**CLASSIFICATION:**

| EXHIBIT R-2, RDT&E Budget Item Justification | | | | | | | DATE: **February 2006** | |
|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>**RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4** | | | | | R-1 ITEM NOMENCLATURE<br>0603562N/Submarine Tactical Warfare Systems | | | |
| COST ($ in Millions) | | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
| Total PE Cost | | **5.891** | **7.017** | **10.357** | **9.909** | **10.219** | **10.400** | **10.650** |
| 0770/Advanced Sub. Spt Equipment Program | | **3.273** | **3.861** | **4.774** | **4.221** | **4.324** | **4.434** | **4.542** |
| 9040/Multi-Line Towed Array | | | | | | | | |
| 1739/Sub. Artic Warfare Development | | **2.618** | **3.156** | **5.583** | **5.688** | **5.895** | **5.966** | **6.108** |
| Quality of RDT&E Articles | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

**Defense Emergency Response Funds (DERF) Funds: NOT APPLICABLE**

**A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** The Submarine Tactical Warfare Systems program element is comprised of the Advanced Submarine Support Equipment Program (ASSEP) and the Submarine Special Operations Support Program. The objective is to improve submarine operational effectiveness through the development and implementation of advanced Research and Development (R&D). Areas of improved operational effectiveness for Electronic Warfare Support (ES) and Imaging technologies include Threat Warning/Self Protection; Situational Awareness; and Intelligence, Surveillance, and Reconnaissance. A continuing need exists to improve these capabilities in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. The Submarine Arctic Warfare Development program responds to the increased threat of Naval activity in the Littorals and the continuing threat of submarine and surface ship activity in regions of the world through the development of advanced submarine R&D technology to provide improved operational capability in shallow water regions. Particular emphasis is placed in the areas of sonar operability and maintainability, Littoral operations, mine warfare, tactical surveillance, weapon utility and other submarine support missions. Efforts include assessment of combat system effectiveness, development of Arctic shallow water specific improvements for existing sonars and weapons, development of class specific Arctic operational guidelines and the testing of ice-capable submarine support structures. This program also provides the framework for various R&D programs to conduct Test and Evaluation in shallow water and Arctic regions.

**CLASSIFICATION:**

| EXHIBIT R-2a, RDT&E Project Justification | | | | | | | DATE: **February 2006** | |
|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>**RDT&E, N / BA-4** | PROGRAM ELEMENT NUMBER AND NAME<br>0603562N/Submarine Tactical Warfare System | | | | PROJECT NUMBER AND NAME<br>0770/Advanced Submarine Support Equipment Program (ASSEP) | | | |
| COST ($ in Millions) | | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
| Project Cost | | **3.273** | **3.861** | **4.774** | **4.221** | **4.324** | **4.434** | **4.542** |
| RDT&E Articles Qty | | | | | | | | |

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** A continuing need exists to improve submarine capabilities to improve safety of ship, survivability, and operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine ES and imaging to be operationally effective in the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare, Intelligence Collection, Maritime Protection and Joint Strike. The program is divided into three project categories: Threat Warning/Self Protection, Situational Awareness, and Intelligence, Surveillance and Reconnaissance. The Threat Warning/Self Protection project evaluates the vulnerability of submarine masts, periscopes and sensors to visual, radar, and infrared detection and evaluates the state of the art technology to implement periscope/mast engineering improvements to reduce counter detection threats. Both Situational Awareness and Intelligence, Surveillance, and Reconnaissance projects develop submarine unique improvements to mast, periscope, and ES electromagnetic and electro-optic sensors based on emerging technologies available from DOD Exploratory Development Programs, industry Independent Research and Development, and other sources. Feasibility demonstration models (FDMs) are developed, evaluated, and validated in the lab and through at-sea testing.

Threat Warning/Self Protection sub-projects include: Mast Signature Reduction (RCS and EO/IR) and Low Probability of Intercept (LPI) Receiver.

Situational Awareness sub-projects include: Automated Rangefinder (Phase B), Imaging Technologies (virtual periscope), Automatic Identification System (AIS), Low Cost Expndable Sensor (LCES), Advanced Camera Technology (360 Degree Imaging System), Alternate Communications Acquisition Direction Finding (CADF) Antenna, and LCES Payload improvements.

Intelligence, Surveillance and Reconnaissance sub-projects include: Submarine Offboard Sensors (UAV/UUV Pay Load), Advanced EW Tuners, Passive Suriellance Radar (PSR) at-sea testing, PSR AIS and EVS Packaging Studies, Imaging Enhancements (fusion) and R.F. Imaging (360 Degree Non-Scanning Radar).

All programs funded in this project are non-acquisition category programs. Program plans and priorities are established by N77. The test articles identified consist of critical components that will be fully developed during engineering development into Engineering Development Models (EDM's).

