FY 2003 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2002

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603236N
PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology

TEST (U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2001 ACTUAL	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2915 Warfighter Sustainment Advanced Technology	**	54,660	57,542	54,950	60,146	69,624	72,508	CONTINUE	CONTINUE
R3008 High Speed Vessel			25,000					0	25,000
R9021 Low Volume Production Program		3,469						0	3,469
R9022 National Center for Remanufacturing and Resource Recovery		991						0	991
R9023 Commercial Off The Shelf (COTS) Carbon Fiber Qualification Program		991						0	991
R9024 Distance Learning Information Technology (IT) Center		12,687						0	12,687
TOTAL	**	72,798	82,542	54,950	60,146	69,624	72,508	CONTINUE	CONTINUE

** The Science and Technology PEs were restructured in FY 2002. FY 2001 efforts were funded in PEs 0602122N, 0603217N 0603707N and 0603792N.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

R2915 Warfighter Sustainment Advanced Technology supports: a) the Integrated Warfare Architecture (IWAR) Support Areas for Manpower and Personnel, Training, and Readiness; b) the IWAR Mission Areas; c) the Future Joint Warfighting Capabilities identified by the Joint Chiefs of Staff; and d) the Future Naval Capabilities (FNC) for Capable Manpower, Total Ownership Cost, and Expeditionary Logistics. 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 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 improves Naval surface distribution/replenishment and the situational awareness of readiness and operating logistics status.

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603236N
PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology

R3008 The High Speed Vessel develops technology to enable a future generation of fast ships for rapid movement of military payloads from CONUS to theater as well as within theater. Speeds of up to 70 knots will be considered. Increased payload fraction and reduced friction drag are key technical objectives. Technologies to be demonstrated include advanced hull forms, drag reduction, power dense propulsion, high strength-to-weight ratio structural materials, and rapid cargo handling.

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

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within the ADVANCED TECHNOLOGY Budget Activity because it encompasses design, development, simulation, or experimental testing or prototype hardware to validate technological feasibility and concept of operations and reduce technological risk prior to initiation of a new acquisition program or transition to an ongoing acquisition program.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 2001	FY 2002	FY 2003
FY 2002 President's Submission:		57,685	
Adjustments from FY 2002 PRESBUDG:			
FFRDC		-38	
Congressional Reduction (Navy Transformation Priorities)		-2,500	
Congressional Plus Ups		18,300	
8123 Management Reform Initiative Reduction		-649	
FY 2003 President's Submission	**	72,798	82,542

** The Science and Technology PEs were restructured in FY 2002. FY 2001 efforts were funded in PEs 0602122N, 0603217N 0603707N and 0603792N.

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BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603236N
PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2001 ACTUAL	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2915 Warfighter Sustainment Advanced Technology									
TOTAL	**	54,660	57,542	54,950	60,146	69,624	72,508	CONTINUE	CONTINUE

** The Science and Technology PEs were restructured in FY 2002. FY 2001 efforts were funded in PEs 0602122N, 0603217N 0603707N and 0603792N.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This PE supports: a) the Integrated Warfare Architecture (IWAR) Support Areas for Manpower and Personnel, Training, and Readiness; b) the IWAR Mission Areas; c) the Future Joint Warfighting Capabilities identified by the Joint Chiefs of Staff; and d) the Future Naval Capabilities (FNC) for Capable Manpower, Total Ownership Cost, and Expeditionary Logistics. 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 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 improves Naval surface distribution/replenishment and the situational awareness of readiness and operating logistics status.

B. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2001 ACCOMPLISHMENTS:

- (U) ($4,280) Manpower and Personnel Development: (FY01 accomplishments were funded in PE 0603707N.)
  - (U) Initiated the Models of Navy Compensation and Personnel Behavior (MODCOMP). Conducted a comprehensive feasibility study of Bayesian estimation to predict retention behavior.
  - (U) Continued the development of the Comprehensive Officer Force Management Environment (CHROME) information management system. Completed officer loss projection model.
  - (U) Continued the development of the Enlisted Manpower and Personnel Integrated Planning System (EMPIPS). Enabled the web development of Minimal Statistical Summary Reports (MiniStats), Web Target, and Skilled Personnel Projection for Enlisted Retention (SKIPPER). Demonstrated proof of concept integration portal.

