FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: June 2001

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602435N
PROGRAM ELEMENT TITLE: Ocean Warfighting Environment Applied Research

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
N/A Ocean Warfighting Environment Applied Research	66,642	76,363	50,738

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE)-previously named Oceanographic and Atmospheric Technology - provides the unique, fundamental programmatic instrument by which basic research on the natural-environment is transformed into technology developments that provide new or enhanced warfare capabilities for the Battlespace Environment (BSE). We use natural-environment and BSE interchangeably; each term is to be understood to potentially encompass aspects of the ocean, atmosphere, space, or land.

(U) This PE also provides technologies that form the natural-environment technical base on which all systems development and advanced technology depend. This PE contains the National Oceanographic Partnership Program (NOPP)(Title II, subtitle E, of Public Law 104-201) enacted into law for FY 1997. A major component of the program supports Organic Mine Countermeasures (MCM). The objectives of the PE are met through measuring, analyzing, modeling and simulating, and applying environmental factors affecting naval materiel and operations in the BSE.

(U) Due to the breadth of efforts included in this PE, the programs described in the Accomplishments and Plans sections are representative selections of the work included in this PE.

(U) This PE provides for BSE technology developments that contribute to meeting top joint warfare capabilities established by the Joint Chiefs of Staff. Major efforts of this PE are devoted to (1) gaining real-time knowledge of the BSE, (2) determining the natural-environment needs of regional warfare, (3) providing the on-scene commander the capability to exploit the environment to tactical advantage, and (4) developing atmospheric research related to detection of sea-skimming missiles and strike warfare.

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(U) This PE provides natural-environment applied research for all fleet operations and for current or emerging systems. This PE supports virtually all the Joint Mission Areas/Support Areas with primary emphasis on Joint Littoral Warfare and Joint Strike Warfare. Specifically:

(U) Joint Littoral Warfare efforts address issues in undersea, surface, and air battlespace. Programs include ocean and atmospheric prediction for real-time description of the operational environment, shallow water acoustics and multiple-influence sensors for undersea surveillance and weapon systems, and influences of the natural environment on mine countermeasure (MCM) systems.

(U) Joint Strike Warfare efforts address issues in air battlespace dominance. Programs include influences of the natural environment on electromagnetic (EM)/electro-optic (EO) systems used in the targeting and detection of missile weapon systems as well as improvements in tactical information management about the BSE.

(U) These efforts support the Joint Warfare Strategy "Forward From the Sea." This program fully supports the Director of Defense Research and Engineering’s Science and Technology Strategy and is coordinated with other DoD Components through the Defense Science and Technology Reliance process. Work in this PE is related to and fully coordinated with efforts in accordance with the ongoing Reliance joint planning process. There is close coordination with the US Air Force and US Army under the Reliance program in the Battlespace Environment categories of Lower Atmosphere, Ocean Environments, Space & Upper Atmosphere, and Terrestrial Environments.

(U) The Navy program includes projects that focus on, or have attributes that enhance, the affordability of warfighting systems.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within APPLIED RESEARCH, Budget Activity, because it investigates technical advances with possible applications toward solution of specific Naval problems, short of a major development effort.

(U) PROGRAMS PLANS AND ACCOMPLISHMENTS:

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BSE* SENSORS & DATA	**FY00-$16,800**	**FY01-$19,850**	**FY02-$7,349**
Initiate	• Participation in GODAE*		
Continue	• Advanced Ocean Wave Prediction • Bioluminescence Sensor • Physics-Based Models for Hyperspectral Sensors • Naval Impact of Natural Environmental Processes, especially in the Littoral Zone • AUV* Sensors and Technology for Oceanography/MCM*	• GODAE* • Advanced Ocean Wave Prediction • Bioluminescence Sensor • Physics-Based Models for Hyperspectral Imaging Sensors • Naval Impact of Natural Environmental Processes, especially in the Littoral Zone • AUV* Sensors and Technology for Oceanography/MCM*	• GODAE* • Bioluminescence Sensor • Physics-Based Models for Hyperspectral Imaging Sensors • Naval Impact of Natural Environmental Processes, especially in the Littoral Zone • AUV* Sensors and Technology for Oceanography/MCM*
Complete	• Components of AUV* Technology Transitioned to Higher Category Programs	• Preliminary Field Tests of New Digital Bioluminescence Sensor • Completion of Phase I of Testing Utility of Synthetic Aperture Sonar for Increased Ranges	• Advanced Ocean Wave Prediction

