FY 2004
PHOTONIC MACHINING APPLICATIONS	0	989

This add supports Photonic Machining Applications.

R9327	FY 2003	FY 2004
REDUCTION OF CATAPULT POST-RETRACTION EXHAUST DISCHARGE	0	989

This add supports the development of a dry lubricant for aircraft carrier catapult hardware and combines this technology with the capability to wirelessly monitor the health of the components lubricated.

R9328	FY 2003	FY 2004
TITANIUM MATRIX COMPOSITES PROGRAM	0	1,780

This add is to develop a lightweight produceable composite metal for key components of the joint strike fighter, to include possible candidates of the engine and hook components.