National Oceanographic Partnership Program

NAVY	EPA	OMB
NOAA	USCG	DoS
NSF	USGS	OSTP
NASA	USACE	DARPA
DoE	MMS	DHS

Report to the U.S. Congress on the National Oceanographic Partnership Program

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National Ocean Research Leadership Council

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I. Executive Summary

Established in FY 1997, the National Oceanographic Partnership Program (NOPP) promotes the national goals of assuring national security, advancing economic development, protecting quality of life, and strengthening science education and communication through improved knowledge of the ocean. The National Ocean Research Leadership Council (NORLC), now comprising leaders of fifteen Federal agencies, guides NOPP in identifying and carrying out partnerships among Federal agencies, industry, and other members of the ocean sciences community in support of those goals.

In the first seven years of the Program, NOPP-Funded activities focused on the following five areas: operational/routine observations, research "observatories", observational technique development, a "commons" for ocean information, and outreach/education. In FY 2004, NOPP developed a new Ten-Year Strategic Plan. The prior investment areas were coalesced and re-configured to address four NOPP Goals established in the Strategic Plan: Achieve and Sustain an Integrated Ocean Observing System (IOOS); Promote Lifelong Ocean Education; Modernize Ocean Infrastructure and Enhance Technology Development; and Foster Interagency Partnerships to Increase and Apply Scientific Knowledge. NOPP-Funded activities are those that are either solicited or managed by NOPP and involve support from two or more agencies. Overall investment in NOPP-funded activities, which totaled $30 million in FY 2004, has increased significantly since the program's inception. From FY 1997 to FY 2004, NOPP has funded 93 projects, including 20 renewal projects, in response to Broad Agency Announcements and Requests for Proposals. Of the total funds awarded during this period, approximately 56 percent, 26 percent and 18 percent went to academia, government and industry (including non-governmental organizations/others), respectively.

In addition to NOPP-Funded activities, individual agencies invest in NOPP-related activities, which are funded primarily by a single agency in response to plans produced by NOPP entities. Examples include several projects related to the development of an Integrated Ocean Observing System, which is coordinated through a NOPP interagency office called Ocean.US.

Highlights of the NOPP Program in FY 2004 and early FY 2005 include the funding of individual projects, as well as progress on broader planning efforts. Ten projects were funded in FY 2004. In recognition of the fundamental role of partnerships in NOPP activities, the 2004 NOPP Award for Excellence in Partnering went to the project "Estimating the Economic Benefits of Regional Ocean Observing Systems." The team developed techniques for estimating potential economic benefits from coastal ocean observing information and applied these to a set of industrial and recreational activities in ten regions encompassing all coastal waters of the United States.

In terms of broader planning efforts, the Federal Oceanographic Facilities Committee (FOFC) is developing an integrated, cross-agency research fleet plan. Ocean.US has completed the draft of the First Annual IOOS Development Plan. The Ocean Research Advisory Panel convened a meeting on the Ocean Biogeographical Information Systems in support of ecosystem-basedmanagement.

II. Introduction

The FY 1997 Defense Authorization Act (P.L. 104-201) directed the Secretary of the Navy to establish the National Oceanographic Partnership Program. Supplemental legislation for appointments to the NOPP oversight body, the National Ocean Research Leadership Council, and the Ocean Research Advisory Panel (ORAP) is contained in Public Law 105-85, the FY 1998 Defense Authorization Act.

The Secretary of the Navy is charged in Subtitle E of title II, Division A, Public Law 104-201 to establish a National Oceanographic Partnership Program to:

1) promote the national goals of assuring national security, advancing economic development, protecting quality of life, and strengthening science education and communication through improved knowledge of the ocean; and

2) coordinate and strengthen oceanographic efforts in support of those goals by:
    a) identifying and carrying out partnerships among Federal agencies, academia, industry, and other members of the oceanographic scientific community in the areas of data, resources, education, and communication, and
    b) reporting annually to Congress on the Program.

This report addresses the latter component of the statutory requirement.

NOPP Organization: The NOPP organizational chart is shown below.

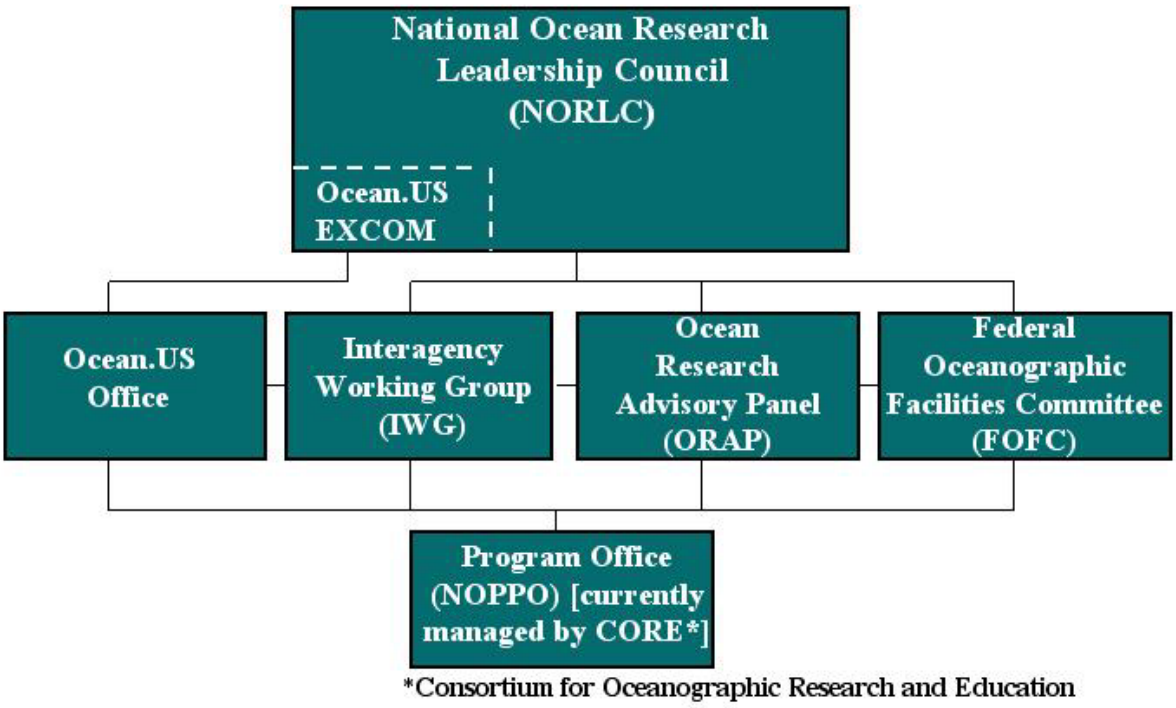

Figure 1. NOPP Organizational Chart

The **National Ocean Research Leadership Council** is the decision-making body of NOPP. The Council confirms Program activities and funding opportunities and is composed of the heads of fifteen federal agencies that are involved in conducting or funding ocean research or developing ocean research policy. The current list of members can be found in Appendix 1.

The **Ocean Research Advisory Panel** provides advice and scientific guidance to NOPP. It is composed of representatives from the National Academies, ocean industries, state governments, academia, and other organizations/communities as appropriate. The current list of members can be found in Appendix 2.

The **Interagency Working Group** (IWG) performs staffing functions assigned by, and on behalf of, the NORLC. Membership reflects that of the NORLC. The current list of members can be found in Appendix 3.

The **Federal Oceanographic Facilities Committee** advises the NORLC on policies, procedures, and plans relating to oceanographic facility use, upgrades, and investments. Membership is composed of federal oceanographic facilities managers. The current list of members can be found in Appendix 4.

The **Ocean Observations Executive Committee** (EXCOM) serves as the oversight body for the Ocean.US Office. Membership is composed of NOPP agencies that are both party to the Ocean.US Memorandum of Agreement and have provided personnel or other resources to the Ocean.US Office.

The **Ocean.US Office** serves as the national focal point for integrating ocean observing activities. Its goal over the next decade is to integrate existing and planned elements to establish a sustained ocean observing system to meet common research and operational agency needs.

The **National Oceanographic Partnership Program Office** (NOPPO) was established by the legislation to assist in the management of NOPP and provide daily administrative support. Using competitive procedures, a 5-year contract for the operation of the NOPPO was awarded to the Consortium for Oceanographic Research and Education (CORE) on 14 July 1997. The NOPPO contract was re-competed in 2002 and was awarded to CORE on 5 February 2003.

III. NOPP Investment Strategy

In August 2004, the NORLC approved a new Ten-Year Strategic Plan for NOPP (see Insert or http://www.nopp.org/) outlining the four NOPP Strategic Goals. The Goals, listed below, are based on the original NOPP investment areas as revised to reflect seven years of experience in an evolving political and scientific climate. Agency and ocean science community inputs, Congressional direction, scientific advice of the ORAP, an increased understanding of NOPP's role beyond the missions of the individual agencies, and input from the U.S. Commission on Ocean Policy (USCOP) are incorporated into these Goals. The Plan was also used to shape the development of the U.S. Ocean Action Plan.

Each of the four Goals has listed one Critical Action as a specific target for which action-partnerships can be formed and performance metrics can be developed and applied. The Critical Actions are the minimum acceptable progress for this Ten-Year Strategic Plan. The challenge for NOPP is the construction of interagency and inter-sector partnerships and support mechanisms to ensure at least the Critical Actions for the Goals are completed within ten years.

The intention of this Strategic Plan is to provide a structure valid for ten years, during which time the NOPP partners can work to pursue at least the Critical Actions. More Actions will be added, implementation plans will be prepared, and metrics will be developed and tracked for each agreed Action. This Strategic Plan will be updated periodically as needed, but it is intended to be generally valid for a decade. Plans to address the Actions, and their associated metrics, will be documented separately from this Strategic Plan, and are intended for annual assessment and update.

The following is an excerpt from the NOPP Ten-Year Strategic Plan:

NOPP GOALS...TO BE ACHIEVED WITHIN TEN YEARS

Goal 1 Achieve and sustain an Integrated Ocean Observing System (IOOS).

Purpose: Provide coastal and global ocean data and products for decision-makers, researchers, and other operational/practical purposes, in support of the four NOPP Strategic Objectives and the seven IOOS Objectives, namely:

> 1) Improve predictions of climate change and variability (weather) and their effects on coastal communities and the nation; 2) Improve the safety and efficiency of marine operations; 3) More effectively mitigate the effects of natural hazards; 4) Improve national and homeland security; 5) Reduce public health risks; 6) More effectively protect and restore healthy coastal marine ecosystems; and 7) Enable the sustained use of marine resources.

Critical Action: Through the interagency Ocean.US office, stabilize and integrate existing ocean observation programs to provide timely and sustained ocean data and data products with minimal gaps, affordable costs, and maximal utility.

Goal 2 Promote lifelong ocean education.

Purpose: Instill in the general public and governmental decision-makers the importance of wise stewardship of the ocean and the coastal zone, through the support of science education and communication.

Critical Action: Facilitate and support the use of ocean examples in the teaching of the National Research Council's National Science Education Standards.

Goal 3 Modernize ocean infrastructure and enhance technology development.

Purpose: Provide access to state-of-the-art tools, training, and facilities for effective and efficient utilization by national ocean programs, in support of the four NOPP Strategic Objectives.

Critical Action: Implement the Federal Oceanographic Facilities (FOFC) fleet renewal plan.

Goal 4 Foster interagency partnerships to increase and apply scientific knowledge.

Purpose: Enable and ensure multi-agency efforts in support of the four NOPP Strategic Objectives where such collaboration enhances efficiency or effectiveness, and/or reduces costs.

Critical Action: Narrow the gap between biological/chemical measurements and physical measurements in support of the science underlying ecosystem-based management.

With consensus agreement, additional goals or investment areas may be added.

IV. NOPP Investment Profile

Overall fiscal investment in NOPP has increased since startup in 1997 and can best be described in terms of NOPP-Funded Activities and NOPP-Related Activites. NOPP-Funded Activities are those that are either solicited or managed by NOPP and involve support from two or more agencies. NOPP-Related Activities are those that are funded primarily by a single agency in response to plans produced by NOPP entities. Both types of activities have grown since NOPP's inception.

NOPP FUNDED ACTIVITIES

Figure 2 shows the growth of NOPP-Funded Activities from 1997-2004 as well as the breakdown by subcategory for Solicited Projects and Managed Activities. In 2004, the total funding was $30M.

NOPP Solicited Projects

NOPP Solicited Projects are those funded as a direct result of a formal NOPP Broad Agency Announcement (BAA) or Request For Proposals (RFP). The funding level for solicited projects has grown from $12M in 1997 to $26M in 2004 (Figure 2). The cumulative investment over seven years is $150M. Through 2004, there have been 93 funded projects, including 20 renewal projects. On average, 12 new projects are started each year, with a typical duration of three years.

One of the primary functions of NOPP is to promote partnerships within the Federal government and between the Federal government and other members of the ocean sciences community – including academia, industry and non-governmental organizations. Figure 3 shows the annual distribution of funding for new awards across sectors within the ocean science community. Approximately 56 percent, 26 percent and 18 percent were awarded to academia, government and industry (including non-governmental organizations/others), respectively.

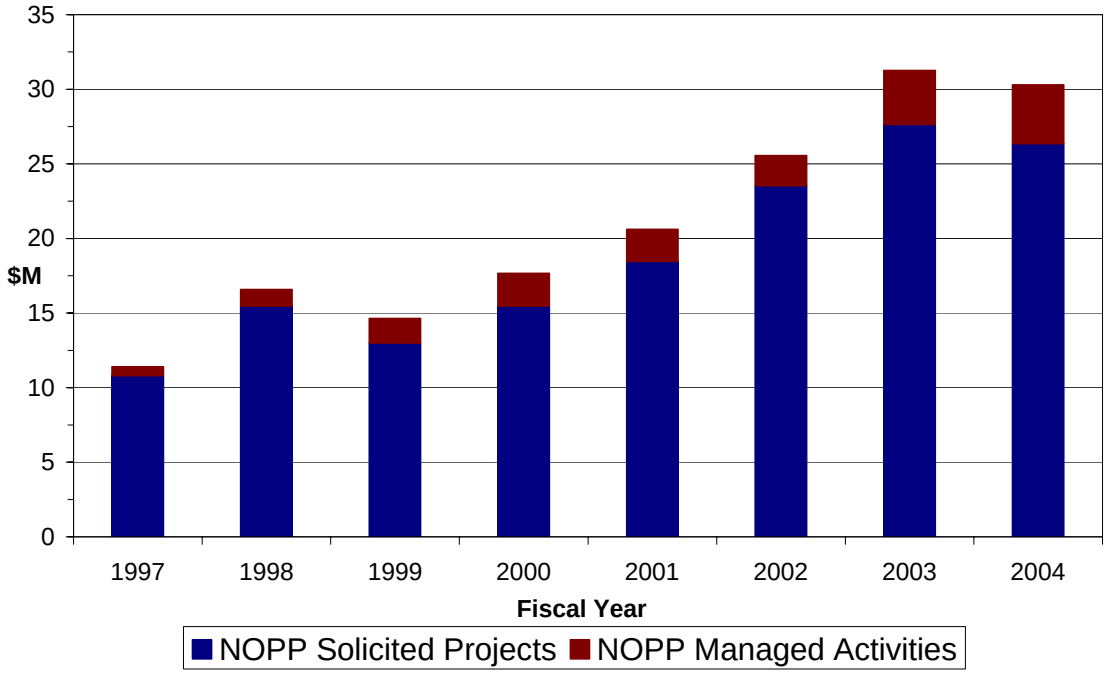

Figure 2. FY 1997-2004 Investment in NOPP Funded Activities, including both NOPP Solicited Projects and NOPP Managed Activities. Note that the dollar amounts shown are those spent each year; out-year commitments are not shown. The bar on the right indicates the sector averages over 1997-2004 for all NOPP Solicited Project awards.

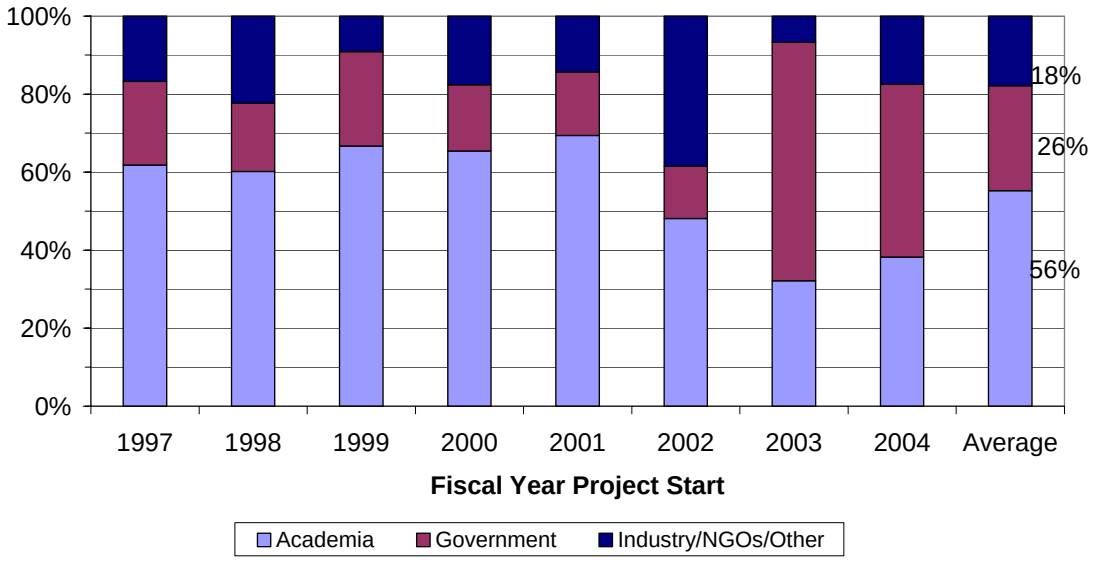

Figure 3. Bar graph showing the annual NOPP funding for new solicited project awards by sector from 1997-2004 for academia, government, industry and NGOs/others. The bar on the far right indicates the eight-year sector average.

NOPP Managed Activities

NOPP Managed Activities include expenditures for the NOPP Office, the Ocean.US office, the National Ocean Sciences Bowl, the Ocean Information Technology Infrastructure initiative, the Virtual Ocean Data System and the Year of the Ocean Drifters. The cumulative expenditure for these activities is $17.4M from 1997-2004 (Figure 2).

NOPP RELATED ACTIVITIES

In addition to NOPP Funded Activities, individual agencies invest in NOPP Related Activities. Examples include new investments in activities overseen by NOPP entities such as Ocean.US and FOFC. These investments fulfill the broad cross-cutting oceanographic goals and partnerships embraced by NOPP, but they are primarily single agency expenditures.

V. Fiscal Year 2004 Activities

NOPP FUNDED ACTIVITIES

NOPP Solicited Projects

The NOPP agencies invested approximately $16M in new NOPP-solicited projects in FY 2004 in response to two solicitations, a Request for Proposals in July 2003 and a Broad Agency Announcement in August 2003. The solicitations employed a peer-review process to determine which proposals would be funded, and awards were approved by the IWG on behalf of the NORLC.

The first FY 2004 NOPP Solicitation was an RFP issued by the Minerals Management Service (MMS) on which focused on *Surface Circulation Radar Mapping in Alaskan Coastal Waters: Field Study Beaufort and Cook Inlet.* The total funding level was $900K for up to four years of effort. The solicitation is included as Appendix 5.1.

The second FY 2004 NOPP Solicitation, a BAA was issued by the Office of Naval Research (ONR) on three topics: *Sea Surface Temperature (SST) for the Global Ocean Data Assimilation Experiment (GODAE), A Wireless Network for the U.S. Coastal Zone* and 5 subtopics focused on *Marine Mammals.* Total funding available was approximately $16M, the solicitation is included as Appendix 5.2.

In response to these two solicitations, 36 proposals were received and subjected to a competitive peer-review process. Ten projects were funded and approved by the IWG on behalf of the NORLC. The funded projects are listed below and project summaries are provided in Appendix 6.

<u>Topic A: Operational / Routine Observations</u>

Surface Circulation Radar Mapping in Alaskan Coastal Waters: Field Study Beaufort Sea and Cook Inlet
Lead PI: Dr. Dave Musgrave

Multi-sensor Improved Sea Surface Temperature (MISST) for GODAE
Lead PI: Dr. Chelle A. Gentemann

U. S. GODAE: Sustained Global Ocean State Estimation for Scientific and Practical Application
Lead PI: Dr. Carl Wunsch

Topic C: Observational Technique Development

An Integrated Wireless Coastal Communications Network
Lead PI: Dr. Robert A. Nichols

Topic M: Marine Mammals

Acoustics in the Cetaceans' Environment: A Multimedia Educational Package
Lead PI: Dr. Marc S. Dantzker

An Annotated and Federated Digital Library of Marine Mammal Sounds
Lead PI: Dr. Jack W. Bradbury

Measuring the Behavior of Beaked Whales and Their Responses to Sound Using a Digital Recording Tag
Lead PI: Drs. Mark Johnson and Peter Tyack

Models of Beaked Whale Hearing and Responses to Underwater Noise
Lead PI: Dr. Darlene Ketten

Radar-Based Detection, Tracking and Speciation of Marine Mammals from Ships
Lead PI: Dr. Douglas DeProspo

Standardization of Electrophysiological Measures of Hearing in Marine Mammals
Lead PI: Drs. Colleen Reichmuth Kastak and David Kastak

NOPP Managed Activities

2004 was the seventh year of the National Ocean Sciences Bowl (NOSB®), which has grown to encompass 24 sites, 400 high schools, 2200 students and their coaches (teachers/parents). Two additional programs created to complement the NOSB®, the National Ocean Scholar Program and COAST internship, are extending the NOSB® experience while creating opportunities for students to further their interest in ocean and coastal sciences. Additional information on the NOSB® and other education projects can be found on the NOPP web site at http://www.nopp.org/.

NOPP also hosted a NOSB® booth at the American Geophysical Union Ocean Sciences (AGU, Portland, January 2004) and the American Society of Limnology and Oceanography/The Oceanography Society (ASLO/TOS, Honolulu, February 2004) meetings.

NOPP RELATED ACTIVITIES

In addition to the NOPP-Funded and NOPP-Managed Activities described above, individual agencies invested in NOPP-Related Activities. Significant examples of such investments included several projects related to the development of an Integrated Ocean Observing System.