— (U) Continued the development of the Rating Identification Engine (RIDE) algorithms and the Jobs and Occupational Interest in the Navy (JOIN) interest profiles. Beta-tested RIDE classification algorithm on 400 recruits at Military Entrance Processing Station, San Diego CA.
— (U) Completed the Training Continuum and Readiness Modeling (TCARM).

• (U)($13,333) Training Systems: (FY01 accomplishments were funded in PE 0603707N.)
— (U) Initiated the development of the Deployable Sonar Operator Trainer (DSOT).
— (U) Continued development of the stand-alone training delivery system, Synthetic Cognition for Operational Team Training (SCOTT), for aviation team members.
— (U) Completed the development of prototype curriculum for the Computer Simulation Based Training System with Intelligent Tutoring Components (CSITS)
— (U) Completed the Tactical Decision Making (TDM) project.
— (U) Completed the integration and simulation components required for mission rehearsal in the single Transportable Strike/Assault Rehearsal (TSTARS) system.
— (U) Completed the integration of training technologies into the Conning Officer Virtual Environments (COVE) simulation-based application.

• (U) ($10,400) Integrated High Performance Turbine Engine Technology (IHPTET): (FY01 accomplishments were funded in PEs 0602122N and 0603217N.)
— (U) Continued the Phase II Joint Technology Demonstrator Engine (JTDE): Design and fabrication of General Electric (GE)/Allison Advanced Development Company (AADC) goal demonstrator engine.
— (U) Continued the Phase II Joint Turbine Advanced Gas Generator (JTAGG): Fabrication, assembly, instrumentation and initial testing of Honeywell Engines and Systems (HES) demonstrator engine.
— (U) Continued the Phase II Joint Expendable Turbine Engine Concepts (JETEC): Assembly, instrumentation and initial testing of both Williams International (WI) and AADC supersonic demonstrator engines.
— (U) Continued the Phase III JTDE: Design and fabrication of Pratt & Whitney (P&W) and GE/AADC demonstrator engines.
— (U) Continued the Phase III JTAGG: Design of HES/GE demonstrator engine.
— (U) Continued the Phase III JETEC: Design and fabrication of HES and AADC demonstrator engines.

• (U) ($5,100) Advanced Shipboard Crane Motion System Advanced Technology Demonstration (ATD): (FY01 accomplishments were funded in PE 0603792N.)
— (U) Initiated a pendulation control system demonstration for shipboard cranes at pierside and at anchor permitting ship-to-shore transfer of logistics through sea state three.
— (U) Continued to design, procure/fabricate the sensor and control package. Installed crane simulator/trainer for military operator training and conducted a demonstration of test ship roll simulation system.

2. (U) FY 2002 PLAN:

- (U) ($2,900) Manpower and Personnel Development:
  - (U) Initiate Attrition Reduction Technologies. Test measures and modify indices aimed at reducing attrition during the first year of service.
  - (U) Initiate Distribution Incentive System. Develop a baseline of various distribution incentive pay using simulations, experimental economics and surveys.
  - (U) Continue the development of the Rating Identification Engine (RIDE) algorithms and the Jobs and Occupational Interest in the Navy (JOIN) interest profiles.
  - (U) Continue Enlisted Manpower and Personnel Integrated Planning System (EMPIPS). Integrate the following: Minimal Statistical Summary Reports (MiniStats); Web Target; and Skilled Personnel Projection for Enlisted Retention (SKIPPER). Demonstrate a manpower and personnel planning tool as a single integrated system.
  - (U) Complete the Models of Navy Compensation and Personnel Behavior (MODCOMP). Deliver retention forecasting tool to Assistant Chief of Naval Personnel for Military Personnel Policy and Career Progression, Code N13.
  - (U) Complete the Comprehensive Officer Force Management Environment (CHROME). Deliver in-year and out-year behavioral loss models to N13.