*AUV=Autonomous Underwater Vehicle; BSE=Battlespace Environment; GODAE=Global Ocean Data Assimilation Experiment; MCM=Mine Countermeasures

BSE* CONCEPT ENABLERS	**FY00-$22,902**	**FY01-$25,658**	**FY02-$20,510**
Initiate	• FY00 BAA* Awards for the National Oceanographic	• Capturing Uncertainty	• Marine Mammals Program

	• Naval Battlespace Awareness • Geoclutter	• Air-Sea Interaction	
Continue	• Precise Time/Time Interval • National Oceanographic Partnership Program • Biosensor Technology • SecNav/CNO* Ocean Chairs • Collaborative Efforts with Basic Research Programs • Dual Use Radar Effort	• Naval Battlespace Awareness • Precise Time/Time Interval • Geoclutter • National Oceanographic Partnership Program • Biosensor Technology • SecNav/CNO* Ocean Chairs • Collaborative Efforts with Basic Research Programs	• Naval Battlespace Awareness • Precise Time/Time Interval • Geoclutter • Capturing Uncertainty • Air-Sea Interaction • National Oceanographic Partnership Program • SecNav/CNO* Ocean Chairs • Collaborative Efforts with Basic Research Programs
Complete	• FY97 BAA* Projects in National Oceanographic Partnership Program • NBA* Workshop Report Published	• Dual Use Radar Tactics and Weather Effort • FY98 BAA* Projects in National Oceanographic Partnership Program	• Biosensor Technology

*BAA=Broad Agency Announcement; BSE=Battlespace Environment; NBA=Naval Battlespace Awareness; SecNav/CNO=Secretary of the Navy/Chief of Naval Operations

OCEAN AND ATMOSPHERIC MODELING/ PREDICTION AND EFFECTS	**FY00-$14,858**	**FY01-$16,901**	**FY02-$12,157**
Initiate	• Distributed Marine Environment Forecast System • Construction of an End-to-End		

	Observation/Analysis/Prediction System for Coastal Aerosols and Dust		
Continue	• Ocean Model Nowcast/Forecast at a variety of Scales (Global, Regional, Semi-Enclosed Seas, Local), including Relocateable and Nested Models • Advanced On-Board Ocean Models • Model Testing/Validation • Coupled Ocean/Atmosphere Models • Nested Atmospheric Models (Global, Regional, Local) • On-Scene Weather Prediction • Atmospheric Effects on EM/EO*	• Ocean Model Nowcast/Forecast at a variety of Scales (Global, Regional, Semi-Enclosed Seas, Local), including Relocateable and Nested Models • Advanced On-Board Ocean Models • Model Testing/Validation • Coupled Ocean/Atmosphere Models • Nested Atmospheric Models (Global, Regional, Local) • On-Scene Weather Prediction • Atmospheric Effects on EM/EO* • Construction of an End-to-End Observation/Analysis/Prediction System for Coastal Aerosols and Dust	• Ocean Model Nowcast/Forecast at a Variety of Scales (Global, Regional, Semi-Enclosed Seas, Local), including Relocateable and Nested Models • Advanced On-Board Ocean Models • Model Testing/Validation • Coupled Ocean/Atmosphere Models • Nested Atmospheric Models (Global, Regional, Local) • On-Scene Weather Prediction • Atmospheric Effects on EM/EO* • Construction of an End-to-End Observation/Analysis/Prediction System for Coastal Aerosols and Dust
Complete	• Participation in the California Air Resources Board Program "PM-10" • Distributed Marine Environment Forecast System • Field Demonstrations of the Tactical Environmental Processor		

