

# UNCLASSIFIED

## FY 2004/2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Exhibit R-2

DATE: February 2003

BUDGET ACTIVITY: 3      PROGRAM ELEMENT: 0603747N  
PROGRAM ELEMENT TITLE: Undersea Warfare Advanced  
Technology

COST: (Dollars in Thousands)

PROJECT NUMBER/ TITLE	FY 2002 ACTUAL	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	FY 2008 ESTIMATE	FY 2009 ESTIMATE
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R2916 Undersea Warfare Advanced Technology	48,244	39,240	38,168	45,475	41,505	45,292	46,179	47,087
R2844 Magnetrestrictive Transduction	2,017							
R2846 Low Frequency Broadband Acoustic Airgun Source	1,256							
R9164 Motorized Airgun Program	0	978						
R9165 University Oceanographic Laboratory	0	3,423						
Total	51,517	43,641	38,168	45,475	41,505	45,292	46,179	47,087

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

All Navy advanced technology development in undersea target detection, classification, localization, tracking and neutralization is funded through this Program Element (PE). Technologies being developed within this Program Element are aimed at enabling Sea Shield, one of the three core operational concepts detailed in the Naval Transformational Roadmap. Associated efforts focus on new anti-submarine warfare (ASW) operational concepts that promise to improve wide-area surveillance, detection, localization, tracking and attack capabilities against quiet adversary submarines operating in noisy and cluttered shallow water environments. Related efforts are aimed at leveraging technologies that will protect the country's current capital investment in surveillance, submarine, surface ship and air ASW assets.

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

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## B. PROGRAM CHANGE SUMMARY:

	FY 2002	FY 2003	FY 2004	FY 2005
FY 2003 President's Budget Submission:	59,175	40,125	40,966	39,258
SBIR Adjustment	-341			
NWCF Rate Adjustment			-293	-217
Congressional Plus-Ups		+4,500		
Cong Rescissions/Adjustments/Undist Reductions	-289	-511		
Execution Adjustments	-7,028			
S&T Program Adjustments			-1,624	+7,414
Pay Raise/Inflation Adjustments		-473	-881	-980
FY 2004/2005 President's Budget Submission:	51,517	43,641	38,168	45,475

### PROGRAM CHANGE SUMMARY EXPLANATION:

Schedule: Not applicable.  
Technical: Not Applicable

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DATE: February 2003

BUDGET ACTIVITY: 3

PROGRAM ELEMENT: 0603747N

Project Number: R2916

PROGRAM ELEMENT TITLE: Undersea Warfare Advanced  
Technology

Project Title: Undersea Warfare  
Advanced Technology

COST: (Dollars in Thousands)

PROJECT NUMBER/ TITLE	FY 2002 ACTUAL	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	FY 2008 ESTIMATE	FY 2009 ESTIMATE
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R2916/Undersea Warfare Advanced Technology	48,244	39,240	38,168	45,475	41,505	45,292	46,179	47,087
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## A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

All Navy advanced technology development in undersea target detection, classification, localization, tracking and neutralization is funded through this project. Technologies being developed within this project are aimed at enabling Sea Shield, one of the three core operational concepts detailed in the Naval Transformational Roadmap. Associated efforts focus on new anti-submarine warfare (ASW) operational concepts that promise to improve wide-area surveillance, detection, localization, tracking and attack capabilities against quiet adversary submarines operating in noisy and cluttered shallow water environments. Related efforts are aimed at leveraging technologies that will protect the country's current capital investment in surveillance, submarine, surface ship and air ASW assets.

## B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY02	FY03	FY04	FY05
Wide Area Anti-Submarine Warfare (ASW) Surveillance	15,610	12,910	13,519	14,674

Wide Area ASW Surveillance is focused on dramatically improving the capability to sanitize large areas relative to the capabilities of legacy ASW sensors. Efforts include the development of affordable off-board systems with associated processing and robust, high bandwidth communications links. The cornerstone of Wide Area Surveillance is the ability to rapidly distribute acoustic and non-acoustic sensors from air, surface and sub-surface platforms as well as to develop long-endurance sensors and unmanned ASW vehicles. This activity represents a shift from traditional fixed surveillance systems to autonomous, networked, multi-static operation, supported by passive/active signal processing with the objective of increased detection capabilities. This activity includes support to Project Morgan; details are of a higher classification.