- (U) ($17,700) Training Systems:
  - (U) Initiate the Prototype Authoring Capabilities for Developing Pedagogically Sound Advanced Distributed and Distance Learning (ADL-AUTHOR).
  - (U) Initiate the Intelligent Instructional System for Identifying and Managing Objective-Based Mentoring Partnerships (OJT - MENTOR).
  - (U) Initiate the Computer-Aided System for Supporting Fleet Personnel in Generating Measures of Performance (OJT - MEASPERF).
  - (U) Initiate the Prototype Virtual Technology/Environments for realistic Landing Craft Air Cushion (LCAC) and Advanced Amphibious Assault Vehicle (AAAV) simulators for coordination among crew for driving and fighting vehicles to maintain and enhance combat readiness (VIRTE - DEMO I).
  - (U) Initiate the Visualization of Environmental Effects on System Performance (VISTRA - ENV).
  - (U) Continue the development of the Deployable Sonar Operator Trainer (DSOT).
  - (U) Continue the development of the Synthetic Cognition for Operational Team Training (SCOTT).

- (U) ($400) Human Systems Integration:
  - (U) Initiate the development of a prototype advanced land attack weapons system interface employing human-centric design principles.
  - (U) Initiate the development of functional software requirements and Unified Modeling Language (UML) code for the Tomahawk, Land Attack, Naval Guns (TLN) human interface design.

- (U) ($10,409) Integrated High Performance Turbine EnginTechnology (IHPTET):

— (U) Continue the Phase II Joint Technology Demonstrator Engine (JTDE): Fabrication, assembly, and instrumentation of General Electric (GE)/Allison Advanced Development Company (AADC) demonstrator engine.
— (U) Continue the Phase II Joint Turbine Advanced Gas Generator (JTAGG): Component optimization and second build of Honeywell Engine and Systems (HES) demonstrator engine to meet Phase II goals.
— (U) Continue the Phase III JTDE: Design, component development, integration and fabrication of Pratt & Whitney (P&W) and GE/AADC Phase III demonstrator engines.
— (U) Continue the Phase III JTAGG: Design, component development, integration and fabrication of HES Phase III demonstrator engines.
— (U) Complete the Phase II Joint Expendable Turbine Engine Concepts (JETEC): Assembly, instrumentation and initial testing of both Williams International (WI) and AADC supersonic demonstrator engines.
— (U) Complete the Phase III JETEC: Design and fabrication of HES and AADC demonstrator engines.

- (U) ($3,144) Airframe Corrosion:

— (U) Initiate development of a single coat system for ship tanks (ballast tank).
— (U) Airframe Corrosion effort to begin.
— (U) Initiate development of a modular hybrid pier (demo hull section).
— (U) Initiate development of an advanced coating and inhibitor applied washdown system for USMC vehicles, contract award for road test facility.

- (U) ($2,494) Smart Wiring:

— (U) Initiate the development of updated requirements document for smart wiring system.
— (U) Initiate an award and execute a contract to develop safety-of-flight qualified hardware for smart wiring system. Intent is to develop and implement diagnostic wiring system for aircraft. System will detect and isolate wiring gaults with minimal off-aircraft test equipment.
— (U) Initiate a test of the Total Oil Monitoring System (TOMS) with actual lubricants from host system.
— (U) Initiate an engine stand test for the Total Oil Monitoring System-Advanced Amphibious Assault Vehicle (TOMS-AAAV) integration. Intent is to provide capability to analyze fluids onboard the vehicle as would be done at an established oil lab. Onboard analysis increases readiness, reduces maintenance cost and reduces quantity of hazardous materials requiring disposal (old oil samples).

- (U) ($15,000) Expeditionary Logistics:

— (U) Initiate shipboard strike up/down for carriers and logistics ships developing advanced weapons elevators, linear electric drive transport, omni-directional vehicle technology, conformal robots, and blast mitigation technologies for naval ammunition storage.
— (U) Initiate underway replenishment development of a 12K system including station keeping and load control technologies employing relative motion compensation, transfer load control and advanced materials.
— (U) Initiate logistic battlefield sensor array architecture to support the utilization of on-board vehicle suites to the rear area battlefield support command decision process.
— (U) Initiate the development of decision support technologies and algorithms for Logistics command and control course of action generation.
— (U) Initiate and complete participation in joint experimentation with high speed vessels, particularly supporting instrumentation and analytical performance data collection aboard a leased aluminum hull planning vessel.
— (U) Initiate and complete the FY02-07 Program Planning for surface distribution including development of metrics, exit criteria and technology risk management.

• (U) ($2,613) Advanced Shipboard Crane Motion System ATD:
— (U) Complete a pendulation control system demonstration for shipboard cranes at pierside and at anchor permitting ship-to-shore transfer of logistics through sea state three.
— (U) Complete the design, procurement/fabrication of the sensor and control package. Install crane simulator/trainer for military operator training and conduct a demonstration of test ship roll simulation system. Demonstrate pendulation control system at pierside and at anchor.