R-1 SHOPPING LIST - Item No. 47

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: **February 2006** |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N /BA-4** | 0603562N/Submarine Tactical Warfare Systems | 0770/Advanced Submarine Support Equipment Program (ASSEP) |

**B. Accomplishments/Planned Program** Threat Warning / Self Protection

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 0.066 | 0.023 | 0.125 |
| RDT&E Articles Quantity | | | | |

Mast Signature Reduction - Selection of coating for RCS and EO/IR signature reduction, and development of a research EDM and testing.

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | | | 0.050 |
| RDT&E Articles Quantity | | | | |

Low Probability of Intercept (LPI) - Development of receiver, testing, and integration of Ultra Wide Chirp capability.

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: February 2006 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N /BA-4** | 0603562N/Submarine Tactical Warfare Systems | 0770/Advanced Submarine Support Equipment Program (ASSEP) |

**B. Accomplishments/Planned Program (Cont.)** Situational Awareness Enhancements

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 1.511 | 1.494 | 0.919 |
| RDT&E Articles Quantity | | | | |

Patriot Rangefinder - Complete testing of Phase A, develop and test sub-components and conceptual EDM for Phase B (Stealthy / Data Link) including a new Phase B antenna prototype, and develop prototype unit for use with photonics mast.

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 0.122 | | |
| RDT&E Articles Quantity | | | | |

Automatic Identification System (AIS) - Complete the development of a conceptual EDM and prepare for and conduct At-Sea testing program.

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 0.444 | 1.400 | 2.350 |
| RDT&E Articles Quantity | | | | |

Advanced Camera Technology (360 Degree Imaging System) - Define the specifications required for advanced development. Commence the development of an AEM, the tracking algorithms and gray scale corelator.

**CLASSIFICATION:**

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: **February 2006** |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N /BA-4** | 0603562N/Submarine Tactical Warfare Systems | 0770/Advanced Submarine Support Equipment Program (ASSEP) |

**B. Accomplishments/Planned Program (Cont.)** Situational Awareness Enhancements (Cont.)

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 0.188 | | |
| RDT&E Articles Quantity | | | | |

Virtual Periscope - Continue development of system algorithms and prototype. Prepare for, conduct and analyze the results of At-Sea testing.

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | | 0.594 | 0.450 |
| RDT&E Articles Quantity | | | | |

Alternate CADF Antenna Technology - Develop a conceptual EDM and conduct field testing.

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 0.246 | 0.250 | 0.350 |
| RDT&E Articles Quantity | | | | |

Low Cost Expendable Sensor (was SAB, now LCES) - Develop conceptual design, develop a prototype, conduct At-Sea testing and commence the development of alternate or improved payloads.

R-1 SHOPPING LIST - Item No. 47

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: February 2006 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N /BA-4** | 0603562N/Submarine Tactical Warfare Systems | 0770/Advanced Submarine Support Equipment Program (ASSEP) |

**B. Accomplishments/Planned Program (Cont.)** Intelligence, Surveillance, and Reconnaissance Enhancements

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 0.604 | 0.050 | 0.030 |
| RDT&E Articles Quantity | | | | |

Passive Surveillance Radar (PSR) - Develop EDM and conduct At-Sea testing and analysis.
Electronic Vulnerability Surveillance Server (EVS) - Develop EDM and conduct At-Sea testing and analysis.
Feasibility Study - AIS/EVS/PSR Packaging.

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 0.072 | 0.000 | 0.000 |
| RDT&E Articles Quantity | | | | |

RF Imaging (360 Degree Non-Scanning Radar) - Conduct feasibility studies, develop concept design.
Sensor Enhancements (Fusion) - Develop concepts, define requirements and performance specifications and a concept design.

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 0.020 | 0.050 | |
| RDT&E Articles Quantity | | | | |

Offboard Sensors (UUV/UAV Payloads) - Conduct feasibility studies, develop concepts and determine performance specifications.

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: February 2006 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N /BA-4** | 0603562N/Submarine Tactical Warfare Systems | 0770/Advanced Submarine Support Equipment Program (ASSEP) |

**B. Accomplishments/Planned Program (Cont.)** Intelligence, Surveillance, and Reconnaissance Enhancements (Cont.)

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | | | 0.500 |
| RDT&E Articles Quantity | | | | |

Advanced EW Tuners - Conduct feasibility studies and prepare performance specifications.

**CLASSIFICATION:**

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: **February 2006** |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N / BA-4** | 0603562N/Submarine Tactical Warfare Systems | 0770/Advanced Submarine Support Equipment Program (ASSEP) |

**C. PROGRAM CHANGE SUMMARY:**

| Funding: | FY 2005 | FY 2006 | FY 2007 |
|---|---|---|---|
| Previous President's Budget: (FY 06 Pres Budget Controls) | 3.275 | 3.920 | 4.746 |
| Current BES/Current FMB: (FY07 DON Controls) | 3.273 | 3.861 | 4.774 |
| Total Adjustments | -0.002 | -0.059 | 0.028 |
| Summary of Adjustments | | | |
| Inflation | 0.000 | -0.018 | 0.021 |
| Rescissions | 0.000 | -0.041 | 0.000 |
| Other General Provisions | 0.000 | 0.000 | 0.007 |
| Warfare Center Rates | 0.000 | 0.000 | 0.000 |
| Programmatic Changes | -0.002 | 0.000 | 0.000 |
| Subtotal | -0.002 | -0.059 | 0.028 |

Schedule:

Not Applicable

Technical:

Not Applicable

R-1 SHOPPING LIST - Item No. 47

**CLASSIFICATION:**

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: **February 2006** |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N / BA-4** | 0603562N/Submarine Tactical Warfare Systems | 0770/Advanced Submarine Support Equipment Program (ASSEP) |

**D. OTHER PROGRAM FUNDING SUMMARY: N/A**

Line Item No. & Name

(U) Other Program Funding Summary: Not applicable.
(U) Related RDT&E: Not applicable.