Over the past three years (FY 2002-FY 2004), the National Oceanic and Atmospheric Administration (NOAA) has provided approximately $54M in funding through its Coastal Observation Technology System (COTS) to further the development and implementation of the IOOS. These COTS project grants are contributing to the development of the IOOS on a regional basis and are further described in Appendix 7. As part of an initial demonstration of data sharing and access capabilities of the IOOS, COTS partners and recipients of ONR ocean observing grants collaborated on the development of a web-accessible data portal (available at www.openioos.org) that provides access to the real-time and near real-time sea surface temperature, winds, and other data from satellites and buoys located in coastal waters of the continental U.S.

NATIONAL OCEAN RESEARCH LEADERSHIP COUNCIL

The NORLC met on 11 February and 20 August 2004. The NORLC granted the IWG approval authority for project awards resulting from the FY 2004 Broad Agency Announcements and Requests for Proposals. The Council approved the new NOPP Ten-Year Strategic Plan and requested that the IWG continue to develop Action Plans for each Strategic Plan goal. They also requested development of an action plan for Ocean Exploration and development of plans for NOPP Budget, Planning and Execution to enhance interagency collaboration. The minutes of both meetings are available on the NOPP web site at http://www.nopp.org.

OCEAN RESEARCH ADVISORY PANEL

The ORAP met twice in FY 2004, on 6-7 January in Washington, DC and again 29-30 June in Boulder, CO. The January meeting was the first since a full slate of new members was officially appointed to the ORAP in 2003 (Appendix 2). The committee elected Dr. Ellen Prager to serve as the first ORAP Vice-Chair. The draft NOPP Ten-Year Strategic Plan was reviewed, and ORAP endorsed the overall broad goals and direction. ORAP agreed to work with the IWG on developing subgoals and associated metrics for each of the Strategic Actions identified in the plan. ORAP also discussed issues regarding governance of the Integrated Ocean Observing System and learned more about how the National Polar Orbiting Environmental Satellite System (NPOESS) is run as an example. The ORAP also received a detailed briefing on the US Commission on Ocean Policy report. The ORAP agreed to draft and circulate a letter to the IWG with recommendations from ORAP on topics that should be included in the NOPP response. ORAP endorsed an Ocean.US pilot project to spearhead the Ocean.US Surface Current Mapping Initiative and helped hold a stakeholder workshop in support of the Ocean Biogeographic Information System (OBIS) in March 2004. During the June meeting, an education subcommittee (ORAP.ED) was initiated to provide expert input to ORAP on education matters

including the effectiveness of the NOPP education efforts and the development of an action plan for the second NOPP Strategic Goal – increasing student and public awareness, knowledge, and understanding of the ocean and NOPP Education Strategy.

FEDERAL OCEANOGRAPHIC FACILITIES COMMITTEE

The FOFC met twice in FY 2004, on 10 November 2003 and 12 April 2004. At the November 2003 meeting, Dr. Margaret Leinen (National Science Foundation) stepped down as Chair of the committee. Mr. Robert Winokur (Office of the Oceanographer of the Navy) was elected to head the committee for the next two years. During the November 2003 meeting, it was decided that FOFC would focus on developing the first update of the Academic Fleet Renewal Plan, released in December 2001. The updated plan will be expanded to cover the entire federal research fleet, in addition to the academic fleet, and address recent reports from the U.S. Commission on Ocean Policy, the U.S. Ocean Action plan, and implementation of the IOOS, with a focus on infrastructure requirements. Opportunities for coordinated acquisitions, common hull designs or mission systems will be analyzed. A FOFC working group retreat to begin formulating the structure and content of the Integrated Fleet Renewal Plan was held at Airlie Conference Center, in Warrenton, VA on 27-29 July 2004. It was agreed that the new plan would be released in September 2005.

2004 NOPP AWARD FOR EXCELLENCE IN PARTNERING

Award Ceremony for the NOPP 2004 Award for Excellence in Partnering. From left to right: Dr. Kite-Powell (WHOI), Dr. Wieand (USF), Dr. Kaiser (LSU), Dr. Colgan (USM), Dr. Pelsoci (DRC), VADM Lautenbacher (NOAA)

At the 28 February 2005 NORLC meeting, RADM Lautenbacher awarded the 2004 NOPP Award for Excellence in Partnering to the NOPP project *Estimating the Economic Benefits of Regional Ocean Observing Systems*. The project was a two-year (2002-2004) effort involving a team of researchers from around the country. The team developed techniques for estimating potential economic benefits from new investments in regional coastal ocean observing information, and applied these to a set of industrial and recreational activities in ten regions encompassing all coastal waters of the United States. The findings suggest that annual benefits to users from the deployment of ocean observing systems are likely to run in the multiple $100s of millions of dollars per year. The project was selected from among eighty-four past or present NOPP research projects. A short project description and the criteria for selecting the recipient of the Excellence in Partnering Award can be found in Appendix 8.

OCEAN.US/INTEGRATED OCEAN OBSERVING SYSTEM

Ocean.US is an interagency office created by the NORLC to plan and coordinate development of an IOOS that consists of two interdependent components, one for the global ocean and one for the nation's exclusive economic zone, the Great Lakes and estuaries. IOOS will constitute the U.S. contribution to a Global Ocean Observing System (GOOS) and reflects increasing interest in expanding the operational capabilities of oceanography. A full-time staff of seven scientists plus support staff are now assigned to this office, supplemented by a committee of users including the U.S. GOOS Steering Committee. To date, ten agencies have agreed to provide resources. Representatives of these agencies comprise an Executive Committee that provides oversight and guidance to the Office.

A major step forward was achieved in 2004 with the completion of the draft First Annual IOOS Development Plan. The plan outlines priorities for (1) a governance structure to manage IOOS development; (2) the establishment of an initial IOOS using existing observing assets; and (3) potential enhancements to the initial system through research and development. The draft plan was submitted to the NORLC and the Interagency Committee for Ocean Science and Resource Management Integration for approval in February 2005.

Establishing a fully integrated IOOS that addresses the societal goals the system is intended to benefit will take time, leadership, and effective interagency collaboration. To these ends, an annual planning and review cycle has been implemented to update the Development Plan and ensure the provision of required data and information by the IOOS and its continued improvement. As part of this planning cycle, the Second Annual IOOS Development Plan is scheduled to be completed by September 2005.

Design and implementation of the system is occurring through partnerships among federal agencies and regional associations that represent the interests of both private and public sectors in their respective regions. Establishing these collaborations and providing the information needed to complete the First Annual IOOS Development Plan were enabled during 2004 by the completion of a data management and communications (DMAC) plan for the IOOS and by three major national workshops: (1) an IOOS Education Workshop (March 22-24); (2) a Regional Organizational Workshop (28-30 March); and (3) the First Annual IOOS Implementation Workshop (31 August - 2 September).

A significant accomplishment during FY 2004 was the completion of a draft of the "Data Management and Communications Plan for Research and Operational Integrated Ocean Observing Systems" that addresses issues of interoperability and data discovery, access, and archival. The plan, to be completed in FY 2005 based on comments received during a thirty-day public review (announced in the Federal Register and widely publicized nationally), is the first in a series of documents that addresses IOOS data management and communications requirements as well as interoperability among operational and research observing systems including the National Science Foundation's Ocean Research Interactive Observatory Networks (ORION) initiative. It provides an overview of DMAC; provides technical focus on interoperable data discovery, access, and archive; and presents a detailed development time line.

The IOOS Education Workshop resulted in a strategic implementation plan for developing education, training, and public awareness networks that will both benefit from the IOOS, ocean observatories, and other sources of data and information on the oceans, coasts, and Great Lakes and contribute to IOOS development through education and technical training of the current and future work force. The plan positions IOOS education, training and public awareness efforts as one component of a larger national education effort that promotes lifelong ocean education within the context of Earth and space system education. Implementation of the plan will (1) enhance the supply of science and technology professionals essential to our Nation's economic prosperity; (2) enhance lifelong science and technology learning with an improved understanding of the ocean's role in the human life support system; and (3) provide the educated and skilled work force needed by ocean observing systems and allied enterprises.

The Regional Organizational Workshop resulted in a consensus on requirements for federal recognition of regional groups as certified Regional Associations (RAs) and an agreement to form a National Federation of Regional Associations (NFRA) to coordinate development of regional coastal ocean observing systems, enable effective exchanges of data and information among regions and federal agencies, and represent regional interests at the federal level. Regional groups represented at the workshop have begun the challenging tasks of engaging user groups from private sectors, state agencies, local and tribal organizations, NGOs, and regional offices of federal agencies in the design, implementation, operation, and improvement of the sustained observations and predictions needed to achieve the seven societal goals of the IOOS.

Federal Response to the Recommendations of the First Annual IOOS Development Conference

"We [the federal agencies] appreciate the work done by the conference attendees to formulate a clear set of consensus priorities for FY 05-06 actions and associated recommended funding. We view the priorities in the context of both maintaining current IOOS activities (including observing systems, data systems, and product-generating/delivery systems), and integrating these activities into a national backbone consistent with the Annual IOOS Development Plan in particular and with the Interagency Working Group on Earth Observations (IWGEO) 10-year plan for GEOSS [Global Earth Observation System of Systems] development in general.

1) We accept the stated priorities [(1) development of RAs and the NFRA, (2) DMAC, both nationally and regionally, and (3) Regional Pilot Projects]. Although each agency may reorder these three priorities to meet its own mission constraints, the interagency consensus is to accept the priorities as given

2) Pending appropriations for FY 05-06, we cannot yet make detailed commitments.

3) To the extent our FY 05-06 budgets and flexibility allow, we will use these priorities to guide our investment strategies.

4) We are constructing an interagency funding agreement, in which we expect all the agencies to make their best effort to participate, but not all agencies will necessarily commit to each priority topic, and the bottom line may not cover the recommended funding.

5) We are committed to using recommendations for FY 07 and beyond to help guide agency-specific program development that will contribute to the establishment of both global and coastal components of the IOOS."

- The First Annual IOOS Implementation Conference provided a forum for leaders of nascent RAs and federal agencies to identify priorities for IOOS implementation that meet both federal and regional needs. By consensus, conferees made recommendations to prioritize the global ocean-climate component of the IOOS, development of the Data Management and Communications (DMAC) subsystem of IOOS, establishment of RAs and the National Federation of Regional Associations, and implementation of selected pilot projects to facilitate the coordinated development of the coastal and global components.

There was also strong agreement on the need to prioritize existing elements of the observing susbsystem for the national backbone, as well as coastal ocean observing systems.

VI. Fiscal Year 2005 Activities and Plans

NOPP FUNDED ACTIVITIES

FY 2005 anticipated agency contributions for NOPP Funded Activities are indicated in Table 1.

Table 1. *Anticipated Fiscal Year 2005 Agency Contributions to NOPP Funded Activities by Investment Area. This includes Solicited Projects (projects solicited through NOPP BAAs and RFPs) and Managed Activities.*

	NOAA	NAVY	NSF	NASA	MMS	DOE	EPA	USACE	USGS	DOS	USCG	OSTP	OMB	DARPA	DHS
NOPP Solicited Projects	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**						
NOPP Managed Activites	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**						
FY 2005 Anticipated Expenditures ($M)	**13.8**	**7.2**	**4.0**	**4.0**	**0.9**	*****	*****	**0.1**	*****	**0**	**0**	**0**	**0**	**0**	**0**

*anticipated expenditures of less than $100K

NOPP Solicited Projects

A BAA was issued in July 2004 for funding in FY 2005. Approximately $11.8M was to be available on the following four topics: *Fusing Multi-Sensor Regional Scale Data to Monitor and Quantify Coastal Processes; Integration of Private and Public Data Sets in the Northern Gulf of Mexico; New Methods for Detection of Fish Populations or Mapping of Fish Habitat; Sensors for Sustained Autonomous Measurement of Chemical or Biological Parameters in the Ocean*. The proposal review has concluded, and approximately 13 awards are anticipated.

NOPP Managed Activities

The Finals of the National Ocean Sciences Bowl will be held in Biloxi, MS, on 23-25 April 2005. This will be the eighth year of the program. NOPP hosted a NOSB® exhibit booth at the AGU meeting in San Francisco in December 2004 and will return in December 2005.

NOPP RELATED ACTIVITIES

The agencies of the Ocean.US EXCOM will continue to support the office and activities of Ocean.US. NOAA will continue to support COTS projects and to help build regional observing system capacity and support the establishment of RAs and the NFRA. The FY 2005 funding level for COTS projects is approximately $24.9M, mostly directed to specific projects.

A November 2004 workshop was held at the NOAA Coastal Services Center for recipients of COTS and ONR coastal and ocean observing awards as well as representatives from each of the nascent RAs to enhance coordination, especially data integration, among recipients and other collaborators in each region. The principal outcome of the workshop was a consensus among COTS and ONR partners to work towards a near real-time integrated "nowcast" demonstration of coastal conditions. Workshop participants identified five critical topics that need to be addressed to accomplish a successful data integration demonstration: metadata, quality control and assurance, data assembly and aggregation, common interface with specialized content, and communication facilitation. Working groups were organized to address specific challenges and common approaches for dealing with each of these five topics areas.

NATIONAL OCEAN RESEARCH LEADERSHIP COUNCIL

The NORLC met on 28 February 2005. Highlights included discussion of FY 2004 funded projects, potential new directions for NOPP Research and Ocean Exploration, the status of the Ocean.US IOOS Development Plan, the new FOFC Fleet Renewal Plan, and NOPP's activities in light of the Administration's U.S. Ocean Action Plan prepared in response to the U.S. Commission on Ocean Policy report. The minutes of all NORLC meetings are posted on the NOPP web site at http://www.nopp.org.

OCEAN RESEARCH ADVISORY PANEL

The ORAP met on 5-6 January 2004 in Washington, DC. The panel discussed its future membership needs in response to the Administration's U.S. Ocean Action Plan. Revisions to the current ORAP charter were discussed, as well as issuing a formal call for nominations of new

members and the subsequent selection process. Dr. Matt Gilligan was elected as Chair of the ORAP Education Subcommittee (ORAP.ED) and non-ORAP potential members were identified. A list of nominated ORAP.ED members will be submitted for approval to ORAP in the upcoming months. The panel also discussed the recent tsunami in the Indian Ocean and the need for education of the populace to tsunami warning signs, as well as increased observations for detection as part of the Global Ocean Observing System of Systems. Committee briefings by federal officials were held on Oceans and Human Health (NOAA), the transition of projects from research to operations (NASA, NOAA, Alliance for Coastal Technologies), Ocean Exploration (NOAA, NSF, USGS, MMS), the US Action Plan (OSTP, CEQ), Pending Ocean Legislation (NOAA), and Marine Mammals Research (Navy, NMFS, MMC, NSF, MMS). The panel accepted the recommendations of its sponsored workshop on the Ocean Biogeographical Information System (OBIS) and will bring them forward to the NORLC at the February, 2005 meeting. The next ORAP meeting will be held in June 2005 in San Diego, CA.

FEDERAL OCEANOGRAPHIC FACILITIES COMMITTEE

The FOFC met on 28 October 2004 to discuss the Integrated Fleet Renewal Plan and the results of the FOFC working group retreat held in July 2004. Over the next year, FOFC will work to analyze existing capabilities and future needs for research vessels and to write and publish the integrated plan by September 2005. FOFC is also involved with ongoing activities to select an optimal hull form to support multiple scientific mission requirements.

OCEAN.US / INTEGRATED OCEAN OBSERVING SYSTEM

Planning has begun for the Second Annual IOOS Implementation Conference, which will be held in Washington, D.C. on 3-5 May 2005. The following activities are planned to facilitate IOOS development and prepare for the workshop and subsequent completion of the Second Annual IOOS Development Plan: (1) meetings with participating federal agencies to obtain guidance for updating and improving the development plan; (2) workshops to accelerate the establishment of RAs and the NFRA; (3) formation of a DMAC Steering Team, DMAC Expert Teams and Working Groups, and an interagency DMAC Implementation Oversight Working Group to develop the DMAC subsystem of the IOOS; (4) workshops and meetings to engage private sectors in IOOS development; and (5) education and public awareness activities to continue developing the education, training, and public awareness network and to inform public and private `sectors on issues related to the oceans and IOOS development. By the end of FY 2005, the Ocean.US planning cycle will have been implemented and in synchrony with the planning and budgeting cycle of the federal government.

VII. Fiscal Year 2006 Plans

Agency-specific budget requests for the Fiscal Year 2006 Budget are pending before Congress; therefore precise funding levels and associated programmatic issues cannot be identified. The NOPP agencies anticipate contributions to NOPP to be comparable to that of Fiscal Year 2005 and anticipate supporting NOPP's four strategic goals:

- Achieve and Sustain an Integrated Ocean Observing System;
- Promote Lifelong Ocean Education;
- Modernize Ocean Infrastructure;
- Foster Interagency Partnerships.

NOAA will continue to utilize COTS funds to support the Ocean.US Office and development of regional observing system capacity.

VIII. Interagency Coordination Activities

The central tenet of NOPP is interagency cooperation. The most recent activities are described in previous sections of this report. The primary thrust of the NOPP over the next few years will be development and implementation of a national Integrated Ocean Observing System coordinated by the Ocean.US office. In FY 2005, FOFC will develop an Integrated Research Fleet Plan and submit it to the NORLC and Inteagency Committee on Ocean Science and Resource Management Integration (ICOSRMI) for approval.

The National Science and Technology Council Committee on Science and Committee on Environment and Natural Resources recently established the Joint Subcommittee on Oceans to consider, among other topics, national ocean science and technology priorities. The Chair and Vice-Chairs of the NOPP IWG serve as ex officio members of the Subcommitteee to ensure coordination of efforts. As set forth in the U.S. Ocean Action Plan, this group will transform into the Joint Subcommittee on Ocean Science and Technology (JSOST).

The NOPP role in the Administration's U.S. Ocean Action Plan will continue to evolve during FY 2005. At this writing, development of the new governance structure is still in progress. To accommodate the role of ORAP laid out in the U.S. Ocean Action Plan, the expansion of the panel with representatives from the resource management sector will be pursued.

Appendix 1. National Ocean Research Leadership Council (NORLC) List of Committee Members

National Oceanic and Atmospheric Administration (Chair)	VADM Conrad C. Lautenbacher, USN (Ret.), Administrator of NOAA/Under Secretary for Oceans and Atmosphere, U.S. Department of Commerce
Navy (Vice-Chair)	Mr. Gordon England, Secretary of the Navy
National Science Foundation (Vice-Chair)	Dr. Arden Bement, Director
National Aeronautics and Space Administration	Administrator, TBD
Department of Energy	Under Secretary, TBD
Environmental Protection Agency	Dr. Stephen Johnson, Administrator (Acting)
United States Coast Guard	ADM Thomas H. Collins, Commandant
United States Geological Survey	Dr. Charles Groat, Director
United States Army Corps of Engineers	Mr. George S. Dunlop, Deputy Assistant Secretary of the Army (Civil Works) for Policy
Minerals Management Service	Ms. Rejane Burton, Director
Office of Management and Budget	Mr. Joshua Bolten, Director
Department of State	Mr. John Turner, Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs
Office of Science and Technology Policy	Dr. John H. Marburger, III, Director
Defense Advanced Research Projects Agency	Dr. Anthony J. Tether, Director
Department of Homeland Security	Dr. Charles E. McQueary, Undersecretary for Science and Technology

Appendix 2. Ocean Research Advisory Panel (ORAP) List of Committee Members

Monterey Bay Aquarium Research Institute (Chair)	Dr. Marcia McNutt
Earth2Ocean, Inc. (ex: U. of Miami, Vice-Chair)	Dr. Ellen Prager
Alfred P. Sloan Foundation	Mr. Jesse Ausubel
Maritime Communication Services, Inc.	Dr. Andrew Clark
Diamond Offshore Drilling, Inc.	Mr. Lawrence Dickerson
Savannah State University	Dr. Matthew Gilligan
Rowan Companies, Inc.	Mr. Paul L. Kelly
National Center for Atmospheric Research (ex: NRL Monterey)	Dr. Philip Merilees
Environet, Inc.	Mr. Joseph Pickard
Chair, Ocean Studies Board, NAS	Dr. Nancy Rabalais
Scripps Institution of Oceanography	Dr. Richard Seymour
The Stephenson Group (ex: Clark Atlanta U.)	Dr. Denise Stephenson-Hawk
Southern California Coastal Water Research Project Authority	Dr. Stephen Weisberg
Virginia Institute of Marine Science	Dr. L. Donelson Wright
Royal Caribbean Cruises Ltd.	CAPT William Wright

Appendix 3. Interagency Working Group (IWG) List of Committee Members

National Oceanic and Atmospheric Administration (Chair)	Dr. Michael Sissenwine
Navy (Vice-Chair)	Dr. Melbourne Briscoe
National Science Foundation (Vice-Chair)	Mr. Larry Clark
National Aeronautics and Space Administration	Dr. Eric Lindstrom
Department of Energy	Dr. Jerry Elwood
Environmental Protection Agency	Dr. Barry Burgan
United States Coast Guard	Dr. Jonathon Berkson
United States Geological Survey	Dr. John Haines
United States Army Corps of Engineers	Mr. Charles Chesnutt
Minerals Management Service	Dr. James Kendall
Office of Management and Budget	Ms. Emily Woglom
Department of State	Ms. Elizabeth Tirpak
Office of Science and Technology Policy	Dr. David Halpern
Defense Advanced Research Projects Agency	Ms. Khine Latt
Department of Homeland Security	TBD

Ex Officio Members	
Chair EXCOM	Dr. Jack Kaye (NASA)
Chair FOFC	Mr. Robert Winokur (Oceanographer of the Navy)
Director Ocean.US	Dr. Thomas Malone (U. Maryland)

Appendix 4. Federal Oceanographic Facilities Committee (FOFC) List of Committee Members

Oceanographer of the Navy (Chair)	Mr. Robert Winokur
National Science Foundation	Dr. Margaret Leinen
Office of Naval Research	Dr. Frank Herr
National Oceanic & Atmospheric Administration	RADM Richard Behn
U.S. Coast Guard	CAPT Dennis Holland
U.S. Environmental Protection Agency	Mr. Kennard W Potts
Minerals Management Service	Dr. Ronald Lai
Department of State	Ms. Margaret F. Hayes
U.S. Army Corps of Engineers	Mr. William Birkemeier
Department of Energy	Dr. Jerry Elwood
U.S. Geological Survey	Dr. John Haines
National Aeronautics and Space Administration	Dr. Paula Bontempi
DARPA Advanced Technology Office	Dr. Thomas J. Green

Appendix 5. National Oceanographic Partnership Program Broad Agency Announcements (BAA) and Requests for Proposals (RFP)

5.1 2004 RFP ON SURFACE CIRCULATION RADAR MAPPING IN ALASKAN COASTAL WATERS: FIELD STUDY BEAUFORT AND COOK INLET

General Information

Document Type: Presolicitation Notice

Solicitation Number: 1435-01-04-RP-35579

Posted Date: Jul 13, 2004

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Current Archive Date: Jul 13, 2005

Contracting Office Address

Minerals Management Service Procurement Operations Branch 381 Elden Street, MS 2500 Herndon VA 20170

Description

The U.S. DEPARTMENT OF THE INTERIOR, MINERALS MANAGEMENT SERVICE (MMS), solicits CAPABILITIES STATEMENTS for the study entitled "SURFACE CIRCULATION RADAR MAPPING IN ALASKAN COASTAL WATERS: FIELD STUDY BEAUFORT SEA AND COOK INLET". The NAICS code is 541710. The MMS intends to competitively award a contract to meet specific study objectives.