3. (U) FY 2003 PLAN:

• (U) ($4,576) Manpower and Personnel Development: This effort 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. Fleet readiness is enhanced and personnel costs reduced via technologies such as modeling and simulation, mathematical optimization, advanced testing, statistical forecasting, information visualization, data warehousing, data cleansing, web-based knowledge management, and human performance measurement.
— (U) Initiate Non-Cognitive Measures of Personality and Social Competency Related to Teamwork. Fully integrate psychometrics of measures into test plan.
— (U) Initiate Naval Job Classification Interface and integrate the Rating Identification Engine (RIDE) algorithms and the Jobs and Occupational Interest in the Navy (JOIN) interest profiles.
— (U) Initiate Career Case Manager Technologies. Baseline career milestones (promotion, training, assignment) associated with each Navy enlisted community.
— (U) Initiate Personnel Force Threat Detection System. Integrate database, statistical models and graphical user interface into decision support system.

— (U) Initiate Artificial Intelligence Data Quality Tool Set. Test data quality technologies.
— (U) Initiate Web-Based Marketplace for Sailors/Jobs. Integrate intelligent agents into prototype virtual personnel mall.
— (U) Continue Attrition Reduction Technologies. Demonstrate person-organization fit model and integrate into attrition reduction model.
— (U) Continue Distribution Incentive System: Develop incentive management prototype and analyze data associated with Sailor preference and propensities to volunteer for chronically difficult-to-fill locations and jobs.
— (U) Continue the Enlisted Manpower and Personnel Integrated Planning System (EMPIPS). Complete the decision support systems, database, and documents integration efforts in EMPIPS. Incorporate the compensation models from the Models of Navy Compensation and Personnel Behavior (MODCOMP) into EMPIPS.
— (U) Complete the Rating Identification Engine (RIDE) algorithms and the Jobs and Occupational Interest in the Navy (JOIN) interest profiles. Complete the aptitude interest model and transition algorithm to Navy Recruiting Command.

- (U) ($20,330) Training Systems: This effort improves mission effectiveness and safety by applying both simulation and instructional technology to the design of affordable education and training methods and systems. Focus is on the development and evaluation of systems to improve basic through advanced individual and team training, skill maintenance, and mission rehearsal capability. 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.

— (U) Initiate the development of Multi-platform Distributed Team Training (ADL - TEAM).
— (U) Initiate the development of Multi-media Visualization for Sensor-Operations Training (VISTRA - SENSOR).
— (U) Initiate the development of Battle Group Level Advanced Under Sea Warfare (USW) Visualization (VISTRA - BG) systems.
— (U) Continue the development of prototype Authoring Capabilities for Developing Pedagogically Sound Continue Advanced Distributed and Distance Learning (ADL - AUTHOR).
— (U) Continue the development of the Intelligent Instructional System for Identifying and Managing Continue Objective-Based Mentoring Partnerships (OJT - MENTOR).
— (U) Continue the development of Computer-Aided System for Supporting Fleet Personnel in Generating Measures of Performance (OJT - MEASPERF).
— (U) Continue the development of Visualization of Environmental Effects on System Performance (VISTRA - ENV).
— (U) Continue the development of Synthetic Cognition for Operational Team Training (SCOTT).
— (U) Complete the development of a Prototype Virtual Technology/Environments for realistic Landing Craft Air Cushion (LCAC) and Advanced Amphibious Assault Vehicle (AAAV) simulators for coordination among crew for driving and fighting vehicles to maintain and enhance combat readiness (VIRTE - DEMO I).
— (U) Complete the development of the Deployable Sonar Operator Trainer (DSOT).

- (U) ($1,192) Human Systems Integration: This effort supports the design of affordable warfighter-centered systems, organizations and jobs by applying knowledge of human capabilities, limitations and needs. Focus is on the development

of selection/training criteria, validation and the development of engineering support tools to enable human-centered design.

— (U) Continue the development of a prototype advanced land attack weapons system interface employing human-centric design principles.

— (U) Continue the development of functional software requirements and Unified Modeling Language (UML) code for the Tomahawk, Land Attack, Naval Guns (TLN) human interface design.