**E. ACQUISITION STRATEGY: ***

This project optimizes technology insertion using a build-test-build approach to support ES and imaging operational needs. Operational needs have been based on the tactical requirements identified in CNO letters, Serial N77/3U629212, dated 04 Sep 03, Serial N77/3U629205, dated 01 Apr 03, and Serial N77/1U651534, dated 30 Oct 01, COMSUBLANT/COMSUBPAC Command Capability Issues (CCIs), Virginia Class SSN Operational Requirements Document objectives, a review, assessment and prioritization of Sensor and Processor efforts and SSN force level projections for SSN688/688I, SSN21, and SSN 774 classes through FY2015. Project efforts develop submarine unique improvements to mast, periscope, and ES electromagnetic and electro-optic sensors based on emerging technologies that are available from DOD Exploratory Development Programs, industry Independent Research and Development, and other sources. Feasibility Demonstration Models (FDMs) will be developed to provide a realistic method of evaluating the improvements, including deployment on submarines for testing.

**F. MAJOR PERFORMERS: ****

NAWC, China Lake, CA
NUWC, Newport, RI
NASA JPL, Pasadena, CA
JHU, Columbia, MD
Applied EM
ARETE

R-1 SHOPPING LIST - Item No. 47

**CLASSIFICATION:**

| Exhibit R-3 Cost Analysis (page 1) | | | | | | DATE: **February 2006** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4** | | PROGRAM ELEMENT 0603562N/Submarine Tactical Warfare Systems | | PROJECT NUMBER AND NAME 0770/Advanced Submarine Support Equipment Program (ASSEP) | | | | | | | | |
| Cost Categories | Contract Method & Type | Performing Activity & Location | Total PY s Cost | FY 05 Cost | FY 05 Award Date | FY 06 Cost | FY 06 Award Date | FY 07 Cost | FY 07 Award Date | Cost to Complete | Total Cost | Target Value of Contract |
| Primary Hardware Development | SS/CPIF | ARETE/AEM/EDO/JHU/JPL/NRL | 0.000 | 0.786 | 10/04 | 1.250 | 10/05 | 2.430 | 10/06 | TBD | TBD | TBD |
| Ancillary Hardware Development | | | | | | | | | | | 0.000 | |
| Component Development | | | | | | | | | | | 0.000 | |
| Ship Integration | | | | | | | | | | | 0.000 | |
| Ship Suitability | | | | | | | | | | | 0.000 | |
| Systems Engineering | WR | NUWC Newport, RI | | 0.560 | 10/04 | 0.549 | 10/05 | 0.735 | 10/06 | CONT | CONT | N/A |
| | WR/RC | NAWC China Lake | | 1.705 | 10/04 | 1.494 | 10/05 | 0.893 | 10/06 | CONT | CONT | N/A |
| Licenses | | | | | | | | | | | 0.000 | |
| GFE | N/A | N/A | | | | | | | | | 0.000 | |
| Miscellaneous | Various | Various | | | | | | | | CONT | CONT | N/A |
| Award Fees | | | | | | | | | | | 0.000 | |
| Subtotal Product Development | | | 0.000 | 3.051 | | 3.293 | | 4.058 | | CONT | CONT | |
| Remarks: | | | | | | | | | | | | |
| Development Support | | | | | | | | | | | 0.000 | |
| Software Development | | | | | | | | | | | 0.000 | |
| Training Development | | | | | | | | | | | 0.000 | |
| Integrated Logistics Support | | | | | | | | | | | 0.000 | |
| Configuration Management | | | | | | | | | | | 0.000 | |
| Engineering Technical Services | C/CPFF | AT&T GSI, Vienna,VA | | 0.200 | 11/04 | 0.210 | 11/05 | 0.220 | 11/06 | CONT | CONT | N//A |
| GFE | | | | | | | | | | | 0.000 | |
| Award Fees | | | | | | | | | | | 0.000 | |
| Subtotal Support | | | 0.000 | 0.200 | | 0.210 | | 0.220 | | CONT | CONT | |
| Remarks: | | | | | | | | | | | | |