LEVEL OF EFFORT: Funding up to $900,000 may be available for this estimated forty-eight (48) month study.

OBJECTIVE: The purpose of this research is to test hypotheses with regards to the collection of surface current measurements (using High Frequency (HF) Doppler radar units) within the Alaskan Beaufort Sea OCS Sea Planning Area, central Beaufort Sea, from approximately150? to 146? West Longitude and 70? to 71? North Latitude (approximate bathymetric range, 0-30 meter bathymetric contours), and the Lower Cook Inlet Outer Continental Shelf (OCS) Planning Area, between 154?and 150? West Longitude and 59? and 60? 30' North Latitude. The surface current measurements and tested hypotheses will improve the present understanding of the surface circulation in these areas under open water and mixed ice conditions. The surface current results will also be used by MMS for validation, comparison, and boundary condition analysis of general

circulation models and for oil spill risk analysis. The study will be procured under National Oceanographic Partnership Program (NOPP). The MMS, teamed with NOAA/NOS/CO-PO (Center for Operational Oceanographic Products and services), has developed this joint project. On behalf of the National Oceanographic Partnership Program (NOPP), the Minerals Management Service solicits research proposals meeting the goal and purpose of the Partnership Program outlined in Title II, subtitle E, of Public Law 104-201. Team efforts among academia, industry, and government participants are encouraged (at least 2 of the 3). Cost sharing or proposals augmenting ongoing partnership efforts are very strongly encouraged.

SCOPE OF WORK: MMS HF DOPPLER RADAR DEPLOYMENT SCHEDULE FOR THE BEAUFORT SEA AND COOK INLET: This RFP requires at least two seasons in the Beaufort Sea and one season in the Cook Inlet. The Contractor will deploy and maintain two to three HF Doppler radar units in the Beaufort Sea during two consecutive Spring to Fall (June through October) mixed ice and open water periods. The deployments will commence in June 2005, during the opening of coastal leads and end in October 2006 during the formation of land fast ice. The Beaufort Sea units will be shut down during the intervening winter months. In October 2006, the HF Doppler radar units from the Beaufort Sea project study area will be transported to the Cook Inlet project study area where the HF radar will be deployed to collect surface current data from November 2006 through November 2007. GENERAL HYPOTHESES: BEAUFORT SEA HYPOTHESES (MAY THROUGH OCTOBER, IN YEARS 2005 AND 2006): 1) HF radar will provide improved oceanographic measurement capabilities in the Alaskan Beaufort Sea, under varying and seasonal ice conditions; 2) HF radar will improve understanding of potential pollutant (oil) transport under both arctic freeze-up and breakup conditions; 3) HF radar offers serendipitous potential beyond standard 2-D mapping of surface water currents. COOK INLET HYPOTHESES (NOVEMBER 2006 THROUGH NOVEMBER 2007): 1) HF radar will identify, resolve, and map regional oceanographic features that may concentrate or otherwise effect pollutant (oil) transport. 2) HF radar will quantify tidal and seasonal variation of these regional oceanographic features; 3) HF radar will provide currently unavailable information to oceanographic models of Cook Inlet such as detailed, measured surface water flux through the mouth of Cook Inlet for use in boundary conditions and mass conservation evaluation. BEAUFORT SEA SPECIFIC OBJECTIVES: 1) Deploy and maintain a minimum of two (preferably three) HF Doppler surface radar sites along the Beaufort Sea shoreline from June, during the opening of the coastal leads through October, ceasing operations after the coastal land fast ice has formed for the years 2005 and 2006; The Contractor will collect, analyze, disseminate over the Internet, and archive surface current vector direction and speed measurements in open water and mixed ice conditions over a distance that is approximately 10-50km from shore and that has a resolution of approximately 250m to 3Km. The surface current measurements will be used to resolve circulation patterns landward (inside) and seaward (outside) of the barrier islands to about the 30 meter bathymetric contour; 2) Collect surface current measurements during spring breakup (and fresh water inflow), opening of coastal leads, mixed ice and open water conditions, open water conditions, freeze-up and during the initial formation of land fast ice. COOK INLET SPECIFIC OBJECTIVES: 1)Provide year-round quality controlled surface current vector direction and speed measurements over a radial distance that is approximately 50-80 km from shore and that has a resolution of 1-3Km through the deployment of HF Doppler surface radar along the Cook Inlet shoreline; 2) Map and interpret the signal response and surface current measurement capability from the radar systems over for an entire season; 3) Map the spatial variability of tidal currents and eddy dynamics. BEAUFORT SEA AND COOK INLET COMMON OBJECTIVES: 1) Examine the effects that sea ice concentration and extent has on the collection of surface current measurements from HF Doppler radar; 2)Validate the HF Doppler radar surface current data measurements by comparing these data against the sub surface current measurements from the Acoustic Doppler Current Profilers (ADCPs); 3) Compare and

contrast the wind measurements from MMS or other adjacent coastal meteorological stations against the surface current measurements from HF Doppler radar system; 3) Develop a web site and ground capability to monitor system integrity and performance; 4) Provide near real-time dissemination of surface current field data, vector maps, and surface current animations; 5) Provide detailed analysis of current variability and system response from the HF Doppler radar; 6) Determine the dynamics and variability of surface current circulation. Include in your analysis of sea-ice, bathymetry, meteorological, ADCP, drifter, tidal, sea surface temperature or other important comparative data within the study area.

THE BEAUFORT SEA AND COOK INLET - TASKS:

TASK 1 - Site Investigations and Site Selection: A detailed study of the topography of the Beaufort Sea and the Cook Inlet shoreline and its implication on radar coverage is needed before making final site selections. The Contractor is responsible for identifying a minimum of four prospective sites. Any combination of three sites shall provide the maximum coverage and accuracy to calculate the surface current speed and direction over the largest area. In addition, the Contractor will deploy and evaluate the optimal equipment, and infrastructure that would meet or exceed the stated objectives within this RFP. The Contractor shall provide good reasons based upon the field conditions to deploy specific units at specific frequencies based upon the stated objectives for capturing data for either the Beaufort Sea or Cook Inlet. In addition, the site investigation shall address any potential radio or other. The Contractor is encouraged to form partnerships with private, government and non-profit agencies. BEAUFORT SEA HF DOPPLER RADAR SITE SELECTIONS: Three potential site selections have been identified by MMS for the Beaufort Sea, without field testing, by utilizing a line of sight program and USGS Digital Elevation Models (DEM's) with Environmental Systems Research Inc. ESRI, ARCGIS software. These three potential sites are the following: (1) Milne Point; (2) West Dock Oil and NOAA Tide Gauge Station; and the (3) Endicott Oil facility. Other potential sites may be located north of the Badami Oil field and at the Milne Point Oil Field. The Contractor shall evaluate these and other potential sites if necessary for their usefulness and applicability to the project objectives. When choosing the type and frequency of the HF Doppler radar system, the Contractor must consider the limited fetch conditions during the breakup of the land fast ice in the Beaufort Sea. COOK INLET HF DOPPLER RADAR SITE SELECTIONS: During a recent MMS meeting in Anchorage called "MMS Research Sponsorship Meeting on the Mapping of Surface Currents from HF in Alaska", three HF radar site locations were proposed for the MMS field project. Two sites, Anchor Point and Nanwalek, were previously studied by researchers at NOAA and the University of Fairbanks. The Contractor shall evaluate these sites for their potential usefulness and applicability to the projects success. The Contractor will use the Anchor Point and Nanwalek sites, and be responsible for adding a third site, preferably on the west site of Cook Inlet that will maximize the coverage and accuracy from all three sites.

TASK 2 - Field Report: Provide a report to MMS that synthesizes the results from the site visit and provides the recommendations on the final site selections for MMS review. The report shall contain maps displaying the radial range of coverage and the potential overlap established by the field tests and a timetable and strategy to initiate the collection of data and maintenance all of the equipment. The Contractor shall identify all of the power requirements from all of the field systems and how those requirements will be supported in the field. The report shall clearly state how such operations will be supported in the field, and how problems will be quickly identified and corrected, so as to minimize the loss of data. The Contractor shall describe how the HF Doppler radar hardware, software and output will be monitored remotely. The Contractor shall provide a system that links remotely via a high speed Internet connection. The Contractor shall describe how the data will be disseminated to the public, and archived on and off site over the projects time period of performance. The field report shall address how all of the MMS study objectives will be addressed. The report shall describe how the Contractor will acquire all

permissions in writing if necessary from the landowners to install and access the HF Systems over the life of the project. The Contractor shall address any potential interference to private, government, or subsistence concerns in the area.

TASK 3 - Deployment, Installation, Calibration, and Maintenance of HF Doppler Radar Units: The HF Doppler radar units for the Beaufort Sea and Cook Inlet will be deployed based upon the results from the field reports within Task 2; Each radar shall consist of transmit antennas, receive antennas, signal processing electronics, and a central computer. The electronics and computer will be mounted in weather-proof, animal proof, temperature controlled structures. Power will be connected to existing facilities when possible. Remote power needs will be installed, as necessary, to run the network. The units will be calibrated subsequent to deployment and during intervals needed to provide high quality data. Regular maintenance of the system will be done to minimize the loss of data. System performance will be monitored at all times via a high speed Internet connection. All system corrections will be accomplished rapidly, especially during the very limited data collection time period for the Beaufort Sea. For the Beaufort Sea, during sufficient open water conditions, the HF Doppler radar units shall be capable of mapping surface ocean currents within a distance of 10-50 km from shoreline. The radars shall be of sufficient resolution to capture the surface current measurements during the development of the coastal leads and addition to resolving the currents around the barrier islands. For the Cook Inlet, High Frequency Doppler radars will be deployed in an array capable of mapping surface ocean currents within a distance of 50-80 km from the Cook Inlet shoreline sites.

TASK 4 - Collection and Analysis of Surface Current Measurements: The Contractor will collect, analyze, and describe the surface current measurements as defined in the objectives. The Contractor will use such methods as stick diagrams or other analysis to correlate wind velocity and direction from MMS funded measurements or other local meteorological stations to HF Doppler radar generated surface current measurements. Scatter plots, cross-spectral, power spectra analysis, or other types of analyzes will be used to compare the surface current measurements from the HF Doppler radar to the sub surface currents obtained through the use ADCPs or other current measuring devices. Sea ice concentration and extent will be compared to the spatial and temporal extent of the return signal and output from the HF Doppler radar. RADARSAT, MODIS or other types of imagery shall be utilized if necessary to monitor the response of HF Doppler radar to the changing ice conditions, especially during breakup, particularly for the Beaufort Sea. Additional research objectives for the Beaufort Sea include determining HF Doppler radar capability to provide information on mesoscale winds (e.g. sea breeze strength and extent in Beaufort Sea, and improved bathymetry). For the Cook Inlet, examine the capability of the HF radar to provide improved information for correlation to mesoscale winds and wind jets and bathymetry. Map and interpret the spatial variability of surface currents and eddy dynamics in the Lower Cook Inlet. Interpret the seasonal and tidal cycle variability of surface currents in open water and in mixed ice and open water conditions. Compare the tidal rips identified in other studies to the surface current measurements collected with the HF Doppler radar. Use existing Cook Inlet HFR-derived surface current velocity data sets to create products that would be of use to the maritime community, such as tidal constituents. These products could be made available to operational interests such as the NOAA/NOS/Center for Operational Oceanographic Products and Services (CO-OPS) and be web-linked to the PORTS program of CO-OPS. When the present project produces HFR-derived velocity data from Cook Inlet, these data could also be subjected to the same analysis.

TASK 5 - Validation of Surface Current Data: Beaufort Sea: ADCPs will be used to validate the surface current measurements measured from the HF Doppler radar. Researchers at the University of Alaska, at Fairbanks are scheduled to collect radial subsurface current data using

upward looking Acoustic Doppler Current Profilers (ADCPs) on the Beaufort Sea shelf. The units are planned to be installed during the summer of 2004. At least one of the units is planned for installation within the planned study area. The Contractor for this project will request access to the ADCP data for the purpose of validation of the HF Doppler radar surface current data measurements. The Contractor may propose to deploy additional ADCP systems for validation purposes if necessary, and if budget allows. Cook Inlet: To quality-control the radar-derived current measurements with in-situ measurements, and to sample their vertical structure, Acoustic Doppler Current Profilers ADCPs or other surface or near surface measurement devices will be deployed simultaneously on shallow water moorings. The radars and current meters will be installed within the proposed study area. Comparisons will be made between radial currents measured by the ADCPs and the surface current radars. If necessary, sea ice data shall be integrated into the validation process since it may have an affect on the response from the HF Doppler radar instruments sensitivity to map surface currents during the winter months in the Cook Inlet.

TASK 6 - Establish a Web Site for Data Validation, to Test System Integrity, and to Provide Public Access to Project Information: The Contractor shall design, build and deploy the infrastructure required to disseminate near real- time surface current measurements from field locations to a central web site accessible to MMS, and the general public. The Contractor must establish a high speed Internet connection to monitor the quality of the incoming data, analyze and dissemination of the data over the Internet in near-real time. The central computer will poll the remote sites hourly, initiate raw data retrieval, combine radial currents into vector current maps, and transfer the maps of currents to a central server for archiving, Internet dissemination, and analysis. The operation will be streamlined so that all data will be processed automatically.
All of the raw data will be archived with a backup stored offsite. The web site shall provide a general description of the study effort and its objectives along with a map displaying the station locations. It shall describe the deployment schedule, daily operational system status, data validation, station log, site photos, near-real time surface current measurements in graphical format, and surface current animations. The surface current maps will be available over the Internet and will be distributed at a minimum of every hour to aid those interests with a need for this information on an operational basis. The Contractor will determine the feasibility of storing the interpreted surface current measurements in a database that can be queried by spatial extent and date range. For data validation, time series comparisons will be made and presented in graphical format on the web between radial currents measured by the DCPs and the surface current data from the HF Doppler radar.

TASK 7 - REPORT SUBMISSION: An ANNUAL report will be provided which summarizes the previous year's operations, results, and analysis based upon the stated objectives. The report will contain maps and analysis of the surface current measurements in different mixed ice and open water conditions. Validation of the surface current measurements will be corroborated from all available ancillary data. The Contractor will propose any changes for the next field season. The usefulness of the radar will be addressed based upon the changing ice conditions. The contractor shall submit a final report that summarizes the field operations, data results, and analysis for all years, and shall combine the data from all years and provide an analysis of all data sets, operational, and environmental conditions. The FINAL report shall specifically address the type of data captured during the changing ice condition surrounding the radar sites and shall identify major contributions from this study with regards to our understanding of surface current circulation.

TASK 8 - Database and Database Documentation: On an annual basis, or subsequent to each field season, the interpreted data from all of the surface current measurements will be provided to

MMS along with the data documentation. The Contractor shall complete this task considering the developing system being designed by the Data management and Communications Committees (DMAC) of the U.S. Integrated Ocean Observing System (IOOS) and Alaska Ocean Observing System (AOOS). The Contractor is responsible for coordinating directly with the DMAC's. If particular portions of the DMAC system such as the database format have not been developed, then MMS would use existing data formats as described at http://marine.rutgers.edu/mrs/newcodar/data/FileFormat.txt. All the surface current measurement data shall be delivered to MMS in a MMS compatible database so that surface current measurements can be queried by spatial (geographic) and temporal (date/time range) extent.

TASK 9 - Bibliographic Database of HF Doppler Radar Surface Current Mapping Studies: Compile a bibliographic database of pertinent citations on the use of HF Doppler radar for the mapping of surface currents. The extent of the bibliography will be limited to the available budget. If budget allows, the references shall be compiled alphabetically in standard format and any abstracts and papers included with the citations. The citations and possible linked articles shall be included in a ProCite database. TASK 10, Preparation and Submission of Journal Article: The Contractor shall prepare and submit a scientific article(s) to a peer-reviewed journal(s). Drafts of manuscripts will be provided to MMS prior to journal submittal. Articles will summarize major objectives, methods, significant results, conclusions, and implications of the work. All journal articles must include MMS in the acknowledgments section and reference the agreement number to facilitate accession through the Environmental Studies Program Information System (ESPIS). Because of the long lead time that is usual for scientific publication, the Contractor is encouraged to start on this submission in parallel with or prior to completion of the final report.

EVALUATION OF CAPABILITY STATEMENTS: Experience and expertise of all Key Personnel with the technical knowledge and experience to accomplish all of the stated tasks: The contractor must provide information on which task(s) each key personnel will perform and the rational for their assignment. The key personnel must have prior experience in deployment, collection and analysis of surface current measurements from HF Doppler radar. Particularly relevant to their experience, knowledge and contractor familiarity, they shall provide their experience in the deployment, maintenance, and analysis of the surface current measurements.

EVALUATION FACTORS: (A) length and experience with the collection and analysis of HF radar data; (B) Project Manager's capability to manage and coordinate a multi-disciplinary team of field of personnel in the collection and analysis of such data; (C) Key personnel's knowledge of Beaufort Sea and Cook Inlet oceanography; (D) Their capability to control costs and keep work performance high and project performance on schedule and within budget; (E) Your organization's history of successfully conducting similar projects (similar in size, scope, complexity, duration and dollar value), producing high-quality documents, and completing similar projects on schedule and within budget. Specific references (including project identifier and description, relationship to current scope of work, Period of Performance, dollar amount, client name, mailing address, Email address, and phone number). If you believe the Government will find derogatory information as a result of checking your past performance record, please provide an explanation and any remedial action taken by your company to address the problem; (F) Team efforts and costs sharing among academia, industry, and government participants.

HOW TO RESPOND: Submit an Original and two (2) copies of your Capability Statement, not later than 5:00 PM EST, Tuesday, August 03, 2004 to Michael W. Hargrove, Minerals Management Service, 381 Elden Street, MS 2510, Herndon VA 20170 and three (3) copies to Warren Horowitz, Minerals Management Service, Alaska OCS Region, 949 East 36th Avenue,

Anchorage AK 99508-4302. Timeliness of receipt of submissions will be determined by the time received in the Procurement Operations Branch, Herndon VA.

QUESTIONS should be faxed as soon as practicable to Michael W. Hargrove on 703-787-1041 or E-mailed to Michael.Hargrove@mms.gov.

FOLLOWING REVIEW OF CAPABILITIES STATEMENTS, offerors will be informed of the results of the evaluation.

ALL CORRESPONDENCE MUST INCLUDE THE RFP NUMBER (35579) & TITLE (SURFACE CIRCULATION RADAR MAPPING IN ALASKAN COASTAL WATERS: FIELD STUDY BEAUFORT SEA AND COOK INLET"), YOUR FULL NAME/COMPANY NAME, ADDRESS AND PHONE AND FACSIMILE NUMBERS. REQUESTS OR QUESTIONS BY TELEPHONE ARE STRONGLY DISCOURAGED.

Original Point of Contact

Michael W. Hargrove Contracting Officer 7037871367 Michael.Hargrove@mms.gov;
Email your questions to Point of Contact above, or if none listed, contact the IDEAS EC HELP DESK for assistance at EC_helpdesk@NBC.GOV.

5.2 2004 BROAD AGENCY ANNOUNCEMENT FOR THE NATIONAL OCEAOGRAPHIC PARTNERSHIP PROGRAM

ONR BAA Announcement # 03-014

INTRODUCTION:

This publication constitutes a Broad Agency Announcement (BAA) as contemplated in Federal Acquisition Regulation (FAR) 6.102(d)(2). A formal Request for Proposals (RFP), solicitation, and/or additional information regarding this announcement will not be issued.

The Office of Naval Research (ONR) will not issue paper copies of this announcement. The ONR, and its partner agencies in the National Oceanographic Partnership Program (NOPP), reserve the right to select for award all some or none of the proposals in response to this announcement. ONR provides no funding for direct reimbursement of proposal development costs. Technical and cost proposals (or any other material) submitted in response to this BAA will not be returned. It is the policy of ONR to treat all proposals as sensitive competitive information and to disclose their contents only for the purposes of evaluation.

I. GENERAL INFORMATION

1. Agency Name -

Office of Naval Research
Ballston Centre, Tower One
800 N. Quincy Street
Arlington, VA 22217-5660

2. Research Opportunity Title -

National Oceanographic Partnership Program (NOPP)

3. Program Name -

N/A

4. Research Opportunity Number -

ONR BAA 03-014

5. Response Date -

Letters-of-Intent: 5 September 2003
Full Proposals: 1 October 2003

6. Research Opportunity Description -

On behalf of the National Oceanographic Partnership Program (NOPP), the Office of Naval Research (ONR) solicits research proposals meeting the goal and purpose of the Partnership Program outlined in Title II, subtitle E, of Public Law 104-201. Any NOPP member agency may fund research in response to this solicitation.

Up to $3M per year may be available for this solicitation, subject to appropriation and final approval by the National Ocean Research Leadership Council (NORLC). Team efforts among academia, industry, and government participants are required (at least 2 of the 3). Proposals augmenting ongoing partnership efforts are strongly encouraged. Involvement of industry is encouraged to the extent possible.

Background:
The following five Topic Areas have historically formed the basis of the NOPP Investment Portfolio:

Operational/Routine Observations (including pilots, testbeds, etc.),
Research "Observatories" (long-term experiments and data series, etc.),
Observational Technique Development (sensors, platforms, communications),
"Commons" for Ocean Information ("hubs" and "nodes", etc.),
Outreach/Education/Communications.

These investment areas are more fully described at http://www.nopp.org/ where examples of ongoing NOPP efforts are also listed. The NOPP website will contain the most recent information. Not all NOPP solicitations will seek proposals in all areas.

NOTE: As an additional, special investment topic this year, we are calling for proposals involving certain aspects of marine mammals, which is an interest area that cross-cuts and underlies progress in several of our usual Topic Areas. For convenience here, we are listing these items together, called Topic M, rather than placing them into our traditional five investment topics.