- (U) ($10,000) Integrated High Performance Turbine Engine Technology (IHPTET): This effort 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 of doubling thrust-to-weight ratio, halving fuel consumption by the year 2005 (relative to a 1987 baseline) and reducing acquisition and maintenance costs. Additional emphasis has been incorporated to address High Cycle Fatigue issues, which may be associated with propulsion system design system deficiencies. This project covers the Navy's share of the demonstrator engine efforts under the Department of Defense (DoD)/National Aeronautics and Space Administration (NASA) Industry IHPTET program, ensuring that Navy unique design and operational requirements are met. Full scale integrated technology demonstration is essential to validate and transition technologies from applied research through advanced development, program design review, and system development. Without technology demonstrators, system acquisition cost and schedule risk would increase to unacceptable levels or weapons systems would have degraded operational performance. The lack of technology demonstrator efforts could result in system development schedule increases of five or more years along with the associated increase in cost.

  (U) The technology sets integrated into and demonstrated in the IHPTET demonstrator engines are closely related to the system requirements for the Joint Strike Fighter (JSF), F-18E/F, Common Support Aircraft (CSA), Multi-mission Maritime Aircraft (MMA), Tactical Tomahawk, SH-60R, and other future Navy platforms, so that the transition of these high risk and high payback technologies may be effectively accomplished. In addition, IHPTET technologies can transition to current legacy systems via engine Component Improvement Programs (CIP). A strong and viable U.S. propulsion program also provides a dual-use benefit to our country by enhancing our competitiveness in the international commercial engine market. This long term project, coordinated through Reliance, will provide for the future needs in air battlespace dominance and expeditionary forces support (Littoral Warfare Joint Mission Area (JMA)). Increased platform mission endurance (Intelligence, Surveillance, and Reconnaissance JMA) and provide technology for increased affordability and platform survivability and increased mission effectiveness (Strike JMA). The program funds three demonstrator engine classes. Each engine class has specific performance goals that are divided into multiple phases. Phase I has been completed and demonstrated for each of the three classes of demonstrators. Phase II is currently underway in the engine demonstration phase, for all of the advanced component and system technologies. The Phase III concepts were developed and design, integration and component technology efforts are being executed. The phase goals of each engine class are listed as follows and are referenced to a 1987 baseline (additional affordability goals have been developed for fighter/attack and turboprop/shaft classes):

(U) Fighter/attack (Joint Technology Demonstrator Engine (JTDE)):
Phase I - 1991: +30% thrust/weight (Fn/Wt), +100 °F combustor inlet temperature (CIT), +300 °F turbine inlet temperature (TIT), -20% fuel burn.
Phase II - 1997: +60% Fn/Wt, +200 °F CIT, +600 °F TIT, -20% acquisition cost, -20% maintenance cost, -30% fuel burn.
Phase III - 2005: +100% Fn/Wt, +400°F CIT, +900°F TIT, -35% acquisition cost, -35% maintenance cost, -40% fuel burn.
(U) Turboprop/shaft (Joint Turbine Advanced Gas Generator (JTAGG)):
Phase I - 1991: +40% shaft horsepower/weight (SHP/Wt), -20% specific fuel consumption (SFC), +300 °F TIT.
Phase II - 1997: +80% SHP/Wt, -30% SFC, +600 °F TIT, -20% acquisition cost, -20% maintenance cost.
Phase III - 2003: +120% SHP/Wt, -40% SFC, +1000 °F TIT, -35% acquisition cost, -35% maintenance cost.
(U) Missile/expendable engines (Joint Expendable Turbine Engine Concepts (JETEC)):
Phase I - 1991: +35% thrust/airflow (Fn/Wa), -20% SFC, +1100 °F CIT, +500 °F TIT, -30% Cost.
Phase II - 1997: +70% Fn/Wa, -30% SFC, +1200 °F CIT, +900 °F TIT, -45% Cost.
Phase III - 2003: +100% Fn/Wa, -40% SFC, +1400 °F CIT, +1400 °F TIT, -60% Cost.