R-1 SHOPPING LIST - Item No. 47

**CLASSIFICATION:**

| Exhibit R-3 Cost Analysis (page 2) | | | | | | | | | | | | DATE: **February 2006** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4** | | | PROGRAM ELEMENT 0603562N/Submarine Tactical Warfare Systems | | | PROJECT NUMBER AND NAME 0770/Advanced Submarine Support Equipment Program (ASSEP) | | | | | | |
| Cost Categories | Contract Method & Type | Performing Activity & Location | Total PY s Cost | FY 05 Cost | FY 05 Award Date | FY 06 Cost | FY 06 Award Date | FY 07 Cost | FY 07 Award Date | Cost to Complete | Total Cost | Target Value of Contract |
| Developmental Test & Evaluation | | | | | | | | | | | 0.000 | |
| Operational Test & Evaluation | | | | | | | | | | | 0.000 | |
| Live Fire Test & Evaluation | | | | | | | | | | | 0.000 | |
| Test Assets | | | | | | | | | | | 0.000 | |
| Tooling | | | | | | | | | | | 0.000 | |
| GFE | | | | | | | | | | | 0.000 | |
| Award Fees | | | | | | | | | | | 0.000 | |
| Subtotal T&E | | | 0.000 | 0.000 | | 0.000 | | 0.000 | | 0.000 | 0.000 | |
| Remarks: | | | | | | | | | | | | |
| Contractor Engineering Support | | | | | | | | | | | 0.000 | |
| Government Engineering Support | | | | | | | | | | | 0.000 | |
| Management Support Survices | C/CPFF | Various | | | | 0.210 | | 0.314 | | CONT | CONT | N/A |
| Travel | TOs | Various | | 0.020 | | 0.030 | | 0.033 | | 0.000 | 0.083 | |
| Labor (Research Personnel) | | | | | | | | | | | 0.000 | |
| SBIR Assessment | | | | 0.002 | | 0.118 | | 0.149 | | CONT | CONT | |
| Subtotal Management | | | 0.000 | 0.022 | | 0.358 | | 0.496 | | 0.000 | CONT | |
| Remarks: | | | | | | | | | | | | |
| Total Cost | | | 0.000 | 3.273 | | 3.861 | | 4.774 | | CONT | CONT | |
| Remarks: | | | | | | | | | | | | |

R-1 SHOPPING LIST - Item No. 47

| EXHIBIT R-4, RDT&E Schedule Profile | | DATE: February 2006 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NAME AND NUMBER | PROJECT NAME AND NUMBER |
| **RDT&E, N/BA-4** | **0603562N/Submarine Tactical Warfare System** | 0770/Advanced Submarine Support Equipment Program (ASSEP) |

| ASSEP F0770 SCHEDULE | FY03 | FY04 | FY05 | FY06 | FY07 | FY08 | FY09 | FY10 | FY11 |
|---|---|---|---|---|---|---|---|---|---|
| **Threat Warning Self Protection** | | | | | | | | | |
| Mast Signature Reduction RCS and EO/IR Signature Reduction | Coating Selection | | EDM | Coating Testng | Alt Coating or Material R&D | | Alt Coating or Material Selection | EDM | Coating Testng |
| Low Probability of Intercept (LPI) Receiver Special Signal Detection | | | | | Concept | Performance Spec | EDM | Testing | |
| Laser Detection Study | | | | | | Concept | Performance Spec | EDM | Testing |
| **Situational Awareness Enhancements** | | | | | | | | | |
| PATRIOT Phase B (Stealth, Data Link and ThinKom Antenna) | | Performance Spec | ADM | EDM | Testing | | | | |
| PATRIOT Upgrades | | | | | | Concept | | EDM | Testing |
| Automatic Identification System (AIS) | Performance Spec | EDM | At Sea Testing | | | | | | |
| 360 Degree CMOS Imaging Technology - Advanced Camera Technology | | | Concept | Performance Spec | EDM | Testing | | | |
| Virtual Periscope | Performance Spec | TEMPALT | At Sea Testing | | | | | | |
| Alternate CADF - Antenna Technology | | | | Concept | EDM | Testing | Integration | | |
| Low Cost Expendable Sensor (LCES) (was Situational Awareness Buoy (Expendable)) | | Conceptual Design | Performance Spec | | | EDM Testing | | | |
| LCES Payload Improvements | | | | | Concept | Performance Spec | EDM | Testing | |
| Optical Sensor Networks | | | | | | | Concept | Performance Spec | EDM |
| Special Emitter Identification (SEI) Improvements | | | | | | | Concept | Performance Spec | EDM |
| **ISR Enhancements** | | | | | | | | | |
| Passive Surveillance Radar (PSR) / Electromagnetic Vulnerability Server (EVS) | Conceptual Design | Upgrades to design | Testing | | | | | | |
| Imaging Enhancements (Fusion) | | | | Conceptual Design | | EDM Testing | | | |
| Offboard Sensors (UAV/UUV Payloads) | | | Concept Study | Evaluation | | | | | |
| Advanced EW Tuners | | | | | Concept | Performance Spec | | EDM | Testing |