M. Marine Mammals

This announcement seeks only proposals for new projects under Topics A, C, and M.

Later announcements may call for proposals under any of the NOPP topics, including renewals of existing efforts.

Topic A. Operational/Routine Observations
This topic covers demonstrations and pilot projects that, if successful, can lead to new and improved operational capabilities in an Integrated Ocean Observation System (IOOS). In this current solicitation, NOPP seeks proposals for activities related to Sea Surface Temperature.

A(1) - Sea Surface Temperature (SST) for the Global Ocean Data Assimilation Experiment (GODAE)

While operational SST products have been produced for a quarter of a century, there have been significant recent advances in our research capability to observe and utilize satellite-derived and in-situ SST. Such advances have the potential to make corresponding advances in our operational capability, in programs such as the Global Ocean Data Assimilation Experiment (GODAE) and its operational follow-ons.

In addition to the present AVHRR/POES and future VIIRS/CMIS/National Polar-Orbiting Operational Environmental Satellite Sytem (NPOESS) operational systems, research capabilities now in space include TMI/TRMM, AMSR/AQUA and ADEOS-II. These satellites are complemented by in-situ observations collected by surface drifting buoys, moored systems, and ships of opportunity/volunteer observing ships.

It is now an appropriate time to demonstrate the operational implications of having improved SST products. Specifically, this solicitation seeks to:

(1) produce improved SST products through the 'fusion' of satellite-derived observations from both broad-spatial-resolution, all-weather microwave and fine-spatial-resolution, cloud-obscured, infrared sensors, and then to

(2) assess and demonstrate the implications in operational centers of using these products in combination with oceanic and atmospheric analyses and models. If data from the Advanced Along-Track Scanning Radiometer (AATSR) can be accessed within an operationally useful timeframe, those data could be included as well.

This FY04 solicitation should complement and build on the FY02 NOPP solicitation (see Topic A(3) in http://www.onr.navy.mil/02/baa/expired/02_011.htm) to design and develop a prototype system to produce on an operational basis both in-situ skin and bulk SST products, especially for use with NPOESS; the demonstration of such a prototype system could enable improvements in the calibration of satellite-derived observations of skin SST. That FY02 NOPP solicitation involved the collection of both skin and bulk SSTs from a limited number of volunteer observing ships, where personnel are available to check instruments while the ships span a broad range of latitudes.

This new demonstration is to be accomplished via the research and operational communities working together to help ensure that the operational community is aware of the capabilities of, and has the tools to use, potential improvements to SST data and products that are resident in the research community. If successful, the intention is to implement the results of this demonstration in the nation's operational centers.

Successful proposals must have substantive partnerships involving both research and operational entities. Each project should address the development of new, self-consistent data and products and show why they represent potential improvements to the status quo. It is anticipated that the data will be utilized in the GODAE pilot project funded by NOPP (see Federal Register, Vol. 67, No. 238, Wednesday, December 11, 2002, page 76161) to demonstrate the value of ocean models (and their improvements through better SST) to various operational products.

Approximately $1.5M will be available over three years to support one project at a level of approximately $500K per year for three years. Depending on progress and the availability of funding, the option exists for a one or two-year extension at level funding.

Topic B. Research "Observatories"
No proposals are being solicited in this area at this time.

Topic C. Observational Technique Development
Partnership efforts are sought here to develop and/or demonstrate capabilities to establish to observe oceanic processes and life, and to communicate that information from sea to shore in near real time. For this solicitation the emphasis is on design studies of the required technology and infrastructure for real-time networked telemetry from the U.S. coastal zone to shore, in the sense of "wiring the coastal zone" as a network into which instruments can plug.

C(1) - A Wireless Network for the U.S. Coastal Zone

Wireless data transmission protocols such as 802.11b ("Wi-Fi" in coffee shops, hotels and airports) cover short ranges but allow users easily and transparently to access the network. New protocols such as 802.16 will cover approximately 30-mile ranges.

An enabling technology for NOPP and the IOOS would be an integration of a wireless 802.16-like system plus satellite communications (like Iridium) into a "plug-and-play" network for the U.S. coastal zone (nominally the U.S. Exclusive Economic Zone (EEZ)).

The long-term objective would be to allow a ship-based user, a drifting buoy, a sub-surface sensor with a link to the surface, and shore-based sensors, all to have access to the global Internet though a networked wireless system. Rather than researchers and operators having to each set up their own communication systems to shore, they would use the installed infrastructure of this "U.S. Coastal Area Network (U-SCAN)".

Proposals to consider the design and demonstration of such a network are encouraged. Support of actual at-sea tests will not be funded at this time; this is a Phase 1 design study. Should Phase 2 occur at a later time, equipment and tests would be involved.

Specifically requested for consideration in this study are:

- What existing technologies could be utilized to demonstrate such a Coastal Area Network? What new technologies are needed?
- What data rates are possible, and what are the power requirements for remote, autonomous sensors?
- Where, when and how could a demonstration be performed?
- What are the obstacles to full coverage of the U.S. EEZ?
- What is the recommended architecture, and estimated costs for a demonstration, and for full coverage?

Proposals may request up to two years of support for this design study, with a draft summary final report due by 1 May 2005.

Up to $300,000 per year is available to support 1-2 design studies, for two years.

Topic D. "Commons" for Ocean Information
No proposals are being solicited in this area at this time.

Topic E. Outreach/Education
No proposals are being solicited in this area at this time.

Topic M. Marine Mammals
Offerers proposing to this topic are reminded of their possible responsibilities for various permits and permissions, especially related to topics M(1), M(2), and M(3).

M(1) Controlled Exposure Experiments on Marine Mammals

The very successful SWSS (Sperm Whale Seismic Study) program, coordinated by Minerals Management Service, has shown the value of 'controlled exposure experiments' in understanding the behavior of Sperm Whales in the Gulf of Mexico in the vicinity of seismic sources of known source and receive levels. Other studies have addressed other species and other sound sources, in other locations. Continued interdisciplinary studies of the effects on, and responses of marine mammals to seismic and other acoustic sources are solicited, particularly those that could be valuable in guiding regulations about use of acoustic sources in the oceans.

M(2) Ecology and Behavior of Beaked Whales

Very little is known about beaked whales except that they appear to show extreme sensitivity in some cases to mid-frequency (a few kHz) acoustic transmissions. Research on the behavior and ecology of this cosmopolitan group is of high priority, and could provide critical information to those seeking to avoid causing them inadvertent harm.

M(3) Improved Methods to Survey, Locate and Identify Marine Mammals

Most marine mammal surveys are done visually, in the daytime. New tools and methods to allow greatly improved surveys are needed, for both science and harm-mitigation purposes. As different animals have different responses to perturbing factors (like ships, sounds, and other tools of exploration and science) some specific location and speciation of the animals is desired. Ideas involving novel sensors and platforms such as LIDAR, radar, and small autonomous aircraft are encouraged in addition to acoustics and more standard methods. Modest sea-tests will be considered.

M(4) Algorithms and Databases

The development and standardization of critical modeling algorithms and databases is needed to enable informed assessment of risks from manmade underwater sound. The SEAMAP database under OBIS is one such critical database, but also needed are improved models of impulse sound propagation in both deep and shallow water environments, models of sound propagation for highly reverberant environments such as steep bays, submarine canyons and steep sided channels. In addition, centralized open-access data archives meeting NOPP (and, where appropriate, OBIS) criteria are needed for animal sounds, common manmade sounds such as sonars, ships machinery, industrial activity, and research sound sources, and natural physical environmental sound from earthquakes, landslides, lightning, rain, and wind. Other important databases needing standardization and centralized archival are animal diving and movements data from telemetry tags and other sources, and animal hearing and noise effects data including baseline audiometric data, TTS and masking data, anatomical data and behavioral response data. Workshops are needed to develop community consensus to the desired standardization.

M(5) Education and Outreach

We also encourage proposals to develop education and outreach materials that demonstrate or explain the scientific principles related to the effects of sound on the behavior of marine mammals. Such products may include curricular and/or informal educational materials; museum, aquarium or other public exhibits; web-based presentations, etc.

Up to $2M per year are available for support of efforts in this overall topic, including M(1) through M(5). As this is a new NOPP topic, only one- and two-year proposals are being requested, but options for renewal for an additional one or two-years should also be proposed if appropriate, including a statement of what would be produced in the base 1-2 year effort to allow a decision on renewal.

Renewals:
No renewal proposals are being solicited at this time.

7. Point(s) of Contact -

Questions of a technical nature shall be directed to the cognizant Technical Point of Contact, as specified below:

Science and Technology Point of Contact:

Dr. James Eckman

NOPP Team Leader
OAS Processes and Prediction S&T Division
ONR 322
Office of Naval Research
Ballston Center Tower One, Room 407-1
800 N. Quincy St.
Arlington, VA 22217-5660
Tel: 703-696-4590
Fax: 703-696-3390, ATTN: NOPP BAA
Email: NOPP@onr.navy.mil
Questions of a business nature shall be directed to the cognizant Contract Specialist, as specified below:

Business Point of Contact:

Mr. Brian Glance
Senior Contracting Officer
Placement Two Branch
ONR 252
Office of Naval Research
Ballston Center Tower One, Room 720
800 N. Quincy St.
Arlington, VA 22217-5660
Tel: (703) 696-2596
Fax: (703) 696-2007, ATTN: NOPP BAA
Email: glanceb@onr.navy.mil

8. Instrument Type(s) -

ONR anticipates that basic research (6.1) and applied research (6.2) DoD funding will be available to make awards, as well as funds provided by other government agencies and private foundations. Awards will primarily be in the form of grants (universities) or interagency transfers (government laboratories). However, the Government reserves the right to award cooperative agreements, cost-plus-fixed-fee (CPFF) contracts or other transaction agreements to appropriate parties, should the situation warrant use of an instrument other than a grant or interagency transfer. Therefore, proposals submitted as a result of this announcement may fall under the purview of either the Federal Acquisition Regulations (FAR) or the Department of Defense Grant and Agreement Regulations (DODGARS).

9. Catalog of Federal Domestic Assistance (CFDA) Numbers -

12.300

10. Catalog of Federal Domestic Assistance (CFDA) Titles -

DOD Basic and Applied Scientific Research

11. Other Information -

N/A

II. AWARD INFORMATION

*Total Amount of Funding Available: Up to $3M, subject to appropriation(s) and final approval by the National Ocean Research Leadership Council (NORLC).

*Anticipated Number of Awards: 4-8

*Anticipated Award Types: Awards will primarily be in the form of grants; participating industries should propose as sub-contractors to participating universities.

*Anticipated Range of Individual Award Amounts: 50K-500K annually

*Previous Year(s) Average Individual Award Amounts: N/A

*Anticipated Period of Performance for Awards: 1-3 years (plus options if applicable)

III. ELIGIBILITY INFORMATION

This solicitation is open to all responsible sources.

Historically Black Colleges and Universities and Minority Institutions, as determined by the Secretary of Education to meet requirements of 34 CFR Section 608.2 and 10 U.S.C. Paragraph 2323(a)(1)(C), are particularly encouraged to participate.

IV. APPLICATION AND SUBMISSION INFORMATION

1. Application and Submission Process -

Proposals should be submitted electronically; see details below.

2. Content and Format of Letters-of-Intent and Full Proposals -

The Proposals submitted under this BAA are expected to be unclassified. The Proposal submissions will be protected from unauthorized disclosure in accordance with FAR 15.207, applicable law, and DoD/DoN regulations. Offerors are expected to appropriately mark each page of their submission that contains proprietary information.

Letter of Intent Format and Content

All potential offerors are requested to send an ***electronic*** message of intention to propose to NOPP@onr.navy.mil as soon as possible, but not later than September 5, 2003, to permit the peer/panel review process to be planned in advance. No specific format is necessary.

Such messages should list:

the intended title,
probable partners,
Principal Investigator(s) for the project, and
any additional information that might be helpful in arranging for reviews.

Full Proposal Format – Volume 1 - Technical and Volume 2 - Cost Proposal

Paper Size – 8.5 x 11 inch paper
Margins – 1” inch
Spacing – single or double-spaced
Font – Times New Roman, 12 point
Number of Pages – Volume 1 is limited to no more than 15 pages. Volume 2 is limited to no more than15 pages. Limitations within sections of the proposal are indicated in the individual descriptions shown below. The cover page, table of contents, and resumes are excluded from the

page limitations. Full Proposals exceeding the page limit may not be evaluated. Volumes 1 and 2 may be combined into one document.

Copies –one electronic copy in .PDF format, submitted as described below.

Full Proposal Content

VOLUME 1: Technical Proposal

- **Cover Page:** This should include the words "Technical Proposal" and the following:

BAA number;
Title of Proposal;
Identity of prime Offeror and complete list of subcontractors, if applicable;
Technical contact (name, address, phone/fax, electronic mail address)
Administrative/business contact (name, address, phone/fax, electronic mail address) and;
Duration of effort (differentiate basic effort and options)

- **Table of Contents**

- **Statement of Work:** A Statement of Work (SOW) clearly detailing the scope and objectives of the effort and the technical approach. It is anticipated that the proposed SOW will be incorporated as an attachment to the resultant award instrument. To this end, such proposals must include a severable self-standing SOW without any proprietary restrictions, which can be attached to the contract or agreement award. Include a detailed listing of the technical tasks/subtasks organized by year.

- **Project Schedule and Milestones:** A summary of the schedule of events and milestones.

- **Assertion of Data Rights:** Include here a summary of any proprietary rights to pre-existing results, prototypes, or systems supporting and/or necessary for the use of the research, results, and/or prototype. Any data rights asserted in other parts of the proposal that would impact the rights in this section must be cross-referenced. If there are proprietary rights, the Offeror must explain how these affect its ability to deliver research data, subsystems and toolkits for integration. Additionally, Offerors must explain how the program goals are achievable in light of these proprietary limitations. If there are no claims of proprietary rights in pre-existing data, this section shall consist of a statement to that effect.

  NOTE: The default data policy in NOPP is full, open, and immediate disclosure of all data taken under NOPP sponsorship. Waivers and exceptions should be requested in the proposal and may be granted by the cognizant Program Officer.

- **Management Approach:** A discussion of the overall approach to the management of this effort, including brief discussions of the total organization, use of personnel; project/function/subcontractor relationships; government research interfaces; and planning, scheduling and control practice. Identify which personnel and subcontractors (if any) will be involved. Include a description of the facilities that are required for the proposed effort with a description of any Government Furnished Equipment, Hardware, Software, Information required, by version and/or configuration.

- **Ship Use** Funding estimates for any ship-time must be specifically included in the proposal, and the budget should include full ship costs and clearly specify the size and type of vessels

proposed for use. Ships of opportunity are encouraged. Proposers should include ship time requests on either the former NSF Form 831 (Ship time Request Form) or preferably the University / National Oceanographic Laboratory System (UNOLS) on-line request form available at: http://www.gso.uri.edu/unols/ship/shiptime.html.

VOLUME 2: Cost Proposal

The Cost Proposal shall consist of a cover page and two parts, Part 1 will provide a detailed cost breakdown of all costs by cost category by calendar or Gov't fiscal year and Part 2 will provide a cost breakdown by task/sub-task corresponding to the task numbers in the proposed Statement of Work. Options must be separately priced.

Cover Page: The use of the SF 1411 is optional. The words "Cost Proposal" should appear on the cover page in addition to the following information:

BAA number
Title of Proposal
Identity of prime Offeror and complete list of subcontractors, if applicable
Technical contact (name, address, phone/fax, electronic mail address)
Administrative/business contact (name, address, phone/fax, electronic mail address) and
Duration of effort (separately identify basic effort and any proposed options)

Part 1: Detailed breakdown of all costs by cost category by calendar or Gov't fiscal year:

Direct Labor – Individual labor category or person, with associated labor hours and unburdened direct labor rates
Indirect Costs – Fringe Benefits, Overhead, G&A, COM, etc. (Must show base amount and rate)
Travel – Number of trips, destination, duration, etc.
Subcontract – A cost proposal as detailed as the Offeror's cost proposal will be required to be submitted by the subcontractor. The subcontractor's cost proposal can be provided in a sealed envelope with the Offeror's cost proposal or will be requested from the subcontractor at a later date
Consultant – Provide consultant agreement or other document which verifies the proposed loaded daily/hourly rate
Materials should be specifically itemized with costs or estimated costs. An explanation of any estimating factors, including their derivation and application, shall be provided. Include a brief description of the Offeror's procurement method to be used (Competition, engineering estimate, market survey, etc.)
Other Directs Costs, particularly any proposed items of equipment or facilities. Equipment and facilities generally must be furnished by the contractor/recipient. (Justifications must be provided when Government funding for such items is sought). Include a brief description of the Offeror's procurement method to be used (Competition, engineering estimate, market survey, etc.).

Part 2: Cost breakdown by task/sub-task using the same task numbers in the Statement of Work.

3. Significant Dates and Times -

Anticipated Schedule of Events

Event	Date (MM/DD/YEAR)	Time (Local Eastern Time)
Letters-of-Intent Due Date	09/05/2003	4:00 p.m.
Notification of Evaluations of Letters-of-Intent	No evaluation, no notification	
Full Proposals Due Date	10/01/2003	4:00 p.m.
Notification of Selection for Award	10/31/2003 *	
Contract Awards (start date)	01/01/2004 *	

* These dates are estimates as of the date of this announcement.

4. Submission of Late Proposals –

Any proposal, modification, or revision, that is received at the designated Government office after the exact time specified for receipt of proposals is "late" and will not be considered unless it is received before selection of awards is made, the contracting officer determines that accepting the late proposal would not unduly delay the acquisition and

If it was transmitted through an electronic commerce method authorized by the announcement, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or

There is acceptable evidence to establish that it was received at the Government installation designated for receipt of proposals and was under the Government's control prior to the time set for receipt of proposals; or

It was the only proposal received.

However, a late modification of an otherwise timely and successful proposal that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

NOTE: hard-copy submissions through the USPS are considered to be under Government control at the time of submission to the USPS. Hard-copy submissions through private carriers are not under Government control until received at the Government delivery address.

Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the Government office designated for receipt of proposals by the exact time specified in the announcement, and urgent Government requirements preclude amendment of the announcement closing date, the

time specified for receipt of proposals will be deemed to be extend to the same time of day specified in the announcement on the first work day on which normal Government processes resume.

The contracting officer must promptly notify any offeror if its proposal, modifications, or revision was received late and must inform the offeror whether its proposal will be considered.

5. Address for the Submission of Letters-of-Intent and Full Proposals –

Because of potential delays and/or damage in mailing or shipment of hard copy submissions, electronic submissions of Letters of Intent and Full Proposals are required. Letters of Intent may be in plain text emails. Electronic submissions of full proposals must be in PDF format.

Letters of Intent are requested by email to NOPP@onr.navy.mil. Electronic proposal submissions must be directed to the National Oceanographic Partnership Program at http://www.onr.navy.mil/sci_tech/ocean/outside/nopp_04.htm;
ATTN: James Eckman.

V. EVALUATION INFORMATION

1. Evaluation Criteria –

Evaluations of the proposals will be performed using the following selection criteria:

Relevance of the proposed research to NOPP objectives;
Overall scientific and technical merits of the proposal;
Level of support of critical research objectives or operational goals such as data accessibility, education and communication;
Quality of proposed partnerships including the degree of broad participation within the oceanographic community and demonstration of significant partnering among at least two of the following parties: academia, industry, or government and extent resources are shared among partners;
NOPP project accomplishments to date (applies to renewal projects only);
The offeror's capabilities, related experience, and facilities or unique combinations of these that are critical to the proposal objectives;
The partnership members' long-term commitment to the proposed objectives;
The qualifications and experience of the proposed principal investigator and key personnel;
Encouragement of industry as participants and partners; and
Encouragement of under-represented groups as participants and partners.

2. Evaluation Panel -

All proposals will be subject to mail and/or panel review by peers, which may include non-governmental reviewers under non-disclosure agreements. All reviewers will adhere to confidentiality and conflict of interest standards. A synopsis of the NOPP review process can be found at http://www.nopp.org/.

The final distribution of awards will depend on quality of proposals, programmatic balance, NOPP priorities and availability of funds.

VI. AWARD ADMINISTRATION INFORMATION

1. Administrative Requirements –

CCR - Successful Offerors not already registered in the Central Contractor Registry (CCR) will be required to register in CCR prior to award of any grant, contract, cooperative agreement, or other

transaction agreement. Information on CCR registration is available at http://www.onr.navy.mil/02/ccr.htm.

Certifications – Proposals should be accompanied by a completed certification package which can be accessed on the ONR Home Page at Contracts & Grants. For grant proposals and proposals for cooperative agreements or other transaction agreements (other than for prototypes), the certification package is entitled, "Certifications for Grants and Agreements. " For contract proposals and for other transaction proposals involving prototypes (Section 845 agreements), the certification package is entitled, "Representations and Certifications for Contracts."

2. Annual Reporting -

All funded NOPP efforts must submit an Annual Report for use in the mandatory annual Spring NOPP Report to Congress. The NOPP Program Office will call for these each winter.

VII. OTHER INFORMATION

1. Government Property/Government Furnished Equipment (GFE) and Facilities

Each proposer must provide a very specific description of any equipment/hardware that it needs to acquire to perform the work. Also, this description should identify the component, nomenclature, and configuration of the equipment/hardware that it proposes to purchase for this effort. The purchase on a direct reimbursement basis of special test equipment or other equipment will be evaluated for allowability on a case-by-case basis. Maximum use of Government integration, test, and experiment facilities is encouraged in each of the Offeror's proposals.

Government research facilities and operational military units are available and should be considered as potential government furnished equipment/facilities. These facilities and resources are of high value and some are in constant demand by multiple programs. The use of these facilities and resources will be negotiated as the program unfolds. Offerors should explain which of these facilities they recommend.

2. Use of Animals and Human Subjects in Research

If animals are to be utilized in the research effort proposed, the Offeror must complete a DoD Animal Use Protocol with supporting documentation (copies of AAALAC accreditation and /or NIH assurance, IACUC approval, research literature database searches, and the two most recent USDA inspection reports) prior to award. Similarly, for any proposal that involves the experimental use of human subjects, the Offeror must obtain approval from the Offeror's committee for protection of human subjects (normally referred to as an Institutional Review Board (IRB)). The Offeror must also provide NIH (OHRP/DHHS) documentation of a Federal Wide Assurance that covers the proposed human subjects study. If the Offeror does not have a Federal Wide Assurance, a DoD Single Project Assurance for that work must be completed prior to award. Please see http://www.onr.navy.mil/02/howto.htm for further information.