*EM/EO=Electromagnetic/Electro-Optic

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Naval Warfare System-Focused Efforts	**FY00-$12,082**	**FY01-$13,954**	**FY02-$10,722**
Initiate	• 3-D Geoacoustic Predictions & Inversion of Chirp Sonar Data for Seabed Inhomogeneities • Soliton Packet Predictions using Remote Acoustics		
Continue	• Remote Sensing Techniques, especially Hyperspectral Technology for the Littoral Zone • Bi-Static and Multi-Static Active Acoustics • Rapidly Adaptive Environmental Transfer Functions • Environmental Impact on Acoustics/Multi-Sensor Systems and Processing Techniques, especially in Shallow Water, at both Undersea Surveillance and MCM* Frequencies • Internal Wave/Coastal Front Influences on Acoustic Propagation	• 3-D Geoacoustic Predictions & Inversion of Chirp Sonar Data for Seabed Inhomogeneities • Soliton Packet Predictions using Remote Acoustics • Remote Sensing Techniques, especially Hyperspectral Technology for the Littoral Zone • Bi-Static and Multi-Static Active Acoustics • Rapidly Adaptive Environmental Transfer Functions • Environmental Impact on Acoustics/Multi-Sensor Systems and Processing Techniques, especially in Shallow Water, at both Undersea Surveillance and MCM* Frequencies • Internal Wave/Coastal Front Influences on Acoustic	• 3-D Geoacoustic Predictions & Inversion of Chirp Sonar Data for Seabed Inhomogeneities • Soliton Packet Predictions using Remote Acoustics • Remote Sensing Techniques, especially Hyperspectral Technology for the Littoral Zone • Bi-Static and Multi-Static Active Acoustics • Rapidly Adaptive Environmental Transfer Functions • Environmental Impact on Acoustics/Multi-Sensor Systems and Processing Techniques, especially in Shallow Water, at both Undersea Surveillance and MCM* Frequencies • Internal Wave/Coastal Front Influences on Acoustic

		Propagation	Propagation
Complete	• Characterization of Bubble Distributions in Littoral Zones • Contaminant Transport Modeling in Complex BSE*		

*BSE=Battlespace Environment; MCM=Mine Countermeasures

SBIR	FY00	FY01 - $1,264	FY02
Initiate	• N/A	• Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638	• N/A

(U) PROGRAM CHANGE SUMMARY:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget	72,681	60,320	63,764
Appropriated Value:			
Adjustments from FY 2001 President's Budget:			
PE Restructure			-13,826
Execution Adjustment	-4,803		
Congressional Recission	-285	-707	
Congressional Plus-up		+16,750	
Federal Technology Transfer	-6		
Non Pay Inflation			+55
NWCF Rate Adjustment			+324

NMCI- Reimbursable Funding			+421
SBIR/STTR Transfer	-945		
FY 2002 PRESBUDG Submission	66,642	76,363	50,738

(U) CHANGE SUMMARY EXPLANATION:

(U) Schedule: Not Applicable.

(U) OTHER PROGRAM FUNDING SUMMARY: The Navy's 6.1 program contributes to this effort.

(U) NAVY RELATED RDT&E:
- (U) PE 0601153N (Defense Research Sciences)
- (U) PE 0602114N (Power Projection Applied Research)
- (U) PE 0602123N (Force Protection Applied Research)
- (U) PE 0602235N (Common Picture Applied Research)
- (U) PE 0602271N (RF Systems Applied Research)
- (U) PE 0602747N (Undersea Warfare Applied Research)
- (U) PE 0602782N (Mine and Expeditionary Warfare Applied Research)
- (U) PE 0603207N (Air/Ocean Tactical Applications)
- (U) PE 0603271N (RF Systems Advanced Technology)
- (U) PE 0603747N (Undersea Warfare Advanced Technology)
- (U) PE 0603782N (Mine & Expeditionary Warfare Advanced Technology)
- (U) PE 0604218N (Air/Ocean Equipment Engineering)

(U) NON NAVY RELATED RDT&E:
- (U) PE 0602101F (Geophysics)
- (U) PE 0602601F (Phillips Lab Exploratory Development)
- (U) PE 0602784A (Military Engineering Technology)
- (U) PE 0603410F (Space Systems Environmental Interactions Technology)
- (U) PE 0603707F (Weather Systems Technology

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(U) SCHEDULE PROFILE: Not applicable.