| Exhibit R-4a, Schedule Detail | **UNCLASSIFIED** | | | | DATE: **February 2006** | | | |
|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>**BA-04** | PROGRAM ELEMENT<br>0603562N/Submarine Tactical Warfare Systems | | | | PROJECT NUMBER AND NAME<br>0770/Advanced Submarine Support Equip Prog (ASSEP) | | | |
| Schedule Profile | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 | |
| **Threat Warning / Self Protection** | | | | | | | | |
| Mast Signature Reduction - RCS and EO/IR Coating Selection | Q1 | Q1 | Q1 | Q1 | Q1 | Q1 | Q1 | |
| MSR EO/IR Material Testing | | Q3 | Q4 | | Q1 | Q4 | Q4 | |
| LPI Ultra Wide Chirp Concept Design | | | Q1 | | | | | |
| LPI Ultra Wide Chirp Develop Specification | | | | Q1 | | | | |
| LPI Ultra Wide Chirp EDM | | | | | Q3 | | | |
| LPI Ultra Wide Chirp Test EDM | | | | | | Q3 | | |
| Laser Detection Concept Study | | | | Q1 | | | | |
| Laser Detection Develop Specification | | | | | Q1 | | | |
| Laser Detection Develop EDM | | | | | | Q1 | | |
| Laser Detection Test EDM | | | | | | | Q3 | |
| **Situational Awareness Enhancements** | | | | | | | | |
| Patriot Phase B Sub-component Fabrication | | | | | | | | |
| Patriot Phase B EDM | Q4 | | | | | | | |
| Patriot Phase B Test EDM | | Q4 | | | | | | |
| Patriot Antenna Prototype Testing | Q3 | | | | | | | |
| Automatic ID System EDM | | | | | | | | |
| Automatic ID System At-sea Testing | Q3 | | | | | | | |
| Advanced Camera Technology (360 degree imaging) Feasibility Study | | Q2 | | | | | | |
| Advanced Camera Technology (360 degree imaging) Image Reconfiguration | | | Q1 | | | | | |
| Advanced Camera Technology (360 degree imaging) EDM | | | Q1 | | | | | |
| Advanced Camera Technology (360 degree Imaging) DT/OT | | | | Q2 | | | | |
| Virtual Periscope At-sea Testing | Q3 | | | | | | | |
| Alternate CADF Antenna Technology Concept for Slotted Spiral Ant | | Q1 | | | | | | |
| Alternate CADF Antenna Technology EDM | | | Q1 | | | | | |
| Alternate CADF Antenna Technology DT/OT | | | | Q1 | | | | |
| Alternate CADF Antenna Technology At-Sea Testing | | | | Q3 | | | | |
| Alternate CADF Antenna Technology Mast Integration | | | | | Q1 | | | |
| Low Cost Expendable Sensor (LCES) Feasibility Study | Q1 | | | | | | | |
| Low Cost Expendable Sensor (LCES) Develop Prototype | | Q1 | | | | | | |
| Low Cost Expendable Sensor (LCES) At-Sea Testing | | | Q3 | | | | | |
| Low Cost Expendable Sensor (LCES) Payload Improvements Concept | | | Q1 | | | | | |
| Low Cost Expendable Sensor (LCES) Payload Improvements Design Upgrades | | | Q3 | | | | | |
| Low Cost Expendable Sensor (LCES) Payload Improvements Perf Specification | | | | Q1 | | | | |
| **Intelligence, Surveillance, Reconnaissance Enhancements** | | | | | | | | |
| PSR At-Sea Testing | Q4 | | | | | | | |
| EVS Fixes and Upgrades - Tempalt Preparation | Q1 | | | | | | | |
| EVS Fixes and Upgrades - Integration | | Q1 | | | | | | |
| AIS/EVS/PSR Packaging Feasibility Study | Q1 | | | | | | | |
| Sensor Enhancements (Fusion) - Develop Concept | | Q1 | | | | | | |
| Sensor Enhancements (Fusion) - Develop Specification | | | Q1 | | | | | |
| Sensor Enhancements (Fusion) - EDM | | | | Q1 | | | | |
| RF Imaging (360 Degree Non Scanning) ADM/EDM | | Q1 | | | | | | |
| RF Imaging (360 Degree Non Scanning) Mast Integration | | | Q1 | | | | | |
| RF Imaging (360 Degree Non Scanning) DT/OT | | | | Q3 | | | | |
| RF Imaging (360 Degree Non Scanning) At-Ses Testing | | | | | Q4 | | | |
| Offboard Sensors Concept Study | Q2 | | | | | | | |
| Offboard Sensors Develop Specification | | Q2 | | | | | | |
| Advanced EW Tuners Concept Studies | | | Q2 | | | | | |
| Advanced EW Tuners - ADM/EDM | | | | | Q1 | | | |
| Advanced EW Tuners - OT/At-Sea Testing | | | | | | Q3 | | |