3. Department of Defense High Performance Computing Program

The DoD High Performance Computing Program (HPCMP) furnishes the DoD S & T and DT & E communities with use-access to very powerful high performance computing systems. Awardees of ONR contracts, grants, and assistance instruments may be eligible to use HPCMP assets in support of their funded activities if ONR Program Officer approval is obtained and if security/screening requirements are favorably completed. Additional information and an application may be found at http://www.hpcmo.hpc.mil/.

Appendix 6. National Oceanographic Partnership Program FY 2004 Funded Project Summaries

TOPIC A. OPERATIONAL / ROUTINE OBSERVATIONS

Multi-sensor Improved Sea Surface Temperature (MISST) for GODAE

Lead PI: Dr. Chelle A. Gentemann

This proposal has two parts to address the two distinct aims of the current announcement. Part 1 focuses on producing an improved sea surface temperature (SST) product through the combination of observations from complementary infrared (IR) and microwave (MW) sensors. Part 2 focuses on demonstrating the impact of improved multi-sensor SST products on operational ocean models, numerical weather prediction, and tropical cyclone intensity forecasting. Close collaboration and the international coordinated exchange of SST products with error statistics with operational agencies will optimize utility of these new data streams by US and international operational agencies. Innovative techniques to blend these complementary data will be applied in operational frameworks at NOAA and Navy. This project will make a direct US contribution to the Global Ocean Data Assimilation Experiment (GODAE) by working within the GODAE High-Resolution SST Pilot Project (GHRSST-PP), initiated by the international GODAE steering team, to coordinate the production of a new generation high resolution SST. Within the GHRSST-PP framework close coordination with complementary efforts in Europe and Japan have already been established. By contributing to the GHRSST-PP this team will minimize duplication of efforts, harmonize research and development activities, and maximize data access.

Project Objectives To produce multi-sensor improved SSTs and successfully assess the impact of these products, five clear project tasks have been identified:

1) Computation of sensor-specific observational error characteristics required for optimal application and data fusion techniques.
2) Parameterization of IR and MW retrieval differences, with consideration of diurnal warming and cool-skin effects required for multi-sensor blending.
3) Production and dissemination of sensor-specific SST products with associated retrieval confidence, standard deviation (STD), and diurnal warming estimates to the application user community.
4) Production and dissemination of improved multi-sensor high-resolution skin and bulk SST analyses to demonstrate and optimize utility in operational applications.
5) Targeted impact assessment of the SST analyses on hurricane intensity forecasting, numerical data assimilation by ocean models (both national and within GODAE), numerical weather prediction, and operational ocean forecast models.

Specific activities include careful inter-calibration of different satellite sensors, involving the calculation of sensor-specific observation errors that consider environmental variables, location of observation, time of day, and sensor calibration problems; developing techniques for relating and combining measurements at different depths, spatial resolutions, and times of the day; and implementing data fusion methodologies. We propose to establish a regional data assembly center (RDAC) that will facilitate the coordination, data sharing, and joint processing as a parallel activity to GHRSST-PP RDACs in Japan and Europe.

By providing this high-resolution SST data, in a pseudo-operational manner, we expect to demonstrate positive impacts in many fields including: improved hurricane intensity forecasts, better predictive capabilities in numerical weather prediction (NWP) and ocean forecasting, and consolidation of the numerous SST data products into an optimal, easily accessible new generation product shared by the US and international community. This effort will ensure that US scientists and operational activities remain at the forefront of the international ocean and weather forecasting activities.

Number of Years: 3

Partners:
Remote Sensing Systems
University of Maryland
University of Edinburgh
University of Miami
University of Colorado
Woods Hole Oceanographic Institution
NOAA/Environmental Technology Laboratory
Naval Research Laboratory-Monterey
NOAA/NESDIS/Office of Research and Applications
NOAA/NESDIS/National Oceanographic Data Center
NOAA/NESDIS/National Coastal Data Center
Jet Propulsion Laboratory Physical Oceanographic Distributed Active Archive Center
Naval Oceanographic Office
Naval Research Laboratory-Stennis Space Center
NOAA/Atlantic Oceanographic and Meteorological Laboratory
International GODAE High-Resolution SST Pilot Project Project Office

U. S. GODAE: Sustained Global Ocean State Estimation for Scientific and Practical Application

Lead PI: Carl Wunsch

This project is directed at the full exploitation of new capabilities for combining global scale ocean observations with the most powerful available ocean circulation models. The results are essential for a variety of important uses, including seasonal-to-interannual forecasting of the climate system, of numerous national contributions to the Intergovernmental Panel on Climate Change (IPCC) process for assessing climate change and its impacts (including sea level change and carbon uptake), and the much firmer scientific understanding of the ocean circulation and its variability in time. The latter ultimately influences such diverse problems as national fisheries policies, national security (in its widest sense), and even energy policy.

The work is a collaboration of several institutions, an arrangement necessary given the complexity of the problem. This complexity arises because of the need to have available the latest, most sophisticated and highly efficient ocean circulation numerical models, the understanding of the rich diversity of ocean data types — suitably quality controlled — and ready access to optimization software suitable for problems of dimension many orders of magnitude larger than previously attempted. The work builds directly on what has been accomplished by the Estimating the Circulation and Climate of the Ocean (ECCO) Consortium with NOPP support (2000-2004), and aims to extend and exploit the capability of the wider community.

The major components of the project include: (1) the production of seasonal-to-interannual forecasts, their testing and comparison; (2) the continued estimation of dynamically consistent, global, day-to-day estimates of the three-dimensional time-evolving ocean circulation at the highest feasible resolution; (3) the public distribution of all products including both the scientific and application communities; (4) continued evolution of models and methodologies so that the estimates continue to reflect the state-of-the-art; (5) a quality-controlled global data stream reflecting the great majority of the oceanic observations now available.

Number of Years: 5

Partners: Massachusetts Institute of Technology
Jet Propulsion Laboratory, California Institute of Technology
NOAA/Geophysical Fluid Dynamics Laboratory
NOAA/National Centers for Environmental Prediction
NASA/Goddard Space Flight Center
Atmospheric and Environmental Research, Inc.
Scripps Institution of Oceanography,
University of California, SanDiego

TOPIC C OBSERVATIONAL TECHNIQUE DEVELOPMENT

An Integrated Wireless Coastal Communications Network

Lead PI: Dr. Robert A. Nichols

The design of a coastal communications network that enables real-time telemetry collection and connectivity can be employed for a wide range of applications. The advantage of establishing a United States Coastal Area Network (U-SCAN) is the ability to permit immediate and ad hoc access for both manned and unmanned platforms. Commercial Wireless Local Area Network (WLAN) technology has become a technically mature and commercially pervasive technology that we believe will permit such an infrastructure to be realized in the near-term for coastal instrumentation and other roles. It is anticipated that improved wireless communications will find immediate applications in the evolving national network of coastal ocean observing systems, the planned coastal component of the National Science Foundation Ocean Observation Initiative (OOI) and in diverse applications such as commercial and homeland security applications. The proposed design will follow a four-step process. First, high-level requirements for the U-SCAN will be derived. Second, available WLAN and over-the-horizon (OTH) communications technologies will be assessed for their overall applicability against the requirements. Third, performance studies will be conducted to determine the viability of those technologies to be combined in an integrated architecture. Finally, proposals for technology demonstrations will be conceived to address implementation issues, risk mitigation, and technology transition. A documented design will be produced through these steps. The other primary area of interest is the support to ship-based researchers and operators with U-SCAN connectivity not only to the autonomous platforms but also into the terrestrial, global Internet. It is also prudent to consider other user segments such as U.S. Coast Guard platforms, which could potentially share an infrastructure such as this for homeland security missions. Private sector at-sea operators (e.g. fishing boats) will also be considered. The implementation issues of the U-SCAN architecture could best be considered via a demonstration of the technology. The critical requirements that stress the network will be identified and demonstration approaches documented for those requirements. These may include laboratory, land-based and sea-based demonstrations. The participants in this partnership have extensive background in oceanography, autonomous platform development for oceanographic use and communications and network engineering. The partnership will leverage these diverse backgrounds to incorporate both the scientific aspects of this type of network and the technological aspects involved in implementing the U-SCAN network. We plan to deliver a design and demonstration plan for a coastal communications network that provides an integrated perspective of user classes and desired capabilities, communications network requirements, performance analyses, demonstration approaches, cost estimates, and key follow-on activities.

Number of Years: 2

Partners:

The Johns Hopkins University
Rutgers University
Webb Research Corporation

TOPIC M. MARINE MAMMALS

Acoustics in the Cetaceans' Environment: A Multimedia Educational Package

Lead PI: Dr. Marc S. Dantzker

The majority of the public perceives the undersea realm to be a largely silent world. While many people are aware that whales produce haunting songs or cacophonous clicks and whistles, most don't know the extent to which marine mammals use sounds to communicate, survey their environment, and find food. More surprising to many is that the sea is alive with sounds of all kinds, from bubbles in breaking waves and rumbling undersea volcanoes, to croaking fish, snapping shrimp, and rasping mollusks. The general public has a poor understanding of how the behavior of sound in marine environments compares with our terrestrial world. They also know little about the critical role sound plays in marine research and marine mammal conservation. While there is increasing public concern over rising levels of anthropogenic noise in the marine environment, there is a lack of comprehensive, broadly disseminated information about sound in the sea. This makes it difficult for the public to make informed decisions about sound-related marine issues. This project will help ensure that accurate information about sound in the sea is made available to as many people as possible. Using cetaceans as our focal subjects, we will create state-of-the-art outreach and education materials about sound in the seas. We propose the creation of a comprehensive multimedia educational package built from a set of top-tier materials that we will gather and produce — professional-quality surround-sound environmental recordings and High Definition (HD) video acquired at four National Marine Sanctuaries; 3D scientific illustrations and data visualizations of key concepts in ocean acoustics; and teacher-tested interactive exercises created by one of the top teams in interactive media. These raw materials will be combined into a multifaceted set of outreach products that will be distributed to thousands of classrooms and organizations in hard format, and thousands more over the Internet. Unlike any other media project of its kind, all of the media acquired for this project will be archived and available as part of a growing online public archive, for repurposing by educators, researchers, and conservationists. The package, being developed with the working title "Sea of Sound," includes:

- Capture of High Definition video and surround-sound audio of several species of marine mammals and their varied habitats, for incorporation into Cornell University's Macaulay Library, part of the National Science Digital Library System. This material will be available in perpetuity for research, education and conservation applications. (In partnership with NOAA) Documentation of a variety of acoustic-based marine research projects, also available for education and outreach. (In partnership with NOAA)
- Creation of dynamic data visualizations and compelling interactive exercises that clearly illustrate complex concepts such as the near-field effects of pile drivers, and the trans-ocean reach of sounds in the SOFAR channel. (In partnership with the National Center for Supercomputing Applications, Marine Acoustics, Inc., and Cornell's Bioacoustic Research Program)
- Creation of a DVD and curricula about sound in the sea. (In partnership with WGBH Boston Public Television and Apple Computer)
- Creation of Web-based interactive activities, such as the ability to see the effects of adding noise sources to one's own virtual sea. The web will also add deeper scientific content, with in-depth looks at active research programs and timely oceanographic news. (In partnership with WGBH Boston Public Television and Apple Computer)
- Creation of a documentary that takes people on a "whale's ear" journey of the seas. Using cetaceans as animal "guides," this documentary will let people see and hear the whales' world, bringing the sound of the seas into homes and classrooms around the world. We will explore Hawaiian waters with humpback whales, the waters off the Pacific Northwest with orca, coral reefs in the Northwestern Hawaiian Islands with spinner dolphins, and the Lower Gulf of Maine with

Northern right whales. We will spotlight researchers using sounds to study the oceans, and the myriad ways in which people create undersea sounds through activities like shipping and drilling. (In partnership with NOAA's National Marine Sanctuary Program)

This project will answer the need for comprehensive, top-quality outreach materials with which to tell the story of sound in the sea, helping to develop a more informed public about the role people play in managing a healthy ocean, for all species.

Number of Years: 2

Partners:
Cornell University
WGBH Foundation
National Center for Supercomputing Applications
Marine Acoustics Incorporated

An Annotated and Federated Digital Library of Marine Mammal Sounds

Lead PI: Dr. Jack W. Bradbury

This proposal is a response to BAA 03-014: M(4) Algorithms and Databases. It proposes a broadly based and highly sustainable solution to the call for "open-access data archives… for animal sounds". We request funds to integrate three independent data sources: i) a rapidly growing marine animal sound archive at the Macaulay Library; ii) contemporary acoustic survey datasets from cetacean research programs, and iii) other existing NOPP databases (such as OBISSEAMAP). We have designed a seamless framework that will be transparent to Internet users of the constituent databases and provide integrated and cross-referenced access to acoustic, distributional, and biogeographic data. In addition to assembling this interdisciplinary database, our proposal addresses a number of the informational needs outlined in a recent NOAA report (Mellinger and Barlow, 2003). We identify key recommendations in that report and outline below how the proposed integrated library structure will help meet those declared needs.

Number of Years: 2

Partners:
Cornell University
NOAA National Marine Mammal Laboratory
NOAA Pacific Marine Environmental Laboratory

Measuring the Behavior of Beaked Whales and Their Responses to Sound Using a Digital Recording Tag

Lead PI: Drs. Mark Johnson and Peter Tyack

Several mass strandings of beaked whales in recent years have been associated with nearby deployments of mid-frequency navy sonars and, more recently, airguns used for seismic exploration. Although the connection between sound and stranding is circumstantial, the persistence of such strandings suggests that beaked whales, especially Ziphius cavirostris and Mesoplodon sp., may be acutely sensitive to sound in the low-kilohertz range. While this may result from an anatomical susceptibility, it is likely that a combination of factors, physiological, behavioral and habitat choice, increase the risk to these whales. Unfortunately, the deep-diving lifestyle and acoustically cryptic behavior of most beaked whales makes them extremely difficult to study. Since 2000, with funding from SERDP, we have been developing filed sites for studying Z. cavirostris and M. densirostris. Working with European partners, ULL and bluWest, we have discovered two sites with very high encounter rates. This work culminated in attachments of the DTAG, an acoustic and multi-sensor recording tag to three Z. cavirostris, the first time this species has been tagged successfully. We propose an integrated effort to develop the field sites and methodologies necessary to achieve reliable DTAG recordings on beaked whales, especially Z. cavirostris and M. densirostris, with the ultimate goal of performing controlled exposure experiments (CEEs) to tagged whales. The DTAG data will be combined with surface visual observations, photo-identification and genetic catalogs, and rapid fine-scale physical oceanographic measurements in the presence of beaked whales, to provide a thorough characterization of the movement patterns, vocalizations, foraging styles, and preferred habitat of tagged whales. The resulting baseline data will greatly expand our understanding and will be crucial in developing effective mitigation policies for these sensitive animals. As tagging operations become reliable, we will plan a pilot CEE study aimed at examining the behavioral responses of beaked whales to low levels of low and/or mid-frequency sound. Before attempting such a study, we will host a workshop to establish safety guidelines, stimulus priorities, and target levels.

Number of Years: 2

Partners:
Woods Hole Oceanographic Institution
University of La Laguna
Government of the Canary Islands
BluWest
SACLANT Undersea Research Center Central Institute for Applied Marine Research, Italy

Models of Beaked Whale Hearing and Responses to Underwater Noise

Lead PI: Dr. Darlene Ketten

At present, there are broad scientific and public concerns about potential impacts of human sound sources in the oceans. Both research and U.S. Navy operations are hampered by intense public oversight and even injunction because of a lack of knowledge about the hearing and the mechanisms and specificity of acoustic impacts for many marine mammals. These concerns are particularly acute for effects of sonars on whales and dolphins, as reflected by emphasis in this program announcement on the need for data on underwater hearing and acoustic impacts, particularly for beaked whales. It is imperative for conservation purposes that we find some means of assessing as accurately as possible how marine mammals may be affected by anthropogenic noise in the oceans, but to achieve the necessary level of detailed insight known about hearing in land mammals would require acute experimentation on whales that is impossible for practical, regulatory, and ethical considerations. Therefore, we must invent alternative methods for obtaining reliable underwater hearing and impact estimates. To accomplish this requires developing robust, marine-explicit auditory models. To that end, we propose to develop biophysically based models of the acoustic power flow from the water, through the tissues of the head and middle ear, into the cochlea, and ultimately to the sensory receptor cells (hair cells). These models will allow us to estimate audiograms for multiple odontocete species from anatomical and mechanical measurements and to predict the excitation pattern within individual cochlea for a range of acoustic inputs as well as modeling stresses and strains on key cochlear tissues from over-stimulation.

Number of Years: 2

Partners:
Woods Hole Oceanographic Institution
Boston University
Naval Research Laboratory

Radar-Based Detection, Tracking and Speciation of Marine Mammals from Ships

Lead PI: Dr. Douglas DeProspo

The overall objective of the proposed baseline program is to establish the ability of current or planned ship-based radars, augmented by specialized signal processing, to detect, discriminate and track (geo-locate) a number of different marine mammal species (e.g., great whales, schooling dolphins, etc.) under a variety of representative sea environments (e.g., Atlantic, Pacific, Mediterranean, etc.). This work will build upon the technology base generated during the recent Project Humpback. To support the realization of the overall objective, we have designed a comprehensive two-year program, centered on modeling, simulation and experimental validation and demonstration, around the more specific objectives. Number of Years: 2

Partners:
Areté Associates
University of Hawaii

Standardization of Electrophysiological Measures of Hearing in Marine Mammals

Lead PI: Drs. Colleen Reichmuth Kastak and David Kastak

Noise in the marine environment has increased significantly during the past several decades as a result of escalating industrial and military activities. Consequently, there is growing concern for how marine animals and ecosystems may be adversely affected by anthropogenic noise. Navy sponsored research programs have examined auditory processes in taxa such as fish, turtles, seals, and dolphins in efforts to better understand the hearing of aquatic organisms and the impacts of various noise sources. Current knowledge of hearing in marine mammals has been largely generated by behavioral studies using captive animals trained to participate in psychophysical testing procedures. Although this behavioral approach has yielded important data on auditory processing for certain marine mammals, it is costly, time consuming, and limited to a small sample size of individuals representing a small number of species. An alternative to obtaining behavioral measures of hearing sensitivity is a physiological technique based on the measurement of small electrical voltages produced by the brain in response to an acoustic stimulation. These voltages are called auditory evoked potentials (AEPs). This method has been applied to the investigation of auditory processes in numerous terrestrial mammals and in some dolphins and other toothed whales. The success of this approach in evaluating physiological processes of the auditory system in small cetacean species (whales, porpoises and dolphins) has led to the speculation that it can be applied to studying hearing in amphibious marine mammals such as the pinnipeds (seals and sea lions). However, the application of this approach to the study of pinniped hearing is problematic for several reasons. First, there is a lack of standardization of testing procedures in the marine mammals that have been studied thus far using AEP measurements. Second, there is a lack of basic information about the relevant electrophysiological characteristics of the pinniped auditory system that must be addressed to make comparisons between pinnipeds and other marine mammals. This information is required for the development of standardized testing procedures that will allow rapid assessment of auditory sensitivity across multiple species. The research proposed here will answer fundamental questions about AEP measurement in pinnipeds and examine the feasibility of using AEP techniques to measure hearing sensitivity and noise impacts in three representative species. The primary objective of the proposed study is to standardize techniques so that they can be used to directly compare electrophysiological and behavioral hearing assessments within individuals and to determine the variation in results expected between the two techniques. A second objective is to compare the results obtained with pinnipeds to those obtained in dolphins using similar electrophysiological approaches. This will be accomplished through a research partnership involving academic, government, and industry cooperation. Results of the proposed research will enhance Office of Naval Research efforts and technological capability to investigate marine mammal bioacoustics and the impact of underwater noise on marine mammals. Following the benchmarking of an AEP system and establishment of data collections protocols, the AEP technique can be applied to several research areas relevant to ONR with the likelihood of obtaining more expedient results in those areas. These include, but are not limited to, increasing the number of marine mammal species for which hearing data is available and examining the effects of noise exposure on the hearing of pinnipeds inhabiting diverse environments. Ultimately, these efforts will facilitate the work of regulatory agencies responsible for establishing and enforcing appropriate guidelines related to the Marine Mammal Protection Act and Endangered Species Act, and improve environmental compliance planning and assessment for military and industrial activities. The proposed study will develop an evoked potential audiometry system and standardized approach to determining AEP's in the study of marine mammal hearing. The University of California Santa Cruz (academic partner and primary offeror), the U.S. Navy Marine Mammal Program at the Space and Naval Warfare Systems Center (government partner), and BIOMIMETICA (industry partner) will cooperatively engage in the technological development of an AEP system and the comparative electrophysiological and behavioral investigations necessary to groundtruth the system. The research will be carried out at two sites: pinniped research will be conducted at Long Marine Laboratory at the University of California in Santa Cruz and comparative dolphin investigations will be conducted at the Navy Marine Mammal Program (NMMP) of the Space and Naval

Warfare Systems Center in San Diego (SSC SD). Technology development and refinement of data collection protocols for the dolphin research is currently underway at SSC SD in a research partnership between the NMMP and BIOMIMETICA. Evoked potentials will be elicited and recorded from trained subjects representing three pinniped species. Results will be compared to cetacean audiometric data collected with similar AEP techniques and behavioral audiometric data collected in the same pinnipeds. This laboratory research will investigate optimal electrode placement positions, identify appropriate stimulus parameters, and characterize the evoked physiological response to various stimuli. Electrophysiological threshold measurements will be obtained at a range of frequencies and compared to threshold measurements made at the same frequencies using traditional behavioral methodologies. This work will be done in parallel with ongoing studies by the government and industry partner comparing electrophysiological and behavioral measures of auditory sensitivity in bottlenose dolphins. The behavioral and physiological hearing assessments in the dolphin and pinniped test subjects will be standardized in the current study, allowing for appropriate comparisons to be made with respect to hearing sensitivity and technology development. Technology developments and research protocols resulting from these studies will be used in several future transitions, including rapid assessment of hearing loss following controlled noise exposures, use of the AEP technique under aerial ambient noise conditions with untrained animals, and exploration of whether the technique can be adapted for underwater testing of pinnipeds

Number of Years: 1

Partners:
University of California, Santa Cruz
U.S. Navy Marine Mammal Program, Space and Naval Warfare Systems Center
BIOMIMETICA

Appendix 7. Fiscal Year 2004 Coastal Observation Technology Systems Projects

The Coastal Observation Technology System (COTS) project grants currently funded by NOAA are designed to further the development of integrated coastal ocean observing systems on a regional basis. COTS projects target two critical elements of developing regional capacity for coastal/ocean observations: 1) creating infrastructure (e.g., sensors, data management systems) and methodologies to collect, share, and integrate environmental data and create useful information products, and 2) developing organizational/governance structures for regional associations as components of the IOOS. In FY04 NOAA funded 24 COTS projects for a total amount of approximately $29M. Fourteen awards were congressionally directed and nine of those were continued from FY03. Another ten projects were competitively selected in response to an announcement in FY04. Of these, eight support development of RAs, and two pilot observing system technology projects were funded.