(U) Each engine company (Allison Advanced Development Company (AADC) (IN), Honeywell Engines and Systems (HES) (AZ), General Electric (GE) (OH & MA), Pratt & Whitney (P&W) (CT & FL), Teledyne Continental Motors Engine Division (formerly Teledyne Ryan Aeronautical) (OH) and Williams International (WI) (MI)) attempts to utilize at least two engine builds or demonstrator tests within each Phase to demonstrate the performance and cost goals. The JETEC goals are divided into demonstrating SFC and Cost for a subsonic demonstrator and Fn/Wa, CIT, TIT and Cost for a supersonic demonstrator.

— (U) Continue the Phase II JTDE: Demonstration of Phase II goals with GE/AADC demonstration engine.
— (U) Continue the Phase III JTDE: Component development, integration, fabrication, assembly and instrumentation of GE/AADC and P&W demonstrator engines and demonstration of P&W progress toward Phase III goals.
— (U) Continue the Phase III JTAGG: Component development, integration, fabrication and initial test of HES demonstrator to meet Phase III goals.
— (U) Complete the Phase II JTAGG: Component optimization and second build of HES demonstrator to meet Phase II goals.

• (U) ($1,500) Airframe Corrosion: This effort 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.
— (U) Initiate the development of single coat system for ship tanks (potable water tank).
— (U) Initiate the development of the road test development for USMC vehicle.
— (U) Initiate the development of modular hybrid pier (Demo joint modules).
— (U) Continue the development of single coat systems for ship tanks (ballast tank).
— (U) Continue Airframe Corrosion efforts.
— (U) Continue the development of modular hybrid pier (Demo hull section).

— (U) Continue the development of advanced coatings and inhibitor applied washdown system for USMC vehicles; contract award for road test facility.

- (U) ($2,200) Smart Wiring: Smart Wiring is a subset of the Total Ownership Cost (TOC) Future Naval Capability (FNC). Smart Wiring focuses will develop a flight-qualified smart aircraft wiring system hardware and perform required flight demonstration. Smart wiring embeds diagnostic and prognostic technologies into aircraft wiring systems to manage wiring system health. The goals of smart wiring are (1) reduce wiring maintenance man-hours by 20%, (2) reduce wiring induced mission aborts and non-mission capable hours by 20%, and (3) reduce in-flight electrical fires and subsequent loss of aircraft by 80%. Total Oil Monitoring System (TOMS) will develop an oil system for in-situ oil analysis of a mechanical component, with Advanced Amphibious Assault Vehicle (AAAV) being the specific transition target. The "total" aspect of the system combines oil debris and oil condition monitoring with a wireless intra-vehicle data/information delivery capability. Benefits of the technology program will be increased readiness, reduced system TOC, reduction in Hazardous Materials (HAZMAT), and reduction in maintenance tasks.

— (U) Initiate the development of smart wiring hardware, perform bench test and aircraft integration testing. Intent is to develop and implement an aircraft wiring diagnostic and prognostic system.
— (U) Initiate complete vehicle - Total Oil Monitoring System (TOMS) integration.
— (U) Initiate a test of Total Oil Monitoring System (TOMS) on Advanced Amphibious Assault (AAA) prototype.
— (U) Complete the development of updated requirements documents for smart wiring system.
— (U) Complete the award and execution of a contract to develop safety-of-flight qualified hardware for smart wiring system.
— (U) Complete the test of the Total Oil Monitoring System (TOMS) with actual lubricants from host system.
— (U) Complete the engine stand test for the Total Oil Monitoring System-Advanced Amphibious Assault Vehicle (TOMS-AAAV) integration.

- (U) ($17,000) Expeditionary Logistics: This effort represents the Advanced Technology investment strategy supporting the Expeditionary Logistics Future Naval Capability (FNC). The FNC is broken into three enabling capabilities covering distribution, Command and Control, and readiness. Work areas encompass surface replenishment and activities within ship-to-shore material distribution. Additionally, Command and Control of ground logistics is addressed including decision support and battlefield sensor arrays. This program supports the technology maturation, demonstration and transition line.

— (U) Continue shipboard strike up/down for carriers and logistics ships developing advanced weapons elevators, linear electric drive transport, omni-directional vehicle technology, conformal robots, and blast mitigation technologies for naval ammunition storage.
— (U) Continue development of a 12K underway connected replenishment capability including station keeping and load control technologies employing relative motion compensation, transfer load control and advanced materials.

— (U) Continue logistic battlefield sensor array architecture to support the utilization of on-board vehicle suites to the rear area battlefield support command decision process.
— (U) Continue the development of decision support technologies and algorithms for Logistics command and control course of action generation.