**CLASSIFICATION:**

| EXHIBIT R-2a, RDT&E Project Justification | | | | | | | DATE: **February 2006** | |
|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4** | PROGRAM ELEMENT NUMBER AND NAME PE 0603562N Submarine Tactical Warfare System | | | PROJECT NUMBER AND NAME 1739 Submarine Special Operations Support | | | | |
| COST ($ in Millions) | | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
| Project Cost | | **2.618** | **3.156** | **5.583** | **5.688** | **5.895** | **5.966** | **6.108** |
| RDT&E Articles Qty | | | | | | | | |

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:**

The Arctic project responds to the increased threat of Naval activity in the Littoral and continuing threat of submarine and surface ship activity in all regions of the world through the development of advanced submarine concepts. It places particular emphasis on submarine operability and mission support in unique environments. Efforts include assessment of combat system effectiveness, weapons testing, use of high frequency sonars in Arctic regions, testing of ice-capable submarine structures, and development of class specific Arctic shallow water operational guidelines. This program also provides the framework for various Research and Development (R&D) programs to conduct Test and Evaluation in the shallow water and Arctic regions.

R-1 SHOPPING LIST - Item No. 47

**CLASSIFICATION:**

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: **February 2006** |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N / BA4** | PE 0603562N Submarine Tactical Warfare System | 1739 Submarine Special Operations Support |

**B. Accomplishments/Planned Program**

| | | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | 2.618 | 3.156 | 5.583 |
| RDT&E Articles Quantity | | | | |

Conduct ICEX mission, arctic transit mission, ICEX workup, ICEX training, and Ice Camp.
Provide planning, logistics, support for Ice Camp Operations and SCICEX accommodation.

FY06 Plans:
Support Arctic deployments, including inter-fleet transfers, as required by the Submarine Force Commanders. Investigate, research, develop and deploy new systems for Arctic submarine support. Support testing and tactical development required to improve submarine Arctic operability and warfighting. Plan a large ice camp in the Arctic Ocean during Spring 2007 to conduct submarine technical testing and tactical development, and to collect Arctic environmental data.
FY07 Plans:
Support Arctic deployments, including inter-fleet transfers, as required by the Submarine Force Commanders. Investigate, research, develop and deploy new systems for Arctic submarine support. Support testing and tactical development required to improve submarine Arctic operability and warfighting. Coordinate and provide technical and logistic support for the Spring 2007 Ice Camp in the Arctic Ocean.

| | FY 04 | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | | | |
| RDT&E Articles Quantity | | | | |

| | FY 04 | FY 05 | FY 06 | FY 07 |
|---|---|---|---|---|
| Accomplishments/Effort/Subtotal Cost | | | | |
| RDT&E Articles Quantity | | | | |

**CLASSIFICATION:**

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: **February 2006** |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N / BA4** | PE 063562N Submarine Tactical Warfare Sys | 1739 Submarine Special Operations Support |

**C. PROGRAM CHANGE SUMMARY:**

| Funding: | FY 2005 | FY 2006 | FY 2007 |
|---|---|---|---|
| FY2006 President's Budget Controls | 2.625 | 3.205 | 5.623 |
| FY2007 President's Budget Controls | 2.618 | 3.156 | 5.583 |
| Totals Adjustments | -0.007 | -0.049 | -0.040 |
| Summary of Adjustments | | | |
| Contract Support Reduction | | | -0.010 |
| NWCF Civpers Efficiencies | | | -0.063 |
| Small Business Innovation Research | -0.003 | | |
| Nuclear Physical Security (OSD) | 0.001 | | |
| PBD 604 Inflation | | | 0.025 |
| PBD 606 Civpers Pay Raise Rate | | | 0.008 |
| Sec. 8125: Revised Economic As | | -0.015 | |
| Congressional Action 1% Reduct | | -0.034 | |
| Department of Energy Transfer | -0.002 | | |
| Cancelled Accounts Liabilities | -0.003 | | |
| | -0.007 | -0.049 | -0.040 |

Schedule:

N/A

Technical:

N/A

R-1 SHOPPING LIST - Item No. 47

**CLASSIFICATION:**

| EXHIBIT R-2a, RDT&E Project Justification | | DATE: **February 2006** |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
| **RDT&E, N / BA4** | PE 063562N Submarine Tactical Warfare System | 1739 Submarine Special Operations Support |

**D. OTHER PROGRAM FUNDING SUMMARY:** N/A

**E. ACQUISITION STRATEGY: ***

NON-ACAT Progam

**F. MAJOR PERFORMERS: ****

Command Submarine ForceUS PacificFleet (COMSUBPAC) - Develop and definitize an Arctic-Deploying side Scan Sonar replacement plan, which will deliver a significant improved qualitative view of the underside of the ICE Canopy Sighting and tracking surfaceable features of current submarines, and the future VA Class submarine.