COTS concentrates on creating an environment to share data and information collected by, and technology useful to, coastal observing systems. Partners are sharing information on techniques and methods they are employing, and work to create a seamless flow of data, information, and products. Interoperability is the first overarching theme as the COTS partners strive to create a model of integrated observing systems that will serve to advance the national agenda as well address regional needs. The regional organization component of the COTS projects is establishing the necessary coordination framework for the various groups working within and across regions. The overall effort includes facilitating communication, reporting, and workshops as necessary, with the NOAA Coastal Services Center serving as the lead federal coordinating partner.

NOAA also utilizes COTS funds to support the Ocean.US office and is working with the COTS partners and other federal agencies to ensure that projects conform to the vision and implementation requirements of an integrated ocean observing system. Additionally, NOAA is engaged with the private and academic sectors to determine the economic value of enhanced ocean observations and to define relationships and respective roles to ensure that federal resources are focused on providing essential core functions.

COTS FY 04 CONGRESSIONALLY DIRECTED AWARDS

Alliance for Coastal Technologies (ACT)

Funding – $2.98 M in FY 03

Date Project Initiated: May 1, 2001

Recipient Institution: University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory

The Alliance for Coastal Technologies (ACT) is a partnership of research institutions, state and regional resource managers, and private-sector companies interested in developing and applying sensor and sensor platform technologies for monitoring coastal systems. ACT serves as 1) an unbiased, third-party testbed for evaluating new and developing coastal sensor and sensor platform technologies, (2) a comprehensive data and information clearinghouse on coastal technologies, and (3) a forum for capacity building through a series of annual workshops and seminars on specific technology topics. Through these activities, ACT aids resource managers, coastal scientists, and private-sector companies by providing critical information on the latest, best, and most innovative and efficient technologies for monitoring and studying coastal waters.

Benefits: ACT provides a mechanism for transitioning newly emerging ocean-observation technologies to operational use rapidly, efficiently, and effectively. As a "technology broker," ACT maintains a continuing dialogue with operational technology users, technology providers, and the research and development community to identify technology needs, find new technologies, and document technology potential. This dialogue is one element of ACT that will help the operational IOOS agencies decide how to fund and manage technology development and link these activities, both in research institutions and the private sector, with IOOS operations. In addition, ACT, working with universities and ocean technology companies to quantitatively evaluate alternative technologies, will provide the IOOS agencies with information needed to deploy a cost-effective system of synergistic observing instruments and platforms, and capitalize on technical advances to continually upgrade its operations.

Accomplishments to Date:

- Established an organizational framework and a governance structure to function as a nationally coordinated, regionally distributed, networked "co-laboratory." Organizational elements of ACT include a headquarters unit at the Chesapeake Biological Laboratory to coordinate all ACT activities, partner research institutions located throughout the country to conduct field and laboratory work and regional outreach activities, a Stakeholder Council, and regional Alliance Members chapters.
- Established mechanisms for sustained stakeholder dialogues to develop consensus on key issues and created a coordinated international network of users and producers of coastal monitoring technologies through the Stakeholder Council, Alliance Members, and issue-focused workshops.
- Created an outreach program to increase awareness of ACT and its activities to a broad audience, which included creating an ACT Web site, exhibits and special events, audiovisual presentations for education and training, and print media, with particular emphasis given to critical high-visibility publications.
- Established the ACT Coastal Observing Technology Clearinghouse, a searchable database available on the ACT Web site, which helps coastal managers and other technology seekers learn about commercially available and new coastal observing technologies.
- Developed, through customer needs surveys and a series of technical workshops, a consensus among resource managers, coastal scientists, and private sector companies on the state-of-the-art and

priority development needs for coastal technologies in a number of areas. These needs include biological sensors for harmful algae and pathogen detection, chemical sensors for measuring nutrients and dissolved oxygen, acoustic imaging technologies for coastal habitat and resources assessment, high frequency radar for oceanographic observations, and biofouling prevention technologies.

Initiated a verification test of in situ dissolved oxygen sensors for accuracy, reliability, precision, and instrument drift/calibration life. The tests will be conducted from June to August 2004, and verification statements will be released to the public in December 2004. Five instrument manufacturers are participating in the test.

Goals:

Establish mechanisms for strategic planning and program evaluation.

Sustain stakeholder dialogues through the Stakeholder Council, Alliance Members, and technical workshops.

Sustain and enhance ongoing activities to disseminate information through Web-based media, including the Web site and the Coastal Observing Technology Clearinghouse.

Continue to network and collaborate with other technology verification and transfer programs, including collaboration with European institutions in the development of a Euro-ACT.

Continue technical workshop series on the following topics: underwater imaging systems, acoustic remote sensing, in situ nutrient sensors, autonomous geno-sensors, dissolved carbon dioxide sensors, profiling float, and underwater remote-operated vehicles.

Conduct technology verification of selected fluorometry technology for in situ measurements of chlorophyll.

Conduct customer needs and use assessments in support of the verification of fluorometry technology and selected (3–4) technical workshops.

Partners: University of South Florida; Skidaway Institute of Oceanography; Moss Landing Marine Laboratory and Monterey Bay Aquarium Research Institute; Gulf of Maine Ocean Observing System; the School of Ocean and Earth Science and Technology (SOEST), University of Hawai`i; and the Cooperative Institute for Limnology and Ecosystems Research (CILER), University of Michigan. The University of Alaska Fairbanks and the Alaska Sea Life Center will be added to the ACT Partners in May 2005.

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California Center for Integrative Coastal Ocean Research (CI-CORE)

Funding – $993 K in FY 03

Date Project Initiated: August 1, 2002

Recipient Institution: San Jose State University for a California State University Consortium

CI-CORE is dedicated, through a combined program of research, education, and public outreach, to addressing California coastal regulatory and management issues to ensure sustainable use of the coastal zone. Taking advantage of the statewide distribution of California State University (CSU) campuses, CI-CORE promotes three core technologies to develop a distributed, yet integrated, coastal monitoring observatory focused on the critically impacted region from the 100-meter isobath into, and onto, the shore and estuaries. In situ monitoring at fixed locations provides a statewide observatory of time-varying water quality parameters. High-resolution seafloor bathymetry and habitat mapping and hyperspectral imaging of benthic, shallow water and coastal environments improve resource management in critical coastal and wetlands areas. Besides serving the state needs, CI-CORE is integrated with other observatory programs locally, regionally, and nationally to help satisfy the mandate of the U.S. IOOS as articulated by Ocean.US and other state and federal programs. This program ensures that California provides national leadership promoting these mandates.

Accomplishments to Date:

- In situ monitoring:
  - Long-term statewide time-series of water quality and meteorology parameters, including
    - temperature, salinity, density, and pressure,
    - optically monitored parameters (fluorescence, sediment load, turbidity),
    - automated monitoring of dissolved nutrients, phytoplankton, and zooplankton,
    - meteorology
- Hyperspectral imagery of the nearshore and coast
  - Coastal waters optical properties
  - Bloom detection, including harmful algal blooms (HABs)
  - Nearshore bathymetry
  - Kelp forest coverage and change
  - Wetlands characterization
- High-resolution seafloor bathymetry and habitat maps
  - Baseline bathymetry and bottom characterization including hyperspectral validation
  - Environmental change detection

Goals:

CI-CORE year-two objectives have concentrated on extending the hyperspectral coverage into estuarine and wetlands areas and implementing more in situ monitoring. All data and derived products are available through the Web sites hosted by each partner. In addition, the program has solicited new members and will continue to expand as funding allows. There are five more CSU campuses that have expressed interest in joining CI-CORE.

Partners:

CSU Campus

California State Polytechnic University, San Luis Obispo

California State University, Hayward
California State University, Monterey Bay
Humboldt State University
Moss Landing Marine Laboratories
San Francisco State University/Romberg Tiburon Center
San Jose State University: coordinating institution

New CSU campuses (1 August 2004)

California State University, Long Beach
San Diego State University

Other Consortia Members

Florida Environmental Research Institution
Old Dominion University

Strategic Partners

California Department of Fish and Game
Central and Northern California Ocean Observing System (CeNCOOS)
Monterey Bay National Marine Sanctuary
San Francisco Bay National Estuarine Research Reserve

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Project Web Site: http://cicore.mlml.calstate.edu/

Carolinas Coastal Ocean Observing and Prediction System (Caro-COOPS)

Funding – $2.48 M in FY 03

Date Project Initiated: June 1, 2002 (grant start date); July 3, 2002 (the financial assistance award received by University of South Carolina from NOAA Grants Management Division)

Recipient Institution: University of South Carolina (USC) Research Foundation; Belle W. Baruch Institute, University of South Carolina, with North Carolina State University

The central goal of Caro-COOPS is prediction of coastal ocean processes. The overall objectives are to 1) integrate information on biological, chemical, and physical processes in the Carolinas' coastal ocean to provide a thorough understanding of how physical forcing and biological responses are coupled geographically and temporally; 2) assess the predictability of specific coastal processes and events and use this information to develop accurate forecasting models; and 3) create tools for applying and evaluating these predictions to provide user communities with early-warning systems.

Caro-COOPS is a wholly integrated system for coastal observations and their application to user-driven needs, including 1) an extensive array of instrumented moorings in the South Atlantic Bight off South Carolina; 2) a comprehensive data management system, essential for access to, and integration of, high-quality, real-time data; and 3) an advanced suite of integrated models that will markedly improve predictions made from real-time physical data from coastal ocean instrumentation.

An initial demonstration of the real-time interdisciplinary forecast concept for Caro-COOPS is real-time prediction and analysis of storm surge and flooding before and during landfall of coastal storms. This will improve warnings and provide local officials with the information needed for mitigation, preparedness, and prevention measures. Most recently, Caro-COOPS has also been laying the groundwork to develop a pilot project to incorporate predictions of climate variability and other meteorological and oceanic forcings into the development of tools that support commercial and recreational fisheries and their management.

Benefits: Caro-COOPS will systematically acquire and disseminate via Web interfaces real-time data on coastal ocean conditions in the Carolinas. The program will also develop and deliver regular, comprehensive information products to serve the needs of many user groups, including government agencies, industries, scientists, educators, nongovernmental organizations, and the public. Caro-COOPS will support NOAA and other federal agency missions by providing real-time predictions, and ultimately forecast tools, to mitigate coastal hazards, support management of living resources and marine ecosystems, facilitate safe and efficient marine operations, and support national security efforts. A fully operational Caro-COOPS will reduce the costs and risks to people, the economy, and natural resources from natural and human-induced hazards and increase coastal communities' ability to adapt to changing conditions, resulting in a balance of environmental and economic benefits.

Accomplishments to Date:

- Established a real-time observational network consisting of three cross-isobath lines of stations, including a line beginning at Sunset Beach, North Carolina, and extending into Upper Long Bay, North Carolina; a second line extending from Capers Island above Charleston Harbor, and a third line set north of Hilton Head Island, South Carolina, at Fripp Inlet. Each line includes a National Ocean Service CO-OPS National Water Level Observation Network (NWLON)-compatible shore-based water level (and meteorological) station (WLS) and offshore moorings located on the inner shelf (10 meter isobath) and mid-shelf (30 meter).
- Provided real-time data from the mooring systems, through a Web-based interface, on vector current profiles, water level, sea temperature and salinity at the surface and on the seafloor, and

fluorescence near the surface. Data on wave direction and wave energy spectra are collected, but not transmitted in real time. The WLS collect and transmit water-level data, water and air temperature, barometric pressure, relative humidity, and wind speed, direction, and gusts.

Successfully implemented the use of U.S. Department of Defense (DoD) Iridium Low Earth Orbiting communication satellite system for data transmission from offshore sites.

Developed computer programs and infrastructure for automated receipt, organization, and delivery of data transmitted by instrumented moorings.

Developed Web interface and information portal for access to observational data, model predictions, and information products.

Developed map-based and geographic information system (GIS)-based tools that visualize observational data and model predictions, as well as additional data layers—for example, aerial maps, topographic and bathymetric data, and land use information—for user applications.

Developed a new technique to model inundation and drying processes of coastal flooding and a state-of-the-art three-dimensional, time-dependent storm surge and inundation and retreat model, and applied the new technique and model to Charleston Harbor.

In a hindcast analysis, validated the surge and flood inundation model using data from Hurricane Hugo, which struck the Charleston region in 1989.

Incorporated a new concept for storm surge prediction based on an ensemble approach by perturbing storm tracks and intensity using National Hurricane Center storm forecast guidance, and tested this new ensemble approach during the passage of Hurricane Isabel in 2003.

Developed a new NOAA WaveWatchIII wave model to Office of Naval Research SWAN model transition, which establishes wave prediction reliability with computation efficiency. This new wave forecast capability was tested during the passage of Hurricane Isabel in 2003.

Current Year Objectives:

1. Ensure that the observing array is reporting data in a reliable and consistent manner.
2. Upgrade observing subsystem by integrating meteorological sensors on all Caro-COOPS moored buoy systems and developing means to reduce the data telemetry time from six to two hours, or possibly one hour.
3. Upgrade the integrated assimilation, management, archival, and distribution system for Caro-COOPS data, metadata, and products, including developing an automated quality assurance and quality control process, improving mechanisms for data delivery from federal backbone providers, and redesigning and streamlining the GIS mapping and analyses capabilities.
4. Validate and enhance the coastal flooding model for Charleston Harbor and develop the models for Hilton Head and Myrtle Beach areas.
5. Develop the user application components of the program, particularly through establishing a coastal flooding prediction tool and planning for the fisheries application component.

Partners: University of South Carolina's Belle W. Baruch Institute, the North Carolina State University (NCSU), the University of North Carolina at Wilmington (UNCW), and the South Carolina Department of Natural Resources (SCDNR).

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Project Web Site: http://caro-coops.org/carocoops_website/index.php

Center for Integrated Marine Technologies (CIMT)

Funding – $1.98 M in FY 03

Date Project Initiated: July 2002

Recipient Institutions: University of California Santa Cruz (UCSC); Moss Landing Marine Laboratories (MLML); Naval Postgraduate School (NPS); Monterey Bay Aquarium Research Institute (MBARI); Southwest Fisheries Science Center (SWFSC), National Marine Fisheries Service (NMFS); National Oceanic and Atmospheric Administration (NOAA)

The mission of CIMT is to create a coastal ocean monitoring program that links new technologies and data across disciplines of marine science to address key questions for the management and conservation of California coastal marine resources.

Specifically, CIMT is using these technologies to investigate the critical linkages between detailed physical oceanographic measurements of upwelling with assessments of the availability of critical nutrients to determine the extent to which these predict the distribution, abundance, and species composition of phytoplankton and zooplankton, and the distribution, abundance, and species composition of top-level consumers including fish, seabirds, marine mammals, and sea turtles.

This comprehensive interdisciplinary approach will serve as a model for an integrated coastal ocean observing system and establish the scientific basis for the effective monitoring and management of coastal fisheries and protected resources, especially those of the Monterey Bay National Marine Sanctuary.

Accomplishments to Date:

- California Department of Health Services (CDHS) Biotoxins Program receives and uses population abundance and toxin analysis information of toxic algal species from CIMT.
- CIMT has made the California State Crime Lab aware of toxic algal species and has provided them with toxic algal species data and analysis.
- Development of “rapid-response” remote sensing products with Dr. Richard Stumpf (NOAA) for the identification of potential HAB problems in California. Information reported directly to CDHS.
- Partnership of CIMT and Sanctuary Integrated Monitoring Network (SIMoN), Monterey Bay National Marine Sanctuary (MBNMS). CIMT data will be used by the MBNMS staff to inform management decisions.
- Working relationships developed with the Channel Islands, Gulf of the Farallones, and Cordell Banks National Marine Sanctuaries and the Point Reyes Bird Observatory in adapting methodology and equipment to help in future management decisions.
- Direct collaboration with the developing regional IOOS the Central and Northern California Ocean Observation System (CeNCOOS).
- CIMT acted as the Regional Data Center for the Central California coast while participating in the NOAA IOOS Interoperability Demonstration to create Web-accessible maps of hourly sea surface temperatures.
- As a direct result of CIMT, researchers now know how variable toxic bloom areas are (where very high populations can be in one area and not in another).
- Instrumentation and support (calibration, interpretation) for the permanent equipment added to the *R/V John Martin* is available to other entities and is now being used, with CIMT support, by the City of Watsonville, California, as part of its monitoring efforts.

- CIMT is providing local support, dissemination, and validation for remote sensing (ocean color) products in collaboration with NOAA (Dr. Richard Stumpf), Pacific Fisheries Environmental Laboratory (PFEL), and the Tagging of Pacific Pelagics (TOPP) program coordinated by Dr. Barbara Block (Stanford). This partnership includes public access to these data, dissemination to resource managers, and outreach activities (including partnership with the Monterey Bay Aquarium).

Current Year Objectives:

- The CIMT Web site, http://cimt.ucsc.edu/, will undergo construction to better incorporate end-user needs.
- CIMT animation with the intention of being used in an educational setting such as the Seymour Marine Discovery Center.
- A proposal to the Monitoring and Event Response for HABs (MERHAB) program at NOAA is being recommended for funding. This five-year program (Peter Miller, principle investigator, or PI; Raphael Kudela and Mary Silver, Co-PIs—all members of CIMT; Gregg Langlois, CDHS, co-PI) will provide a mechanism for evaluation and integration of new technologies, including volunteer monitoring, molecular tools, and remote sensing, that are being tested as part of CIMT, into the statewide harmful algal bloom (HAB) monitoring program.

Partners: Dr. Gary Griggs, Project Chair, UCSC; Dr. Don Croll, Ship Survey, UCSC; Dr. Raphe Kudela, Remote Sensing and Modeling, UCSC; Dr. Margaret McManus, Database and Visualization, UCSC; Dr. Jeff Paduan, HF Radar, NPS; Dr. Francisco Chavez, Mooring, MBARI; Dr. Steve Lonhart, Outreach, MBNMS; Dr. Ken Bruland, UCSC; Dr. Mary Silver, UCSC; Dr. Dan Costa, UCSC; Dr. Baldo Marinovic, UCSC; Dr. John Vesecky, UCSC; Dr. Chris Edwards, UCSC; Dr. Leslie Rosenfeld, NPS; Dr. Jim Harvey, MLML; and Dr. Scott Benson, SWFSC, NMFS.

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Coastal Ocean Observing and Analysis (COOA)
Center of Excellence for Coastal Ocean Observation and Analysis (COOA)

Funding – $2.48 M in FY 03

Date Project Initiated: August 2002

Recipient Institution: University of New Hampshire (UNH)

The primary mission of COOA is to develop and implement new methodologies for monitoring coastal marine ecosystems. The goal is to develop the capability to detect, model, and ultimately forecast changes in the Western Gulf of Maine ecosystem. The information generated by COOA will help researchers gain a mechanistic understanding of the factors controlling the coastal ocean and estuarine ecosystem in the region, and thus will play an important role in decisions related to ecosystem-based management. The objective is to establish a complete end-to-end observing system for the region of interest in the Western Gulf of Maine, centered at the mouth of the Piscatagua River and extending north to Casco Bay and south to Stellwagen Bank.

Three main goals:

- To develop and implement new methodologies for monitoring coastal marine ecosystems
- To promote and demonstrate the dissemination and use of coastal ocean observing data and information by diverse users.
- To complement and enhance national and regional expertise in coastal ocean observing.

The system includes three subsystems:

- Data acquisition – A combined effort using remote sensing and in-situ monitoring with an emphasis on developing automated methods amenable to operational use.
- Data management and distribution – WebCOAST is the portal for all COOA data, as well as other data including historical archives and on-going regional monitoring programs.
- Modeling and analysis – A fine-mesh coupled physical–biological model for the region will benefit scientists, resource managers, and teachers and students.

Accomplishments to Date:

- Field sampling efforts have been integrated to collect a comprehensive suite of ecological and environmental data at 16 stations, including 2 GoMOOS buoys, monthly.
- The FleetLink sensor system has been installed on two coastal research vessels, the R/V *Gulf Challenger* and R/V *Tioga*, with fully georeferenced real-time data transmission.
- A time series beginning in 2000 of eight-day averaged sea-surface temperature and chlorophyll satellite observations for the Northeast are available on WebCOAST. The data are from the MODIS sensors.
- The time series of biogeochemical measurements at the Martha's Vineyard Coastal Observatory was augmented with a two-week spatial survey in June 2004 to characterize dynamics of coastal carbonate chemistry.
- A unique flow-through system acquired to measure carbonate chemistry, together with biological and physical properties, is being used to survey pCO_2 in estuarine plumes.
- WebCOAST data services have been augmented to provide seamless access to all COOA data regardless of where the data reside.
- COOA is partnering with others in the region to share data as members of the Gulf of Maine Ocean Data Partnership, which held its first meeting at Woods Hole in April 2004.
- An ecological community index has been created to characterize and monitor seasonal patterns in the plankton community and a paper has been accepted for publication based on this work.

- COOA is partnering with GoMOOS to develop educational materials and train teachers to use observing data. A workshop held at UNH in June was attended by 20 educators.

Current Year Objectives:

- Core variables (including nutrients, temperature, salinity, chlorophyll, zooplankton biomass) measured during the field sampling (cruises) will be served routinely on WebCOAST.
- Primary production estimates for the Gulf of Maine region will be produced and served in near-real time using algorithms developed and validated with field measurements.
- WebCOAST will partner with the Gulf of Maine Council to house and provide a searchable database of Gulf of Maine monitoring programs.
- A chapter for the *Earth Exploration Toolbook*, entitled "When Is Dinner Served? Predicting the Spring Phytoplankton Bloom in the Gulf of Maine," will be published in July.
- Two complete years of the ecological community index will be completed in September, and the data and results furnished to the Northeast Fisheries Science Center.
- A memorandum of understanding will be developed with GoMOOS detailing the respective roles and joint commitment to the establishment of a regional ocean observing system.
- A workshop at UMass-Boston on July 15 will bring together physicists and biologists to develop linkages for collaborative, multidisciplinary modeling efforts for the Gulf of Maine.