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PROGRAM ELEMENT TITLE: Undersea Warfare Advanced  
Technology

Project Number: R2916

Project Title: Undersea Warfare  
Advanced Technology

## FY 2002 ACCOMPLISHMENTS:

### • **Multistatic Anti-Submarine Warfare (ASW) (Component of Littoral Anti-Submarine Warfare (LASW) Future Naval Capability (FNC))**

#### Initiated:

- Development of automated multi-static sonar signal classification algorithms for coherent and incoherent sound sources to improve submarine detection performance in littoral waters.
- Requirements and technology study for a small-size, lightweight, low frequency sound source for use in Navy multistatic sonar systems.
- Development of a small size, lightweight, low frequency sound source for use in Navy multistatic sonar systems.

#### Completed:

- In-buoy signal processing software Build 1 laboratory test which demonstrated improved performance compared to existing systems.
- Integration and testing of the long-life thermal source for a prototype long-endurance off-board source in Mk48 torpedo form factor.
- Development of battery-powered prototype long-endurance off-board source in Mk48 torpedo form factor.
- Transition of Deployable Multistatics technology into ASTO Submarine Combat Systems Improvements projects funded by PE 0603561N.

### • **Deployable Autonomous Distributed System (DADS) (Component of LASW FNC)**

#### Continued:

- Development and testing of shallow water, deployable, uncabled, autonomous sensor system technologies in preparation for an FY05 barrier demonstration.
- At-sea testing of a five-node design to verify sensor stability, array element localization capability, acoustic/non-acoustic track fusion and automatic feature extraction.
- Algorithm development and validation.

### • **Claymore Marine (This effort was previously reported under Battlegroup ASW Defense)**

#### Continued:

- Development and interim testing of an on-board, in-flight, real-time processor and associated detection algorithms. Additionally, continued assessment of a "strawman" Engineering Development Model (EDM).

#### Completed:

- Analysis of System Characterization Test data. The results were analyzed and incorporated into preparations for the Tactical Test involving a cooperative target; data were processed post-flight vice real-time.
- FY02 Tactical Test.

## FY 2003 PLANS:

### • **Multistatic Anti-Submarine Warfare (ASW)**

#### Initiate:

- Laboratory testing and refinement of increasingly capable in-the-sonobuoy signal processing software builds.

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PROGRAM ELEMENT TITLE: Undersea Warfare Advanced  
Technology

Project Number: R2916

Project Title: Undersea Warfare  
Advanced Technology

- Development of a concept of operations and performance requirements for a new multistatic sonar system comprised of remotely operated sound sources and receivers.
- Development of an over-the-horizon data link for a new multistatic sonar system comprised of remotely operated sound sources and receivers.
- Transition of Compact Deployable Multistatic Receiver signal processing algorithms to the Naval Air Systems Command Improved Extended Echo Ranging Program in P.E. 0604261N.

Continue:

- Development of multistatic sonar signal classification algorithms for coherent and incoherent sound sources to improve submarine detection performance in littoral waters.
- Development of a small-size, lightweight, low frequency sound source for use in Navy multistatic sonar systems.

Complete:

- Requirements and technology study for a small-size, lightweight, low frequency sound source for use in Navy multistatic sonar systems.

• **Deployable Autonomous Distributed System (DADS).**

Continue:

- Algorithm development and validation.
- Development and testing of DADS technologies in preparation for FY05 barrier demonstration.
- At-sea testing of a five-node design to verify sensor stability, array element localization capability, acoustic/non-acoustic track fusion and automatic feature extraction.

• **Claymore Marine (This effort previously reported under Battlegroup ASW Defense)**

Continue:

- Assessment of the Engineering Development Model (EDM) and document results. Provide recommendation for a potential acquisition decision.

Complete:

- Development and interim testing of an on-board, in-flight, real-time processor and associated detection algorithms. Additionally, continued assessment of a "strawman" Engineering Development Model (EDM).
- Analysis of data from the FY02 Tactical Test and incorporate the results into planning for the Demonstration Test later in FY03.
- Development of the in-flight, real-time processor and advanced detection algorithms. Demonstrate processor technology during a Demonstration Test to include limited free-play against a non-cooperative target, with detections called in-flight.