• (U) ($744) Advanced Shipboard Crane Motion System Advanced Technology Development (ATD): The Advanced Shipboard Crane Motion Control System ATD demonstrates a crane control system that combines recent advances in nonlinear control system technologies with existing strategic Auxiliary Crane Ship electro-hydraulic cranes. The control scheme will control load pendulation through sea state three by applying nonlinear control algorithms, appropriate to the ship motion environment, to the shipboard crane control system and the crane operator commands. This technology will extend the capability for ship to lighterage transfer of expeditionary warfare logistics to at least 300 containers per day in sea state three.
— (U) Initiate and complete an at sea demonstration during military exercise.

C. (U) PROGRAM CHANGE SUMMARY EXPLANATION:

(U) Funding: Not Applicable.
(U) Schedule: Not Applicable.

D. (U) OTHER PROGRAM FUNDING SUMMARY:

(U) RELATED RDT&E:

(U) NAVY RELATED RDT&E:
(U) PE 0601152N In-House Laboratory Independent Research
(U) PE 0601153N Defense Research Sciences
(U) PE 0602123N Force Protection Applied Research
(U) PE 0602236N Warfighter Sustainment Applied Research
(U) PE 0604703N Personnel, Training, Simulation, and Human Factors
(U) PE 0605152N Studies and Analysis Support - Navy

(U) NON NAVY RELATED RDT&E:
(U) PE 0601102A Defense Research Sciences
(U) PE 0602211A Aviation Technology
(U) PE 0603003A Aviation Advanced Technology
(U) PE 0603007A Manpower, Personnel and Training Advanced Technology
(U) PE 0601102F Defense Research Sciences

(U) PE 0602203F Aerospace Propulsion
(U) PE 0603216F Aerospace Propulsion and Power Technology
(U) PE 0603216F Advanced Turbine Engine Gas Generator
(U) PE 0601103D8Z University Research Initiatives

E. (U) SCHEDULE PROFILE: Not applicable.

FY 2003 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2002

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603236N
PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2001 ACTUAL	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R3008 High Speed Vessel									
TOTAL			25,000						25,000

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The High Speed Vessel develops technology to enable a future generation of fast ships for rapid movement of military payloads from CONUS to theater as well as within theater. Speeds of up to 70 knots will be considered. Increased payload fraction and reduced friction drag are key technical objectives. Technologies to be demonstrated include advanced hull forms, drag reduction, power dense propulsion, high strength-to-weight ratio structural materials, and rapid cargo handling.

B. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2001 ACCOMPLISHMENTS: N/A

2. (U) FY 2002 PLAN: N/A

3. (U) FY 2003 PLAN:

- (U) ($25,000) High Speed Vessel:

— Initiate the development of a hydrodynamic testing system for high speed vessels, capable of conducting hydrodynamic drag and lift testing at appropriate fluid velocities and Reynolds number, and of evaluating potential drag reduction approaches. Downselect to preferred testing approach and complete detailed design. Order materials and begin assembly of hydrodynamic testing system. Begin development of drag reduction system concept, including polymer and micro-bubble approaches. Conduct Concept of Operations study to develop requirements and metrics. Begin ship conceptual design studies. Assess state of the art in ship structural materials, establish materials technology requirements, and establish technical approach. Assess state of the art in high speed, power dense propulsion systems and establish technical approach.

— Initiate the award of several contracts for conceptual design of hydrodynamic testing systems, including water tunnel and towed body approaches and for structural and propulsion component demonstrations.

C. (U) PROGRAM CHANGE SUMMARY EXPLANATION:

(U) Funding: Not Applicable.
(U) Schedule: Not Applicable.

D. (U) OTHER PROGRAM FUNDING SUMMARY:

(U) RELATED RDT&E:

(U) NAVY RELATED RDT&E:
(U) PE 0602123N Force Protection Applied Research
(U) PE 0603123N Force Protection Advanced Technology
(U) PE 0603758N Navy Warfighting Experiments and Demonstrations

E. (U) SCHEDULE PROFILE: Not applicable.

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603236N
PROGRAM ELEMENT TITLE: Warfighter Sustainment Advanced Technology

CONGRESSIONAL PLUS-UPS

This section describes the following congressional Plus-Ups appropriated in FY2001 and/or FY2002 whose efforts fall within the scope of this restructured program, or which were appropriated in this PE.