Partners: Gulf of Maine Ocean Observing System (GoMOOS), Northeast Fisheries Science Center, Martha's Vineyard Coastal Observatory, Northeast Center for Ocean Science Education Excellence (COSEE), Gulf of Maine Council, Massachusetts Coastal Zone Management, Regional Association for Research on the Gulf of Maine, and the Northeast Consortium.

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Coastal Ocean Research and Monitoring Program (CORMP)

Funding – $1.19 M in FY 03

Date Project Initiated: September 1999

Recipient Institution: University of North Carolina at Wilmington (UNCW)

CORMP is an integrated, regional coastal ocean observing system (RCOOS) program that will operate under the emerging Southeast Coastal Ocean Observing Regional Association of IOOS. Managed by the University of North Carolina at Wilmington, CORMP provides sustained observational and research data for the region's oceanographic, marine weather, marine fisheries, and coastal resource management users. Observations in the coastal ocean extending from just north of Cape Lookout to the North Carolina/South Carolina state line are provided by a combination of fixed stations providing high temporal resolution and regular transects and station sampling providing higher spatial resolution, particularly in the fisheries-critical Cape Fear River plume region. Data collected include surface, subsurface, and seafloor physical, marine biological, and fisheries parameters, benthic boundary layer processes, and sediment transport.

Beginning in 2004, oceanographic stations will be converted to real-time, and real-time surface meteorological data will also be collected. CORMP is also a partner in the regional modeling effort to improve coastal storm surge flooding predictions and marine ecological and fisheries models. Significant regional user partnerships include NOAA's National Weather Service and local Forecast Office, the U.S. Marine Corps Base at Camp Lejeune, and local school districts, with emerging partnerships with the State Ports Authority Wilmington, the Military Ocean Terminal at Sunny Point, and the U.S. Coast Guard. Agreements are in place for the evaluation and use of CORMP data and research in the improvement of coastal rip tide prediction, sediment transport and beach renourishment planning, safety at sea, blue crab fisheries management (the state's largest value fishery), and coastal storm surge forecast improvement. CORMP, a member of the Coastal Observation Technology System (COTS), is funded through NOAA's Coastal Services Center.

Accomplishments to Date:

- CORMP has established an agreement with the U.S. Marine Corps at Camp Lejeune for a joint (50:50 cost sharing basis) deployment and operation of a near-coast mooring in Onslow Bay. The mooring, to be procured through NOAA's National Data Buoy Center, will provide the Marine Corps needed data on meteorological and oceanographic conditions during area training operations, as well as fill an observation gap identified by NOAA's National Weather Service in its coastal waters forecast services.
- CORMP has established an agreement with the National Weather Service Weather Forecast Office (WFO) Wilmington for the quality review and use of CORMP's new surface meteorological moorings now being procured. WFO Wilmington will assist in the quality assurance review of the data, and explore the use of these new data in the WFO's coastal and beach rip current warnings, marine forecast, current weather analysis, and NOAA All Hazard Radio broadcast operations for the area.
- The CORMP high-resolution observing array captured the passage of Hurricane Isabel across the region in September 2003, documenting for the first time some of the first direct measures of hurricane impact on the bottom boundary layer at midcontinental shelf locations in the southeastern U.S. Isabel was shown to cause significant loss of benthic microalgal biomass (up to 40 percent) and extensive sea bed and bottom sediment reworking out to 27 miles offshore. Such biomass loss and sediment disturbances adversely affect tropic relationships in the coastal ecosystem by redistributing benthic primary producers and benthic infauna that support

commercially and recreationally important fisheries on the shelf. These results are described in greater detail in a CORMP-sponsored manuscript that has been accepted for publication.

- CORMP has established an education and outreach program utilizing the UNCW-developed River Run and Ocean View programs, enabling primary and secondary schoolteachers to use CORMP. Up to 200 teachers, 100 pre-service teachers, and 500 students are expected to make use of this new outreach service this fall. The Oceanview and Riverview Web sites are at http://www.uncw.edu/oceanview and http://www.uncw.edu/riverview/ respectively.
- Assessing temporal and spatial patterns of larval abundance is critical to understanding population dynamics of marine species but is often impossible because of difficulties in identifying planktonic larvae to the species level. Through a partnership with North Carolina Sea Grant, CORMP has developed an efficient multiplex Polymerase Chain Reaction (PCR) assay (a standard technique for making billions of copies of a particular bit of DNA) that can accurately identify (and distinguish) blue crab (*Callinectes* spp.) larvae. This assay is being implemented as part of the CORMP fisheries program in an effort to better understand recruitment variation of the commercially important *C. sapidus*. CORMP has also developed a PCR/RFLP (Restriction Fragment Length Polymorphism) assay that will be used to distinguish three sympatric species of kingfish (*Menticirrhus* spp.) larvae. (RFLP refers to a technique of cutting up DNA. Enzymes specific to a particular sequence of DNA will cut DNA any time that sequence occurs. For example, the enzyme RSA I cuts DNA every time it finds the sequence GTAC.)
- Work supported by both the North Carolina Division of Marine Fisheries (DMF) and CORMP has confirmed the likely importance of the Cape Fear River plume as an important habitat for blue crabs, North Carolina's highest value commercial fishery. DMF is incorporating the new data and findings into the state's management models, and these findings have been used in the recent revision of the division's North Carolina Blue Crab Management Plan.
- Data from CORMP observations of infaunal biomass and benthic microalgal biomass have been provided to the ECOPATH modeling effort sponsored by the South Atlantic Fisheries Management Council. This modeling effort is intended to predict fisheries yields and sustainable fishing levels in the South Atlantic Bight.
- CORMP data are now being provided to the North Carolina Division of Marine Fisheries for use in the state's Coastal Habitat Protection Plans for soft-bottom communities. CORMP now comprises the principal source of benthic primary producer data for this effort. Habitat protection plans are important for use in evaluating proposed dredge material disposal, mineral extraction activities, and seabed construction activities by the North Carolina Division of Coastal Management, the EPA, the Army Corps of Engineers, the National Marine Fisheries Service, and the Minerals Management Service.
- In response to an unsolicited request by the Nature Conservancy, CORMP data in the Cape Fear River Plume area were delivered for use in the conservancy's national initiative to identify critical offshore and coastal habitats that are to be targeted for habitat conservation and focused management efforts. The conservancy noted that CORMP's scientific-quality, high-resolution data were indispensable in their work.
- CORMP is now working with the North Carolina State Veterinarian's Office, which is investigating coastal impacts of ocean dumping of animal carcasses in the event of mass mortalities from natural disaster or agro-terrorism. This work is sponsored by the U.S. Departments of Agriculture and Homeland Security. At issue are nutrient and pathogen loading to coastal ocean ecosystems, flow patterns and dispersal of materials, and decomposition rates and effects in different oceanic disposal scenarios.

Current Year Objectives:

- Successfully establish series of real-time moorings with subsurface and surface instrumentation in Raleigh, Onslow, and Long Bays.

- Instrument two commercial fishing piers with subsurface and surface sensors that will provide detailed data on wave spectra and water conditions along the beach.
- Transition the Cape Fear River Estuarine (CFRE) modeling system from a research model into a provisionally operational quality model that can be used by emergency managers for better storm surge predictions.
- Begin development of a water quality model for the Cape Fear River Estuarine (CFRE) system that will be used by fisheries managers, beach renourishment managers, and local public health officials.
- Provide operationally useful information, based on defined research needs, on the state of living marine resources.
- Implement CORMP data management system in cooperation with Caro-COOPS and SEA-COOS.
- Expand vigorous outreach and educational program to include K-12 teachers, fisheries managers, port and military facilities, and homeland security managers.

Partners:

- Caro-COOPS of the University of South Carolina (Dr. Madilyn Fletcher)
- Sea-COOS Associate Member
- North Carolina State University (Dr. Lian Xie and Dr. Len Peitrafesa)
- National Weather Service and the Wilmington Weather Forecast Office
- U.S. Marine Corps Base at Camp Lejeune
- Dr. George Voulgaris and Dr. Dennis Allen, University of South Carolina

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Gulf of Alaska Ecosystem Monitoring and Research (GEM) Program

Funding – $745 K in FY 03 (over three years)

Date Project Initiated: October 1, 2003

Recipient Institution: Alaska Department of Fish and Game for the
Exxon Valdez Oil Spill Trustee Council

GEM is a long-term marine observing system dedicated to understanding the marine ecosystems of species and other natural resources injured by the *Exxon Valdez* oil spill. GEM monitors basic biological and physical variables that can be used to explain changes in populations of birds, fish, and mammals that are essential to the economic well-being of Alaskan communities in the region and that are central to the missions of state and federal resource management agencies. To meet the responsibilities of the Exxon Valdez Oil Spill Trustee Council, monitoring is directed toward understanding the long-term fate and effects of oil and its impacts on injured resources and their ecosystems.

GEM monitoring stations are chosen through research selected by an open competitive contracting process. Research is organized around four principal habitat types of the northern Gulf of Alaska, the nearshore, watersheds, Alaska coastal current, and offshore, and it is guided by a central hypothesis on how climate and other physical factors influence geochemical and biological processes to bring about changes in populations of birds, fish, and mammals. Although fiscal year 2004 is GEM's first full year of operation, it has been in planning and research since 1999. GEM's science plan and the peer review of GEM's first research plan by the National Research Council are available on the Web site. GEM is currently a mixture of operational, preoperational, and research projects.

Accomplishments to Date:

Operational Projects –

- Continuous plankton recorder (CPR) on vessel of opportunity covering inland, continental shelf. and oceanic waters of the Gulf of Alaska.
- Thermosalinograph (surface) on vessel of opportunity covering inland, continental shelf, and oceanic waters of the Gulf of Alaska.
- Mooring measuring temperature and salinity at depth and surface and fluorescence at surface at site of second oldest continuously occupied oceanographic station in the North Pacific (GAK 1, University of Alaska Fairbanks).
- Thermosalinograph on coastal fisheries research trawl vessel to provide synoptic view of biological and physical conditions on long-standing historical fisheries surveys.

Preoperational Projects

- Implemented preoperational project applying physical oceanographic measurements of currents to design of regulations for salmon fishery operating in area of North America's second highest tidal height variation.
- Implemented preoperational instrument package on ferry operating over continental shelf and inland waters (surface measures of temperature, salinity, optics, nitrate).

Research Projects

- Implemented research project to define monitoring protocols for stable isotopes of nitrogen, carbon, and sulfur to identify the extent and magnitude of marine inputs of carbon and nutrients to coastal watersheds.

- Implemented research on identifying and measuring hydrocarbons in the marine environment preparatory to establishing long-term monitoring stations.

- Implemented research on establishing and measuring exposure of nearshore animals (mussels, clams, ducks, otters) to *Exxon Valdez* oil preparatory to establishing long-term monitoring stations.
- Implemented research survey of nearshore biodiversity utilizing Census of Marine Life NaGISA protocols in preparation for establishing long-term monitoring stations.

Current Year Objectives:

- Participate in establishing long-term administration and governance for regional observing system with Alaskan Ocean Observing System (AOOS).
- Maintain operational observing projects in Alaska coastal current and nearshore.
- Initiate research on biophysical model of northern Gulf of Alaska.
- Continue research for nearshore monitoring of hydrocarbons and biological species and start move into preoperational phase scheduled for fiscal year 2007
- Continue development of preoperational fisheries oceanography project on regulation of salmon fishery.
- Continue research on protocols for establishing marine–terrestrial linkages for coastal watersheds.

Partners: NOAA (National Marine Fisheries, National Ocean Service–Kachemak Bay National Estuarine Research Reserve, Pacific Marine Environmental Laboratory), Department of the Interior (U.S. Geological Survey, U.S. Fish and Wildlife Service), Alaska Department of Fish and Game, University of Alaska Fairbanks, North Pacific Research Board, Oil Spill Recovery Institute, Prince William Sound Science Center, Prince William Sound Regional Citizens Advisory Council, Prince William Sound Regional Citizens Advisory Council.

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Wallops Ocean Observation Project
Research and Development of a Coastal Ocean Observation Sensor Platform: Ocean-Atmosphere Sensor Integration System (OASIS)

Funding – $1.39M in FY 03 (not yet awarded as of September 4, 2003)

Date Project Initiated: September 1, 2003

Recipient Institution: Virginia's Center for Innovative Technology

The primary focus of the project is to establish an ocean observing system along the coastal ocean regions of Virginia, Maryland, and Delaware. A second focus is to establish this system so that it can be used by NASA scientists to develop and test new sensors, platforms, and applications to support NASA and NOAA coastal ocean remote sensing activities and products. The project is focusing on several developments, including developing, testing, and deploying a solar-powered surface autonomous vehicle (Ocean-Atmosphere Sensor Integration System, or OASIS) that is being commercialized with support from NASA's SBIR program. The project is presently developing software for command and control of multiple OASIS platforms to support real-time dynamic mapping capabilities. In conjunction with this, the project is developing a multispectral in situ fluorometer that will be incorporated with the OASIS platform to support HAB (harmful algal bloom) detection research and development efforts. Finally, the project is working to deploy a suite of three long-range coastal surface current radars (CODARs) that will provide real-time surface currents offshore out to 250 kilometers and along the coasts of Virginia, Maryland, and Delaware.

Accomplishments to Date:
- Completion of OASIS platform design that exceeds design specifications and with a reasonable (less than $20,000 to $30,000) manufacturing cost estimate.
- Completion of guidance, navigation, and control testing software
- Collaborated with NASA Goddard Space Flight Center's Autonomous Sensor Fleet software group to create an application for multiple platform command and control for dynamic mapping applications.
- Completion of design for the multispectral in situ fluorometer with EG&G and Luna Innovations.
- Identified locations for CODAR radar units.

Current Year Objectives:
1. Complete development, fabrication, and testing of OASIS prototype platform, including testing of guidance, navigation, and control firmware for autonomous surface mapping.
2. Complete development and testing of the spectrometer-based, fluorescence sensing system under development by Luna Innovations and EG&G.
3. Complete field testing of the OASIS platform to determine its capabilities under actual open-ocean situations.
4. Deploy the suite of three CODAR units along the three-state coastal region.
5. Develop an OpenDAP data archive system for the CODAR and OASIS data sets to allow for open community access to all data sets, as recommended by Ocean.US.

Partners: NASA, Old Dominion University, Donald L. Blount & Associates, DLBA Robotics, Luna Innovations, Oceana Sensor Technologies, Emergent Technologies, EG&G Services, Pacific Gyre, and Noesis Inc.

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Project Web site: http://www.coastalobs.us/ (under construction)

Wave Current Surge Information System (WAVCIS)
Support and Development of Real Time Ocean Observing Systems off Louisiana Coast: Wave Current Surge Information System (WAVCIS)

Funding – $1.0 M in FY 02 (over three years)

Date Project Initiated: July 1, 2001

Recipient Institution: Louisiana State University

The objective of WAVCIS is to provide wave information (sea state), including wave height, period, direction of propagation, water level, surge, near surface current speed and direction, and climatological conditions (wind speed and direction, barometric pressure, air temperature), on a real-time basis for the entire Louisiana coast. The program is designed to provide critical information offshore during hurricanes and offshore accidents. The information is archived or used in real time for many hydrodynamic modeling applications dealing with process-linked studies on coastal erosion and model skill assessment between output and field measurement.

Accomplishments to Date:
- Successful deployment of prototype station off Mississippi coast.
- Successful refinement of connectivity using satellite communications.
- Deployment and maintenance of six stations off Louisiana coast.
- Development of advanced software for comprehensive wave and current analysis.
- Development of new databases for streamlining archival retrieval.
- Development of protocols for data standardization.
- Sharing of data with National Data Buoy Center program.
- Development of work bench for numerical model skill assessment.

Current Year Objectives:
- Continued refinement of interactive geographic information system (GIS).
- Continued refinement of model skill assessment work bench.
- Continued refinement of integration with the National Data Buoy Center.
- Installation of additional stations.
- Continued efforts to integrate WAVCIS with Integrated Ocean Observing System and Gulf of Mexico observatories.

Partners: Minerals Management Service, Office of Naval Research, Naval Research Laboratory, Louisiana Department of Natural Resources.

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Coastal Ocean Monitoring and Prediction System (COMPS)
Enhancements to the Coastal Ocean Monitoring and Prediction System for West Florida: A Component of the Integrated Ocean Observing System

Date Project Initiated: August 1, 2004

Recipient Institution: University of South Florida (USF)

Brief Project Summary: Under this project, new elements will be added to the USF Coastal Ocean Monitoring and Prediction System (COMPS) observing array to complement existing USF and NOAA assets in the coastal ocean of West Florida. New coastal and offshore stations with meteorological and oceanographic sensors, a new coastal ocean surface current radar site, a directional wave buoy, and an autonomous glider will be added to the COMPS observational suite to fill critical voids and extend coverage of the observing system. All COMPS water-level observations will be brought up to National Ocean Service (NOS) standards to permit integration of these water level measurements into the National Water Level Program (NWLP), the national backbone program operated by the NOS Center for Operational Oceanographic Products and Services (CO-OPS).

Accomplishments to Date: This project has not yet begun. COMPS has been operational since 1998 and has provided real-time data for numerous coastal marine applications. The Tampa Bay Physical Oceanographic Real-Time System (TB-PORTS) has been operational since 1992 and is a component of COMPS. TB-PORTS provides real-time information for safe and efficient maritime transportation and for environmental protection.

Current Year Objectives:

- Establish additional oceanographic and meteorological observing systems at critical locations along the West Florida coast to augment and enhance the exiting observing array on the West Florida Shelf, including the following:
  - Additional water-level, meteorological, and oceanographic observing sites at Cape Romano, Boca Ciega Bay, Booker Creek, and Keaton Beach.
  - An Ocean-Atmosphere fluxobserving buoy off Panama City at the shelf break/head of Desoto Canyon.
  - A nearshore Ocean-Atmosphere flux observing site off Longboat Key with waves.
  - A Long-Range CODAR surface current radar site at Cedar Key to extend the existing array northward.
  - A WaveRider directional wave buoy to be deployed off Pinellas County to provide wave measurements to compare with wave estimates from the CODAR array.
  - A Webb glider to augment observations of water column temperature and salinity at fixed sites and from the free-drifting Bottom Stationed Ocean Profilers (BSOPs).
  - Four additional BSOPs to augment the existing fleet of 10 BSOPs to provide distributed profiles of temperature and salinity.
  - Acquire adequate spares for existing and new buoy and coastal stations.
- Upgrade the operational status of the USF water-level station network to ensure the data meet NWLP standards for operation, data dissemination, and vertical control.
- Complete the integration of data collection, processing, quality control, and dissemination of water level and other observations taken by COMPS with the NWLP and the National Data Buoy Center data systems.

Partners:

- NOAA National Ocean Service Center for Operational Oceanographic Products and Services

- NOAA National Data Buoy Center
- U.S. Coast Guard
- U.S. Geological Survey
- Florida Fish and Wildlife Conservation Commission/Florida Marine Research Institute
- Florida Department of Environmental Protection
- Florida Institute of Oceanography
- Pinellas County
- Tampa Port Authority
- Pasco County Office of Emergency Preparedness
- Citrus County Office of Emergency Management
- The Pier Aquarium
- Campbell Park Elementary School

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Southern California Coastal Ocean Observing System (SC-COOS)
Shelf to Shoreline Observatory Development

Date Project Initiated: Anticipate a June 1, 2004, start date

Recipient Institution: Funds will be directed to the Joint Institute for Marine Observations (JIMO) at Scripps Institution of Oceanography; JIMO will then allocate funding to all sub-awardees.

The Southern California Coastal Ocean Observing System (SCCOOS) is a consortium that extends from Northern Baja California in Mexico to Morro Bay at the southern edge of central California. The consortium aims to streamline, coordinate, and further develop individual institutional efforts by creating an integrated, multidisciplinary coastal observatory in the Bight of Southern California to provide data and information primarily for the benefit of society. Sound scientific approaches will be used in the development of SCCOOS to enable the effective translation of observations to users. By leveraging existing infrastructure, partnerships, and private, local, state, and federal resources, SCCOOS plans to develop an operational coastal observing system to address issues in coastal water quality, marine life resources, and coastal hazards for end user communities spanning local, state, and federal governments and the public. This system will provide water-quality and natural resource managers, scientists, and policy makers with the scientific bases for evaluating the effectiveness of management strategies and designing new approaches, and will also serve as a risk management and early warning tool.

Accomplishments to Date:
The coming fiscal year will mark the first year of funding for SCCOOS.

Current Year Objectives:
Launch the pilot Southern California Coastal Ocean Observing System and begin integrating and distributing existing observations in the Southern California Bight (SCB), adding new observations, and developing and distributing data syntheses. The pilot-SCCOOS will be tailored to consolidate information from federal, state, and local sources to form an integrated system with an output tuned to managers at all governmental levels. The project will develop methods to (a) find optimal sensor networking schemes, (b) increase the flow of data to allow efficient, adaptive on-sight sampling, (c) create real-time information products by merging data and real-time analyses, (d) distribute data products to disparate end-users, and (e) initiate K-12 education and outreach programs.

SCCOOS will also, as part of a separately funded NOAA project, begin to gather detailed definitions of users and needs, synthesize these needs to determine which regions can be effectively addressed in SCCOOS and under which timeframe, and finalize development of a flexible organizational structure that allows for the delivery of products to and receipt of resources from local, state, and federal agencies. SCCOOS has also submitted a proposal to California state government for $11 million to install a complete coastal ocean current monitoring system in the bight, relying primarily upon high-frequency radar. This proposal will likely be funded at the end of the summer.

Partners: California Polytechnic University, San Luis Obispo; California State University, Los Angeles; Centro de Investigacion Cientifica y de Educacion Superior de Ensenada; Jet Propulsion Laboratory, National Aeronautics and Space Administration; Scripps Institution of Oceanography, University of California, San Diego; Universidad Autonoma de Baja California; University of California, Santa Barbara; University of California, Irvine; University of California, Los Angeles; University of Southern California; Southern California Coastal Water Research Project.

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Gulf of Maine Ocean Observing System (GoMOOS)
A Regional Pilot of the Integrated Ocean Observing System

Date Project Initiated: Will begin receiving NOAA funding in July 2004
Recipient Institution: Gulf of Maine Ocean Observing System

This project will sustain and enhance the four elements of the Gulf of Maine Ocean Observing System that was initiated in 2000: 1) the organizational structure designed to meet the needs of multiple users, 2) an observing system that operates around the clock with real-time data delivery, 3) a data management system that distributes data on a free and open basis, and 4) an analysis and product subsystem that creates information in a variety of forms, from the simple intuitive display to sophisticated model products. In the coming year, GoMOOS will 1) enhance user involvement by targeting fisheries managers, coastal zone managers, the Coast Guard, and researchers, 2) enhance forecasting and warning capabilities, and 3) launch a nearshore buoy program aimed at meeting the needs of coastal and water quality managers. GoMOOS will accomplish this by sustaining the existing observing and data management systems, building partnerships for the exchange of data in the region and with federal agencies, and the continuing the development of data products to meet user needs. GoMOOS will seek the advice of the Science Advisory Committee for ways in which the system can use technology to better meet the needs of users.