FY 2004 PLANS:

• **Multistatic Anti-Submarine Warfare (ASW)**

Initiate:

- At-sea demonstrations of increasingly capable in-the-sonobuoy signal processing software builds.
- Construction of Advanced Development Model versions of compact deployable multistatic receivers (CDMR) and sources (CDMS) for use in at-sea demonstrations.

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Technology

Project Number: R2916

Project Title: Undersea Warfare  
Advanced Technology

## Continue:

- Development of multistatic sonar signal classification algorithms for coherent and incoherent sound sources to improve submarine detection performance in littoral waters.
- Laboratory testing and refinement of increasingly capable in-the-sonobuoy signal processing software builds.

## Complete:

- Transition of Compact Deployable Multistatic Source waveform designs and performance to the Naval Air Systems Command Improved Extended Echo Ranging Program in P.E. 0604261N.
- Transition of Compact Deployable Multistatic Receiver signal processing algorithms to the Naval Air Systems Command Improved Extended Echo Ranging Program in P.E. 0604261N.
- Development of a small-size, lightweight, low frequency sound source for use in Navy multistatic sonar systems.
- Development of concept of operations and performance requirements for a new multistatic sonar system comprised of remotely operated sound sources and receivers.
- Development of an over-the-horizon radio data link for a new multistatic sonar system comprised of remotely operated sound sources and receivers.

### • **Deployable Autonomous Distributed System (DADS) (Component of LASW FNC)**

#### Initiate:

- Test planning for FY05 barrier demonstration.

#### Continue:

- Development and testing of DADS technologies in preparation for FY05 barrier demonstration.

#### Complete:

- Validation of DADS baseline algorithm development.

### • **Claymore Marine (Component of LASW FNC) (This effort was previously reported under Battlegroup ASW Defense)**

#### Complete:

- Assessment of the Engineering Development Model (EDM) and provide an acquisition recommendation. Transition technologies to Air ASW Systems.

## FY 2005 PLANS:

### • **Multistatic Anti-Submarine Warfare (ASW) (Component of LASW FNC)**

#### Continue:

- Laboratory testing and refinement of increasingly capable in-the-sonobuoy signal processing software builds.
- Development of multistatic sonar signal classification algorithms for coherent and incoherent sources to improve submarine detection performance in littoral waters.
- At-sea demonstrations of increasingly capable in-the-sonobuoy signal processing software builds.

#### Complete:

- Construction of Advanced Development Model versions of compact deployable multistatic receivers (CDMR) and sources (CDMS) for use in at-sea demonstrations.

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Advanced Technology

- **Deployable Autonomous Distributed System (DADS) (Component of LASW FNC)**

- Initiate:

- DADS system documentation.

- Complete:

- Development and testing of DADS technologies in preparation for FY05 barrier demonstration.
  - DADS barrier demonstration.

	FY02	FY03	FY04	FY05
Battlegroup Anti-Submarine Warfare (ASW) Defense	15,520	10,009	10,251	15,017

Battlegroup ASW Defense technology focuses on the development of platform-based sources and receivers aimed at denying submarines the ability to target grey ships. This technology area is primarily concerned with detections inside 10 nm. Battlegroup ASW Defense integrates next-generation technologies, automatic target recognition, sensors that adjust to complex acoustic environments, and environmentally adaptive processing techniques. Battgroup ASW Defense will enable smaller, lighter, and cheaper acoustic/non-acoustic arrays, large multi-line arrays, and submarine flank arrays all with environmental adaptation capabilities. This activity includes support to Project Morgan; details are of a higher classification.

## FY 2002 ACCOMPLISHMENTS:

- **Sonar Automation (Component of Littoral Anti-Submarine Warfare (LASW) Future Naval Capability (FNC))**

- Initiated:

- Sonar Automation Technology development plan to be used as a long-term master plan for the 6-year Sonar Automation Program.
  - Development, demonstration and transition of signal processing algorithms designed to detect and classify acoustic signatures of threat submarines.