R-1 SHOPPING LIST - Item No. 47

**CLASSIFICATION:**

| Exhibit R-3 Cost Analysis (page 1) | | | | | | | | | | | | | DATE: **February 2006** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA4** | | | PROGRAM ELEMENT PE 063562N Submarine Tactical Warfare System | | | PROJECT NUMBER AND NAME 1739 Submarine Special Operations Support | | | | | | | | |
| Cost Categories | Contract Method & Type | Performing Activity & Location | Total PY s Cost | FY 04 Cost | FY 04 Award Date | FY 05 Cost | FY 05 Award Date | FY 06 Cost | FY 06 Award Date | FY 07 Cost | FY 07 Award Date | Cost to Complete | Total Cost | Target Value of Contract |
| Primary Hardware Development | | | | | | | | | | | | | 0.000 | |
| Ancillary Hardware Development | | | | | | | | | | | | | 0.000 | |
| Systems Engineering | WR | NSWC Carderock | 0.400 | | | | | | | | | | 0.400 | |
| Systems Engineering | | EB Corp | 0.025 | | | | | | | | | | 0.025 | |
| Systems Engineering | WR | NSWC INDIAN HEAD | 0.051 | | | | | | | | | | 0.051 | |
| Systems Engineering | WR | SPAWAR | 0.120 | | | | | | | | | | 0.120 | |
| Licenses | | | | | | | | | | | | | 0.000 | |
| Tooling | | | | | | | | | | | | | 0.000 | |
| GFE | | | | | | | | | | | | | 0.000 | |
| Subtotal Product Development | | | 0.596 | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | 0.596 | |
| Remarks: | | | | | | | | | | | | | | |
| Development Support | | | | | | | | | | | | | 0.000 | |
| Software Development | | | | | | | | | | | | | 0.000 | |
| Training Development | | | | | | | | | | | | | 0.000 | |
| Integrated Logistics Support | | | | | | | | | | | | | 0.000 | |
| Configuration Management | | | | | | | | | | | | | 0.000 | |
| Technical Data | | | | | | | | | | | | | 0.000 | |
| GFE | | | | | | | | | | | | | 0.000 | |
| Award Fees | | | | | | | | | | | | | 0.000 | |
| Subtotal Support | | | 0.000 | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | 0.000 | |
| Remarks: | | | | | | | | | | | | | | |

R-1 SHOPPING LIST - Item No. 47

**CLASSIFICATION:**

DATE:

Exhibit R-3 Cost Analysis (page 2) **February 2006**

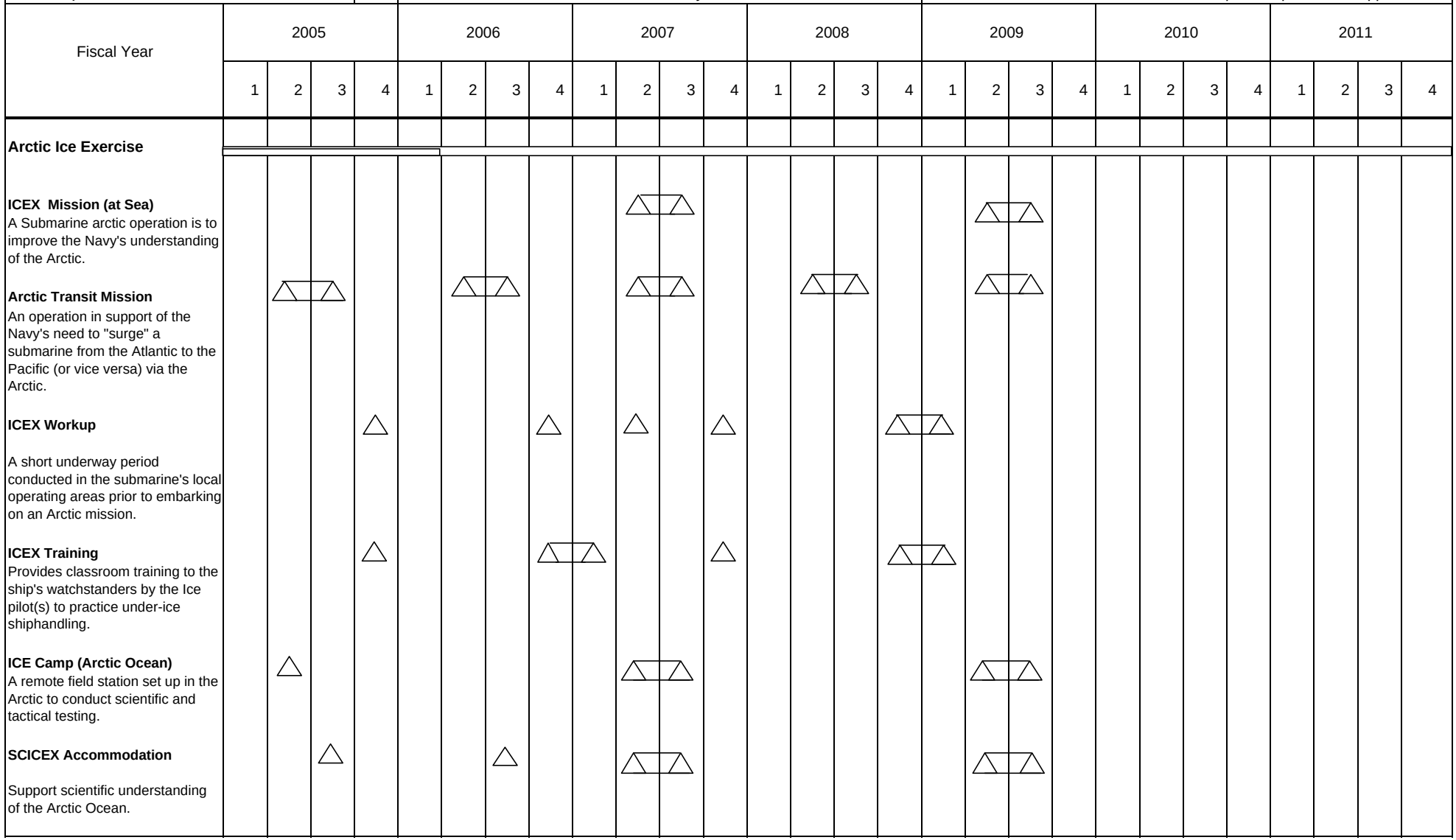
| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT | PROJECT NUMBER AND NAME |
|---|---|---|
| **RDT&E, N / BA** | PE 063562N Submarine Tactical Warfare System | 1739 Submarine Special Operations Support |