R2496 Advanced Distributed Learning (ADL)
R9023 Commercial Off The Shelf (COTS) Carbon Fiber Qualification Program
R2715 Distributed Simulation, Warfighting Concepts (WARCON)
R9024 Distance Learning Information Technology (IT) Center
R2841 Geotrack Positioning Technology Program
R9021 Low Volume Production Program
R9022 National Center for Remanufacturing and Resource Recovery
R2839 Ocean Power Technology
R2739 Rochester Institute of Technology (RIT) Center for Integrated Manufacturing
R9006 Sustainable Readiness Center
R2498 Visualization of Technical Information

1. (U) FY 2001 CONGRESSIONAL PLUS-UPS:

- (U)($9,654) Advanced Distributed Learning (ADL): Established and operated a collaboration and coordination laboratory environment and continued the effort to standardize distance learning courseware. (Appropriated in PE 0603707N.)
- (U)($6,172) Distributed Simulation, Warfighting Concepts (WARCON): Examined warfighting and weapon system design concepts and their relationship to future aircraft carrier designs through linking the operational simulations at Naval Warfare Development Command, Newport, RI, to the smart product design model at Newport News Shipbuilding, Newport News, VA. (Appropriated in PE 0603707N.)
- (U)($5,791) Geotrack Positioning Technology Program: Initiated the development of ultra-wideband (UWB) pulse radio frequency (RF) technology capable of transmitting secure voice and/or data across multiple simultaneous users. (Appropriated in PE 0603712N.)
- (U)($2,907) Ocean Power Technology: Study conducted on the issues critical to the success of wave power generating system. Study focused on the scientific issues affecting the development of multiple buoy systems, system survivability and life cycle costs. (Appropriated in PE 0603712N.)

- (U)($2,898) Rochester Institute of Technology (RIT) Center for Integrated Manufacturing: Pilot program demonstrated remanufacturing as a discipline to extend Navy oriented remanufacturing process research into condition assessment and technology insertion during system midlife. (Appropriated in PE 0603707N.)
- (U)($1,931) Visualization of Technical Information (VTI): Initiated the use of visualization to integrate data from sensors deployed on shipboard systems (with the appropriate diagnostics and prognostics) with the decision making process, and with the resulting maintenance and training actions. (Appropriated in PE 0603712N.)

2. (U) FY 2002 CONGRESSIONAL PLUS-UPS:

- (U)($991) Commercial Off The Shelf (COTS) Carbon Fiber Qualification Program: Assess the viability of using new low-cost, commercially available, intermediate modulus carbon fibers on Navy aircraft and Joint Strike Fighter (JSF) weapons platforms. Demonstrate the performance of the carbon fibers on brake disks. Could lower the price of intermediate modulus fibers and put the US in a more competitive position since most of the graphite fiber manufacturers are in Japan.
- (U)($12,687) Distance Learning Information Technology (IT) Center: In FY01 this effort was entitled "Advanced Distributed Learning (ADL)". Continue the effort to standardize distance learning courseware and initiate an ADL certification process.
- (U)($3,469) Low Volume Production Program: Develop 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. Could increase the life cycle and performance of expensive new parts via protective claddings using laser weld technology.
- (U)($991) National Center for Remanufacturing and Resource Recovery: Develop the methodology for military remanufacturing and resource recovery. Implement a pilot study project by applying the military remanufacturing concept in a military environment.
- (U) Rochester Institute of Technology (RIT) Center for Integrated Manufacturing: Continue the effort started in FY01 to extend Navy oriented remanufacturing process research into condition assessment and technology insertion during system midlife. Develop a number of technology assessment and costing tools from private industry to more systematically deploy new technology in older systems, beginning with the design process. (Appropriated in PE 0603707N, $1,982.)
- (U) Sustainable Readiness Center: A center will be established that will study and evaluate the effect of environmental, cultural, urban, natural resource, and other constraints on critical defense activities. The center will be a national focal point to ensure continued access and use of naval exercise ranges and facilities. The Center will develop a science-based approach to environmental stewardship. Using remote sensing, web-enabled data sharing, Geographic Information Systems, and modeling and analysis, the center will establish a framework for military, public and regulatory stakeholders to reach consensus on sustainability. (Appropriated in PE 0603712N, $1,388.)