- Completed:

- Transition of Diesel Electric Submarine Speed-Related Tone feature detection for automatic detection and classification of threat diesel electric submarines to Naval Sea Systems Command under Program Element 0603561N (Advanced Submarine System Development), Project S0223 (Submarine Combat Systems Improvements).
  - Transition of auto-change detection and multi-sensor auto-classification processing features of IPAC to Naval Sea Systems Command under Program Element 0603561N (Advanced Submarine System Development), Project S0223 (Submarine Combat Systems Improvements).
  - Transition of striation auto detector signal processing algorithm to Naval Sea Systems Command under Program Element 0603561N (Advanced Submarine System Development), Project S0223 (Submarine Combat Systems Improvements).

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PROGRAM ELEMENT TITLE: Undersea Warfare Advanced  
Technology

Project Number: R2916

Project Title: Undersea Warfare  
Advanced Technology

- **High Frequency Broadband Transducer and Arrays for Submarines (Component of LASW FNC)**

- Initiated:

- Development of HF candidate transducers and fabrication of partial arrays to demonstrate performance. Design types include triple resonant and ultra broadband transducers.

- **Limits of Passive Sonar (Component of LASW FNC)**

- Initiated:

- Hardware component integration, testing and installation of an acoustic array testbed to support future passive sonar system designs.
  - Development of adaptive beamforming technology.

- **Lightweight Broadband Variable Depth Sonar (LBVDS) (Component of LASW FNC)**

- Completed:

- Analysis and documentation of results from the FY 2001 LBVDS engineering shakedown and operational sea tests.
  - Development and demonstration of the LBVDS Demonstration System Model; transitioned acoustic source technologies and broadband signal processing to Program Element 0603513N (Shipboard System Component Development), Project 32468 (Undersea Warfare).

- **Environmentally Adaptive (EA) AN/SQQ-89 (Component of LASW FNC)**

- Continued:

- Development of Environmentally Adaptive (EA) AN/SQS-53C (part of AN/SQQ-89) sonar signal processing and system control software.
  - Demonstrations of EA AN/SQS-53C sonar system technologies at sea using fleet test platforms.

FY 2003 PLANS:

- **Sonar Automation**

- Continue:

- Development, demonstration and transition of signal processing algorithms designed to detect and classify acoustic signatures of threat submarines. Throughout the development process, algorithms will be transitioned to Naval Sea Systems Command under Program Element 0603561N (Advanced Submarine System Development), Project S0223 (Submarine Combat Systems Improvements).

- Complete:

- Sonar Automation Technology development plan to be used as a long-term plan for the 6-year Sonar Automation Program.

- **High Frequency Broadband Transducer and Arrays for Submarines**

- Initiate:

- Design and fabrication of prototype HF transducer array.

- Complete:

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PROGRAM ELEMENT TITLE: Undersea Warfare Advanced  
Technology

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Project Title: Undersea Warfare  
Advanced Technology

- Development of HF candidate transducers and fabrication of partial arrays to demonstrate performance. Design types include triple resonant types and ultra broadband.

- **Limits of Passive Sonar**

Continue:

- Hardware component integration, testing and installation of an acoustic array testbed to support future passive sonar system designs.
- Development of adaptive beamforming technology.

- **Environmentally Adaptive SQQ-89 (Component of LASW FNC)**

Complete:

- Development of Environmentally Adaptive (EA) AN/SQS-53C (part of AN/SQQ-89) signal processing and system control software.
- Multiple demonstrations of EA AN/SQS-53C sonar system technologies at-sea using fleet test platforms.
- Development and Land-based Integration and Test System (LBITS) demonstration of EA AN/SQS-53C sonar system technologies. Transition technologies to P.E. 0205620N (Surface ASW Combat System Integration), (as an integral part of the Commercial Technology Transition Office-sponsored environmentally adaptive roll-on-roll-off adjunct to the AN/SQQ-89 and as upgrades to the AN/SQQ-89(V)15 and AN/SQQ-89A(V)15.

FY 2004 PLANS:

- **Sonar Automation (Component of LASW FNC)**

Continue:

- Development, demonstration and transition of signal processing algorithms designed to detect and classify acoustic signatures of threat submarines. Throughout the development process, algorithms will be transitioned to Naval Sea Systems Command under Program Element 0603561N (Advanced Submarine System Development), Project S0223 (Submarine Combat Systems Improvements).