| Cost Categories | Contract Method & Type | Performing Activity & Location | Total PY s Cost | | | FY 05 Cost | FY 05 Award Date | FY 06 Cost | FY 06 Award Date | FY 07 Cost | FY 07 Award Date | Cost to Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | SUBDEVRON Five | 10.282 | | | 2.455 | 11/04 | 2.993 | 11/05 | 5.420 | 11/06 | CONT. | CONT. | |
| Developmental Test & Evaluation | WR | | 0.015 | | | | | | | | | | 0.015 | |
| Developmental Test & Evaluation | WR | CMDR,3rd NAVCON BRIGA | 0.200 | | | | | | | | | | 0.200 | |
| Developmental Test & Evaluation | WR | CMDR,2nd NAVCON BRIGA | 0.250 | | | | | | | | | | 0.250 | |
| Developmental Test & Evaluation | SS/CPFF | APL/University of Washingtor | 3.294 | | | | | | | | | | 3.294 | |
| Tooling | | | | | | | | | | | | | 0.000 | |
| GFE | | | | | | | | | | | | | 0.000 | |
| Subtotal T&E | | | 14.041 | | | 2.455 | | 2.993 | | 5.420 | | 0.000 | 19.489 | |
| Remarks: | | | | | | | | | | | | | | |
| Contractor Engineering Support | | | | | | | | | | | | | | |
| Government Engineering Support | | | | | | | | | | | | | | |
| Program Management Support | | EG&G | 0.481 | | | 0.153 | 11/04 | 0.153 | 11/05 | 0.153 | 11/06 | CONT. | CONT. | |
| Travel | | | 0.050 | | | 0.010 | 11/04 | 0.010 | 11/05 | 0.010 | 11/06 | CONT. | CONT. | |
| Labor (Research Personnel) | | | | | | | | | | | | | 0.000 | |
| SBIR Assessment | | | | | | | | | | | | | 0.000 | |
| Subtotal Management | | | 0.531 | | | 0.163 | | 0.163 | | 0.163 | | 0.000 | 0.857 | |
| Remarks: | | | | | | | | | | | | | | |
| Total Cost | | | 15.168 | 0.000 | | 2.618 | | 3.156 | | 5.583 | | 0.000 | 20.942 | |
| Remarks: | | | | | | | | | | | | | | |

R-1 SHOPPING LIST - Item No. 47

EXHIBIT R4, Schedule Profile | DATE: **February 2006**

| APPROPRIATION/BUDGET ACTIVITY | PROGRAM ELEMENT NUMBER AND NAME | PROJECT NUMBER AND NAME |
|---|---|---|
| **RDT&E, N / BA 4** | PE 063562N Submarine Tactical Warfare System | 1739 Submarine Special Operations Support |






* Not required for Budget Activities 1, 2, 3, and 6

| Exhibit R-4a, Schedule Detail | | | | | DATE: **February 2006** | | |
|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY **RDT&E BA4** | | | | PROJECT NUMBER AND NAME 1739 Submarine Special Operations Support | | | |
| Schedule Profile | FY2005 | FY2006 | FY2007 | FY2008 | FY2009 | FY2010 | FY2011 |
| ICE Mission (at Sea) | | | 2Q-3Q | | 2Q-3Q | | |
| Arctic Transit Mission (at Sea) | 2Q-3Q | 2Q-3Q | 2Q-3Q | 2Q-3Q | 2Q-3Q | | |
| ICEX Workup (at Sea) | 4Q | 4Q | 2Q,4Q | 4Q | 2Q | | |
| ICEX Training | 4Q | 4Q | 1Q, 4Q | 4Q | 1Q | | |
| ICE Camp (Arctic Ocean) | 2Q | | 2Q-3Q | | 2Q-3Q | | |
| SCICEX Accomodation | 3Q | 3Q | 2Q-3Q | | 2Q-3Q | | |