- **High Frequency Broadband Transducer and Arrays for Submarines (Component of LASW FNC)**

This effort has been terminated; final analysis and report documentation will be developed in order to capture and preserve the research progress to date for potential application to future system requirements.

Complete:

- Design and fabrication of prototype HF transducer array.

- **Limits of Passive Sonar**

Continue:

- Hardware component integration, testing and installation of an acoustic array testbed to support future passive sonar system designs.
- Development of adaptive beamforming technology.

- **Counter Torpedo Detection, Classification, and Localization (DCL) (Component of LASW FNC)**

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PROGRAM ELEMENT TITLE: Undersea Warfare Advanced  
Technology

Project Number: R2916

Project Title: Undersea Warfare  
Advanced Technology

## Initiate:

- Performance evaluation of a prototype end-to-end surface ship torpedo protection system against two torpedoes launched in quick succession.
- Integration of project products into the AN/WSQ-11 "Block II and III" system upgrades. Products will transition to PE 0603506N, Project F0225 (Surface Ship Torpedo Defense).

## FY 2005 PLANS:

### • **Sonar Automation (Component of LASW FNC)**

#### Continue:

- Development, demonstration and transition of signal processing algorithms designed to detect and classify acoustic signatures of threat submarines. Throughout the development process, algorithms will be transitioned to Naval Sea Systems Command under Program Element 0603561N (Advanced Submarine System Development), Project S0223 (Submarine Combat Systems Improvements).

### • **Limits of Passive Sonar (Component of LASW FNC)**

#### Initiate:

- Focused research program to study the performance of sonar arrays with volumetric apertures using the acoustic array testbed.

#### Continue:

- Hardware component integration, testing and installation of an acoustic array testbed to support future passive sonar system designs.
- Development of adaptive beamforming technology.

### • **Counter Torpedo Detection, Classification, and Localization (DCL) (Component of LASW FNC)**

#### Continue:

- Performance evaluation of a prototype end-to-end surface ship torpedo protection system against two torpedoes launched in quick succession.
- Integration of project products into the AN/WSQ-11 "Block II and III" system upgrades. Products will transition to PE 0603506N, Project F0225.

	FY02	FY03	FY04	FY05
Cooperative Anti-Submarine Warfare (ASW)	6,646	6,968	6,198	6,584

Cooperative ASW technology developments enable ASW platforms to work together effectively to detect, classify and localize very quiet undersea targets. Many of the tools required to achieve this objective are developed under the heading of Integrated Anti-Submarine Warfare (IASW) in Program Elements (P.E.s) 0602235N and 0603235N. In this P.E., the focus of this activity is to demonstrate the operational utility of employing these IASW tools together with ASW sensor technologies developed as part of the Battlgroup ASW Defense, Wide Area ASW Surveillance, and Neutralization

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program areas. Demonstrations are conducted primarily in conjunction with Fleet platforms and exercises. This activity includes support to Project Morgan; details are of a higher classification.

## FY 2002 ACCOMPLISHMENTS:

### • Littoral Warfare Advanced Demonstration (LWAD) (Component of LASW FNC)

#### Continued:

- LWAD scientific support, fleet and research vessel coordination, test reconstruction, logistical and environmental compliance support for three ASW, at-sea experiments involving multiple technologies. One experiment was conducted around the Continental United States(CONUS), overseas. The overseas experiments were collaborative with the Surface Warfare Development Group(SWDG), and the other collaborative with The Technical Cooperative Program (TTCP) with participation from the United Kingdom, Canada, New Zealand and Australia.

## FY 2003 PLANS:

### • Littoral Warfare Advanced Demonstration (LWAD)

#### Continue:

- LWAD test planning, scientific support, fleet and research vessel coordination, test reconstruction, logistical and environmental compliance support for two Littoral ASW (LASW) Future Naval Capability (FNC) initiatives, with one overseas experiment and one CONUS demonstration

## FY 2004 PLANS:

### • Littoral Warfare Advanced Demonstration (LWAD)

#### Continue:

- LWAD test planning, scientific support, fleet and research vessel coordination, test reconstruction, logistical and environmental compliance support for two LASW FNC CONUS at-sea experiments and one overseas demonstration in collaboration with TTCP and involving multiple acoustic and non-acoustic ASW technologies.

## FY 2005 PLANS:

### • Littoral Warfare Advanced Demonstration (LWAD)

#### Continue:

- LWAD test planning, scientific support, fleet and research vessel coordination, test reconstruction, logistical and environmental compliance support for one LASW FNC CONUS at-sea experiment and two overseas demonstrations involving multiple acoustic and non-acoustic ASW technologies.

	FY02	FY03	FY04	FY05
<b>Neutralization</b>	10,468	9,353	8,200	9,200

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Effort includes:

- **Dynamic System Mechanics Advanced Simulation (DYSMAS) Full-Scale Modeling and Validation** - Part of the family of Coupled Eulerian-Lagrangian (CEL) hydrocodes that has the capability of modeling the interaction between underwater explosions and 3D naval structures including surfaced and submerged underwater vehicles. Effort addresses the adaptation, application and validation of DYSMAS explosion effects hydro-code and off-board sensors. This effort terminated in FY02.
- **Non-Traditional Homing (Component of LASW FNC)** addresses the demonstration of the operational utility of a stealthy torpedo detection, classification and homing sensor. This is a high risk development that holds promise for providing an improvement in probability of kill that is revolutionary.
- **Weapon/Platform Connectivity (Component of LASW FNC)** addresses development of technologies to enable a Heavyweight torpedo and a shooting platform to be effectively employed as a fully linked on-board and off-board sensor system.
- **SwampWorks Advanced Torpedo (SAT)** effort demonstrates technologies to meet emerging challenges of low Doppler, small targets (diesel submarines), in harsh littoral environments.

FY 2002 ACCOMPLISHMENTS:

- **DYSMAS Full-Scale Modeling and Validation**

Terminated:

- PE 0603747N effort terminated in FY02; DYSMAS hydro-code development effort continues in PE 0602747N (Neutralization)

- **Weapons Platform Connectivity**

Continued:

- Development of technologies to enable a Heavyweight torpedo and a shooting platform to be effectively employed as a fully linked on-board and off-board sensor system. Transitioned eight (8) hardware and software technologies to MK48 Common Broadband Active Sonar System (CBASS) acquisition program (PE 0205632N, Project F0366).

FY 2003 PLANS:

- **Weapons/Platform Connectivity**

Continued:

- Development of technologies to enable a Heavyweight torpedo and a shooting platform to be effectively employed as a fully linked on-board and off-board sensor system. Transition broadband signal processing and intelligent torpedo control algorithms (for improved performance) to MK-48 CBASS Program (PE 0205632N, Project F0366).

- **SwampWorks Advanced Torpedo (SAT)**

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<sup>1</sup> Part of the family of Coupled Eulerian-Lagrangian (CEL) hydrocodes that has the capability of modeling the interaction between underwater explosions and 3D naval structures including surfaced and submerged underwater vehicles.

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## Initiate:

- Demonstration of the advanced half-length torpedo vehicle self noise, stability and control, and a proof-of-concept littoral upgrade to the Mk 48 advanced capability (ADCAP) sonar. Demonstration of a broadband recording system. Demonstration of technologies for a new rechargeable electric propulsion system for the SAT.

## FY 2004 PLANS:

### • **Non-Traditional Homing**

#### Initiate:

- Development of a non-traditional homing sensor system to provide a robust adjunct homing capability - including a technical assessment of the viability of integrating the sensor of choice into the MK48 Common Broadband Active Sonar System (MK48 CBASS).

### • **Weapons/Platform Connectivity**

#### Continue:

- Development of technologies to enable a Heavyweight torpedo and a shooting platform to be effectively employed as a fully linked on-board and off-board sensor system.

### • **SwampWorks Advanced Torpedo (SAT)**

#### Continue:

- Demonstration of the advanced half-length torpedo vehicle self noise, stability and control, and a proof-of-concept littoral upgrade to the Mk 48 advanced capability (ADCAP) sonar. Demonstration of a broadband recording system. Demonstration of technologies for a new rechargeable electric propulsion system for the SAT.

## FY 2005 PLANS:

### • **Non-Traditional Homing**

#### Continue:

- Development of a non-traditional homing sensor system to provide a robust adjunct homing capability - including initiating competitive design/manufacture of a sensor suitable for integrating into a MK48 torpedo size test vehicle.

### • **Weapons/Platform Connectivity**

#### Continue:

- Development of technologies to enable a Heavyweight torpedo and a shooting platform to be effectively employed as a fully linked on-board and off-board sensor system. Transition broadband signal processing algorithms to NAVSEA 93 Advanced Systems Technology Office Advanced processing Build - Acoustic in P.E. 0603561N Project.

#### Complete:

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Project Number: R2916

Project Title: Undersea Warfare  
Advanced Technology

- In-water demonstration of an improved probability-of-kill (Pk) for close-in submarine-on-submarine engagements.
- **SwampWorks Advanced Torpedo (SAT)**

Continue:

- Demonstration of the advanced half-length torpedo vehicle self noise, stability and control, and a proof-of-concept littoral upgrade to the Mk 48 advanced capability (ADCAP) sonar. Demonstration of a broadband recording system. Demonstration of technologies for a new rechargeable electric propulsion system for the SAT.

## C. OTHER PROGRAM FUNDING SUMMARY:

### NAVY RELATED RDT&E:

PE 0204311N (Integrated Surveillance System)  
PE 0205620N (Surface ASW Combat System Integration)  
PE 0601153N (Defense Research Sciences)  
PE 0602235N (Common Picture Applied Research)  
PE 0602747N (Undersea Warfare Applied Research)  
PE 0602782N (Mine and Expeditionary Warfare Applied Research)  
PE 0602435N (Ocean Warfighting Environment Applied Research)  
PE 0603235N (Common Picture Advanced Technology)  
PE 0603254N (ASW Systems Development)  
PE 0603506N (Surface Ship Torpedo Defense)  
PE 0603513N (Shipboard System Component Development)  
PE 0603553N (Surface ASW)  
PE 0604221N (P-3 Modernization Program)  
PE 0604261N (Acoustic Search Sensors (ENG))  
PE 0604784N (Distributed Surveillance Systems)  
PE 0604503N (SSN-688 and Trident Modernization)

### NON-NAVY RELATED RDT&E:

PE 0602173C (Support Technologies Applied Research)  
PE 0602702E (Tactical Technology)  
PE 0603739E (Advanced Electronics Technologies)  
PE 0603763E (Marine Technology)

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

DATE: February 2003

BUDGET ACTIVITY: 3

PROGRAM ELEMENT: 0603747N

Project Number: R2916

PROGRAM ELEMENT TITLE: Undersea Warfare Advanced  
Technology

Project Title: Undersea Warfare  
Advanced Technology

D. ACQUISITION STRATEGY: Not Applicable

UNCLASSIFIED

# UNCLASSIFIED

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

DATE: February 2003

BUDGET ACTIVITY: 3      PROGRAM ELEMENT: 0603747N  
PROGRAM ELEMENT TITLE: Undersea Warfare Advanced  
Warfare  
Technology

Project Number: R2916  
Project Title: Undersea

Advanced

Technology

Congressional Plus-Ups:

R2844/ Magnetrestrictive Transduction	FY02	FY03
	2,017	N/A

Conducted investigations into three cost reduction methods for the production of Terfenol-D (magnetorestrictive, high-strain transducer materials). In the aggregate, these cost saving methods can potentially reduce the cost by as much as 90%.

R2846/Low Frequency Broadband Acoustic Airgun Source	FY02	FY03
	1,256	*

\* Funded in FY03 in Project R9164

Developed a compact airgun source for use in detecting quiet submarines in shallow water and deployable from small platforms. Finalized the system design and conducted mechanical, electrical, and acoustic shakedown tests.

R9164/Motorized Airgun Program	FY02	FY03
	*	978

\* Funded in FY02 in Project R2846.

The Motorized Airgun project will conduct an at-sea experiment of the design completed in FY-02, analyze the results and formulate a plan for transition.

R9165/University Oceanographic Laboratory System	FY02	FY03
	N/A	3,423

The University Oceanographic Laboratory System will provide support for research time at sea and to upgrade vessel research capabilities, as well as enhancements to ensure vessel operation reliability.

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