Accomplishments to Date:
- Sustained operations of the system.
- Meeting of Science Advisory Committee set for October 2004.
- Meeting of optical experts in the region to review GoMOOS optical program set for August 2004.

Current Year Objectives:
- Continue to provide reliable measurements on the Gulf of Maine.
- Initiate the nearshore buoy program for meeting needs of coastal managers.
- Continue to ensure data interoperability with federal and regional partners through the Gulf of Maine Ocean Data Partnership.
- Develop data products that assist fishermen and fishery managers to integrate different data sets to help them solve problems and understand their fishery.
- Form partnership with regional entities to support educational and outreach activities.

Partners:
- University of Maine
- Bigelow Laboratory for Ocean Sciences
- Woods Hole Oceanographic Institution
- Bedford Institute for Oceanography
- University of New Hampshire

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Long Island Sound Integrated Coastal Observing System (LISICOS)

Date Project Initiated: September 1, 2003

Recipient Institution: University of Connecticut

With more than eight million people living in its watershed, Long Island Sound (LIS) is the nation's preeminent urban estuary. LIS provides the region with natural resources, including oysters, clams, lobsters, and bluefish, and both commercial and sport fishing are important to the regional economy. Unfortunately, LIS has also served as the region's sewer, resulting in water quality degradation and critical habitat loss. Extensive wastewater treatment plant upgrades have been mandated to rectify these problems. The high concentration of development along the surrounding coastline has also prompted increased dredging for navigation, electric power transmission, and gas pipelines. The goal of the Long Island Sound Integrated Coastal Observing System is the development of a sustained capability to observe the Long Island Sound ecosystem and an adequate capability to understand and predict its response to natural and anthropogenic changes.

Accomplishments to Date:

- Deployment and maintenance of five buoys that monitor salinity, temperature, and dissolved oxygen throughout the sound.
- Three of the above buoys provide over-water meteorological observations. One includes a surface wave sensor, and one includes PAR and chlorophyll sensors.
- Development of a three-dimensional circulation model.
- Development and testing of a primary-production respiration model.
- Coupling of the circulation and ecosystem models.
- Analysis of existing hydrography to infer exchange between LIS, the Hudson River, and the shelf waters

Current Year Objectives:

- Quantify horizontal and vertical transport of water, carbon, nitrogen, and oxygen in the western sound.
- Determine the relative contribution of local primary production (autochthonous) and input of allochthonous matter to the organic fluxes.
- Measure the spatial and temporal variation of primary production and its fate (fraction respired, grazed, vertically sunk, horizontally advected, etc.).
- Measure the spatial and temporal variation in the benthic oxygen demand in western LIS.
- Synthesize the observations and develop a model that can be used to predict the evolution of oxygen concentrations in response to management options.
- Measure and track changes in composition and function of plankton and benthos, including benthic recruitment dynamics.

Partners:

- National Undersea Research Program
- Sea Grant College Program
- Connecticut Department of Environmental Protection
- Norwalk Aquarium
- U.S. Environmental Protection Agency – Long Island Sound Office
- Connecticut Audubon

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Southeastern Universities Research Association (SURA) Coastal Ocean Observing and Prediction (SCOOP) Program

Date Project Initiated: September 2004

Recipient Institution: Southeastern Universities Research Association

In the coming year, the SCOOP program will implement key elements of a distributed system for assessing and predicting environmental response to extreme events in the eastern U.S. coastal zone, from Canada to Mexico. The program will focus on storm surge, wind waves, and surface currents, with special attention on predicting and visualizing phenomena that cause damage and inundation of coastal regions during severe storms and hurricanes. Partners include university researchers and relevant NOAA, Navy, and other federal agency program offices. The agency partnerships will facilitate the transition of well-tested research capabilities to an improved operational prediction system.

SCOOP is emphasizing the transition of "pre-operational" research activities to activities that are operational. This approach, which is the signature of SCOOP, is referred to as "interoperability" and is intended to help bridge the historical gap between research and operations. Each type of activity has its own set of goals and anticipated outcomes. It is the SCOOP mission to create an effective link between them. Thus, SCOOP will bring together science leaders from the research community with operational leaders and user groups to develop and implement specific objectives for numerical modeling, real-time data exchange, and continuous operational prediction and visualization.

Accomplishments to Date:

SCOOP funding began in September 2004. Extensive project planning has taken place, and some of the first deliverables will appear in October of this year.

Current Year Objectives:

It is intended that these three activities will merge into a seamlessly integrated system.

- A data-standards development process;
- A "data grid" demonstration of interoperability at the data level based on Open GIS Consortium (OGC) standards for Web services; and
- A "model grid" demonstration of coupled storm-surge and wind-wave prediction models that employ "grid" technologies based on standards from the Open Grid Services Architecture (OGSA).

Partners: Texas A&M, University of Alabama at Huntsville, University of Miami, Virginia Institute of Marine Science, Louisiana State University, Gulf of Maine Ocean Observing System, University of North Carolina, University of Florida, University of Delaware, Southeast Atlantic Coastal Ocean Observing System.

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Project Web sites: http://www.sura.org/ (click on SCOOP for overview); http://twiki.sura.org/ (for project status); http://www.openioos.org/ (for some project deliverables)

COMPETITIVELY AWARDED

Regional Coordination

Alaska Ocean Observing System

Date Project Initiated: October 2003

Recipient Institution: Alaska Ocean Observing System at the Alaska SeaLife Center

The Alaska Ocean Observing System (AOOS) is part of a growing national network of integrated ocean observing systems that will improve the ability to rapidly detect changes in marine ecosystems and living resources, and predict future changes and their consequences for the public good. When fully developed, AOOS will

- Serve as the Alaska regional node for a national network of observing systems;
- Systematically deliver both real-time information and long-term trends about Alaska's ocean conditions and marine life;
- Provide to the public Internet access to cost-free data and information on coastal conditions; and
- Supply tailored products to meet the needs of mariners, scientists, industry, resource managers, educators, and other users of marine resources.

Accomplishments to Date:

- Hired a director, established an office, created Web site, began to create an organizational infrastructure for program consistent with regional association criteria under development by Ocean.US.
- Held Data Management and Communications (DMAC) workshop, established DMAC committee, drafted terms of reference, and began drafting pilot effort for Prince William Sound.
- Partnerships in place as evidenced by signed memorandum of agreement and funding commitments for two years of planning and pilot efforts.
- Held two Governance Committee meetings.
- Facilitated development of straw man AOOS implementation strategy for three regions in Alaska—Arctic, Bering Sea, and Gulf of Alaska—with more detailed strategy for Bering Sea region and Prince William Sound subregion.
- Actively participated in meetings and workshops to develop regional association criteria and National Federation of Regional Associations (NFRA).
- Widely promoted AOOS and potential benefits to variety of stakeholder groups and individuals, and in turn assessed needs of users for such a system.

Current Year Objectives:

- Determine governance structure that makes sense for Alaska and meets Ocean.US criteria.
- Organize stakeholder user needs assessments, planning workshops geared towards developing final product of strategic operational plans for the three regions: Arctic, Bering Sea/Aleutian Islands, and Gulf of Alaska.
- Develop statewide-integrated data system that conforms to national criteria and protocols.
- Obtain certification as the regional association for Alaska.
- Participate in national efforts, including the national DMAC committee and the National Federation of Regional Associations.

- Develop pilot projects.
- Integrate existing observing systems. Plan for and implement expanded, integrated systems for all three regions.

Partners: University of Alaska, North Pacific Research Board, Exxon Valdez Oil Spill Trustee Council, Alaska SeaLife Center, Prince William Sound Science Center, Barrow Arctic Science Consortium, NOAA, Minerals Management Service, U.S. Geological Survey, Alaska Sea Grant, National Weather Service.

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Central and Northern California Ocean Observing System (CeNCOOS)

Leadership in Coordination of Ocean Observing

Date Project Initiated: October 1, 2003

Recipient Institution: Monterey Bay Aquarium Research Institution (MBARI)

The Monterey Bay Aquarium Research Institute received, on behalf of the Monterey Bay Crescent Ocean Research Consortium (MBCORC) and proposal partners, $100,000 for the first year to initiate and support focused regional coordination of ocean observing activities in central and northern California. This effort, the Central and Northern California Ocean Observing System (CeNCOOS), will strategically enhance the organization, implementation, and application of existing and planned regional coastal observing system efforts along the California coast. In addition to the membership of MBCORC, the CeNCOOS partners extend north to Arcata and south to San Luis Obispo, across 625 miles of California coastline. The CeNCOOS effort will also initiate interaction and coordination with other coastal observing efforts (e.g., the Southern California Coastal Ocean Observing System and the Northwest Association of Networked Ocean Observing System). Our coordinating effort is designed to be multiyear but with the understanding that at this time only the first year of funding was made available.

Accomplishments to Date:

- Hired a full-time coordinator.
- Established an interim Executive Committee.
- Began to expand stakeholder base through site visits, presentations, and participation in meetings.
- Established committees on governance, end users, science, and data management.
- Designed and populated a geodatabase to track observing activities in the region and to plan for their coordination.
- Prepared the first iteration of a summary paper on observing systems in the region.
- Prepared a proposal to the State of California to initiate a Coastal Ocean Currents Monitoring Program (including high-frequency radar, associated technologies, and models) in central and northern California.
- Participated in Ocean.US teleconferences and meetings, as well as the meetings of neighboring regional associations and the Organizing Committee of the National Federation of Regional Associations.
- Responded to Ocean.US request for a status report and priorities through 2011.
- Identified three possible governance models for our regional association.
- Designed and published the Web page, http://www.cencoos.org/.

Current Year Objectives:

- Prepare a summary paper on observing systems in the region.
- Meet with stakeholders in the region.
- Establish subcommittees to address important aspects, such as technology and operations, data management, science, end users, etc.
- Discuss with Ocean.US how the CeNCOOS regional system can best connect with the national backbone.
- Produce a long-term organizational plan for CeNCOOS, including the identification of a governance model.
- Prepare an integrated CeNCOOS strategic plan for many observing efforts planned and under way.

Partners: California State University, Monterey Bay; California Polytechnic State University San Luis Obispo; Earth System Science and Policy Institute, Elkhorn Slough National Estuarine Research Reserve; Fleet Numerical Meteorology and Oceanography Center; Hopkins Marine Station of Stanford University; Humboldt State University; the California Department of Fish and Game's Marine Pollution Studies Laboratory, Marine Region Headquarters, and Marine Wildlife Veterinary Care and Research Center,; Marine Protected Areas Center, Science Institute, NOAA;, Monterey Bay Aquarium; Monterey Bay Aquarium Research Institute; Monterey Institute of International Studies; Monterey Peninsula College, Marine Advanced Technology Education Center; Moss Landing Marine Lab; National Weather Service; Naval Postgraduate School; Naval Research Lab, Marine Meteorology Division; Monterey Bay National Marine Sanctuary; NOAA/NMFS Pacific Fisheries Environmental Lab; NOAA/NMFS Santa Cruz Lab; Romberg Tiburon Center for Environmental Studies, San Francisco State University; San Francisco State University; University of California (UC), Monterey Bay, Education, Science, and Technology Center; UC Davis, Bodega Marine Lab; UC Santa Cruz; UC Santa Cruz, Institute of Marine Sciences/Long Marine Lab; UC Sea Grant Extension Program; U.S. Geological Survey, Pacific Science Center; and West Coastal and Polar Regions Undersea Research Center, NOAA

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Gulf of Mexico Coastal Ocean Observing System

Development of the Regional Association for the Gulf of Mexico Coastal Ocean Observing System

Date Project Initiated: October 1 2003

Recipient Institution: Texas A&M University via the Texas A&M Research Foundation

Our overall objective is to develop a regional association for the management of a Gulf of Mexico Coastal Ocean Observing System (GCOOS) as a contribution to the U.S. Integrated Ocean Observing System (IOOS). The effort will include development of linkages with coastal observing programs of other nations in the Gulf. This section reviews briefly the status of development of GCOOS. It is being developed on the principles of the Global Ocean Observing System (GOOS) as stated in IOC (1998) and those of the IOOS as given in the U.S. IOOS Phased Implementation Plan.

Accomplishments to Date:
Organization of meetings

- Organized an IOOS-Industry meeting held 2-4 March 2004 at Marathon Oil Company in Houston Texas to explore private sector interests and roles in the U.S. Integrated Ocean Observing System with a focus on the regional observing systems of the Gulf of Mexico and southeastern U.S. Ninety-six attended, of whom 64 were from private sectors involved in marine activities. The workshop was judged to be highly successful by the attendees. Details of the meeting, including all presentations, are available via the GCOOS web site.
- Worth Nowlin served on the steering committee for and attended a HABSOS-GCOOS workshop held 13-14 April 2004 in St. Petersburg, FL. Mark Luther and Charlie Colgan also attended.
- Seven key GCOOS planners met in Stennis, MS on 13 May examine inputs from the GCOOS stakeholders regarding highest priorities for the enhancements/additions to the national backbone and GCOOS for the Gulf of Mexico.
- Worth Nowlin served on the organizing committee for the "Next Steps" workshop held on 7-8 July 2004 at the Bush Presidential Conference Center. The objective was to set a research agenda for the Gulf in response to the *Preliminary Report of the U.S. Commission on Ocean Policy*. Commissioners participated. Nowlin gave a presentation on GCOOS Development
- The key players identified in the proposal have commenced planning for the first all Gulf stakeholders meeting to ratify interim governance structure and begin work toward a business plan

Attendance at meetings

- Robert Martin attended the ninth meeting of the U.S. GOOS Steering Committee on 12-14 November 2003 in St. Petersburg, FL as the representative of GCOOS. He made a presentation on the status of the observing system.
- Luis Cifuentes (Texas A&M University) attended as the GCOOS representative the Education Planning Workshop on 22-24 March 2004 in Charleston, SC.
- Worth Nowlin, Robert Martin Mark Luther (University of South Florida) and Landry Bernard attended as GCOOS representatives the second national summit of regional associations held 29-30 March 2004 in Washington, D.C.
- Frank Muller-Karger attended as GCOOS representative the Workshop/Symposium on coastal ecosystems of the Gulf of Mexico: Toward the integration of research groups, June 30 - July 3; Veracruz, Mexico

Other development activities

- Information regarding the nature and costs of Gulf observing system elements, including desired improvements, sources of support and estimated costs through FY2011, was assembled by Nowlin; and a first Gulf user survey was carried out with funding from Texas Sea Grant.
- Practically all Gulf observing system elements producing real time data streams have been integrated via the National Data Buoy Center.

Current Year Objectives:

- Obtain agreement on interim structure for GCOOS Regional Association and on preferred longer-term structure.
- Hold stakeholders' meeting to begin development of GCOOS Business Plan
- With assistance of Gulf Coast Sea Grant Programs and COSEEs, establish a GCOOS Education Council

Partners:

- Robert (Buzz) Martin, Texas General Land Office
- Landry Bernard, University of Southern Mississippi/National Data Buoy Center
- Vernon Asper, University of Southern Mississippi
- Frank Muller-Karger, University of South Florida
- Robert Stickney, Texas Sea Grant program

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Great Lakes Observing System (GLOS)

Date Project Initiated: October 2003

Recipient Institution: Great Lakes Commission

The Great Lakes Commission is leading initial development of the Great Lakes Observing System (GLOS), with funding through the NOAA Coastal Services Center. The GLOS is a regional node of the U.S. national Integrated Ocean Observing System (IOOS) initiative. The GLOS will provide access to information on the climate, meteorology, chemistry, geology, biology and human activities that affect the Great Lakes, their interconnecting waterways, the St. Lawrence River and the coastal environment. Data, information and knowledge about the system will be consolidated to meet the needs of resource managers, researchers, educators, commercial shippers, recreational boaters, beach users, spill responders and homeland security interests, among others.

The design of the GLOS will be a cooperative activity of many U.S. federal and state agencies with significant input from local agencies, academic institutions, nongovernmental organizations and industrial and commercial interests across the region. The development of the GLOS will be closely coordinated with Canadian federal agencies and provincial ministries.

Accomplishments to Date:

- Organized steering committee representing major interests to develop business plan
- Identified and engaged likely regional associates
- Coordinated planning with Canadian federal agencies and Ontario and Quebec ministries
- Developed project Web pages
- Conducted user needs assessments, including focus group discussions and presentations at various conferences and meetings
- Defined data and information subsystems and funding requirements
- Initiated consensus building on governance options for the regional association

Current Year Objectives:

The objective of the first year of the initiative is to develop a consensus of international, federal, state, provincial, municipal, academic, institutional, nongovernmental, industrial and commercial interests for a sustainable business model for this effort and the regional association that will lead it. Each of the individuals engaged in developing this consensus represent major data sources, information managers and large user communities. The GLOS Regional Association is intended to be a vehicle for them to provide meaningful direction and sustained support for the implementation and operation of an integrated observing system for the Great Lakes–St. Lawrence River system. The first year accomplishments are expected to lead to the formation of a formal regional association, with an independent board of directors in the second year, and to a pilot demonstration project involving data and information integration over a representative area of this highly complex system.

Primary Partners:

- International Joint Commission
- Great Lakes Fishery Commission
- Great Lakes Environmental Research Laboratory, NOAA
- U.S. National Weather Service, NOAA
- U.S. National Ocean Service, NOAA
- U.S. Army Corps of Engineers

- U.S. Coast Guard
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- Michigan Department of Environmental Quality
- Great Lakes Sea Grant Network
- Great Lakes States Coastal Zone Management Programs
- Council of Great Lakes Research Managers
- The Ohio State University
- University of Minnesota
- University of Wisconsin
- Environment Canada

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Mid Atlantic Research Association (MARA)

Date Project Initiated: June 2004

Recipient Institution: University of Delaware

As a regional association, MARA will be responsible for the design and coordinated development of Regional Coastal Ocean Observing Systems (RCOOSs) in the Mid-Atlantic that are responsive to the needs of multiple user groups and improve as new knowledge and technologies become available. Although MARA has its roots extending back to the NorthEast Observing System (NEOS), MARA is a new entity, with its purview extending from Cape Cod to Cape Hatteras. MARA will build an integrated observing system covering the watersheds, bays, estuaries, and open shelf waters of the Middle Atlantic Bight. Achieving success at this endeavor requires engagement between information producers and information users at the outset. For this reason, MARA has chosen to begin the process by assembling a team of key representatives from science, commerce, navigation, state coastal environmental management and protection, and homeland security communities whose charge it is to develop an organizational and governance structure. MARA is designed to focus on Integrated Ocean Observing System goals that directly support end user needs. It is a new structure, designed from the ground up with the users at the table.

Accomplishments to Date:

- Provisional Steering Committee established
- Workshop organized for late August to plan organization and governance structure
- Plan for five subregional workshops (based on 5 major ecosystems in the MARA footprint) in November 2004.
- Plan for comprehensive MARA organizational workshop in February 2005 addressing steps and timetable leading to MARA certification by Ocean.US.

Current Year Objectives:

- Establish the MARA organizational and governance structure
- Produce a MARA charter and strategic plan
- Seek funding for a MARA chief executive officer
- Develop a MARA business plan
- Plan regional pilot and demonstration projects

Partners:

- Co-Principals:
    - Dr. William Boicourt, University of Maryland
    - Dr. Scott Glenn, Rutgers University
- MARA membership will be officially determined following the workshop process outlined above.

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Southern California Coastal Ocean Observing System (SCCOOS)
Organization and Outreach Structure for the Southern California Coastal Ocean Observing System (SCCOOS)

Date Project Initiated: March 25, 2004 (University of California advance approval to spend funds for directly related travel only; NOAA funds not yet received as of July 1, 2004).

Recipient Institution: Funds will be directed to the Joint Institute for Marine Observations (JIMO) at Scripps Institution of Oceanography; JIMO will then allocate funding to all subawardees.

This project will provide the organizational framework for building capacity and partnerships among existing regional associations and agency end-users, and encouraging and enhancing collaboration among data collectors, data managers, and users of data and information. This will be accomplished through the establishment of an active user and provider working group network and the development of an organizational framework to support the successful management and operations of a Southern California Coastal Ocean Observing System (SCCOOS). The data provider and user work groups will be active participants in developing the governance, communication, implementation, data management, and product development structures that will support an operational SCCOOS. Implementation of this outreach and organizational development plan will link new and existing science, technology, and observational techniques with defined local and federal needs, and will enhance educational resources.

Accomplishments to Date: The coming fiscal year will mark the first year of funding for SCCOOS. Project leaders have begun to prepare job descriptions in anticipation of hiring an outreach coordinator when funds arrive, and have met with data providers at Scripps Institution of Oceanography and local county watershed management representatives in anticipation of determining personnel needs more specifically.

Current Year Objectives: In year one, to the project will develop a regional network of issue-driven data user and provider working groups in the areas of water quality and coastal hazards, to include erosion, sediment transport, coastal ecology, and living marine resources. The groups will be tasked with defining management needs, building on existing collaborations, and articulating the benefits of such a system to science and society. The following tasks have been identified and remain year-one objectives:

1. Establish SCCOOS Outreach Implementation Team:
    - California Coastal Coalition
    - California Shore and Beach Preservation Association
    - Southern California Coastal Water Research Project
    - Southern California Wetlands Recovery Project
    - California Sea Grant
    - Southern California Coastal Ocean Observing System (SCCOOS)
2. Convene meeting of Implementation Team to design an outreach implementation strategy.
3. Develop and publish an official outreach implementation plan.
4. Identify stakeholders for Water Quality Data and Provider Working Group.
5. Identify stakeholders for Hazards Management and Shoreline Erosion Sediment Transport Data Provider User Group.
6. Identify stakeholders for Coastal Ecology and Living Marine Resources Data Provider User Group.
7. Develop subregional (county) key contacts for each working group issues area.

8. Design, organize, and convene a series of five subregional data and provider user group workshops to be held in San Diego County, Orange County, Los Angeles County, Santa Barbara County, and Ventura County.
9. Produce draft document of results of each workshop.

Partners: Consortium members include the California Polytechnic State University, San Luis Obispo (CalPoly), the University of California campuses at Santa Barbara (UCSB), Los Angeles (UCLA), and Irvine (UCI), the Jet Propulsion Laboratory, University of Southern California, Cal State Los Angeles, the Southern California Coastal Water Research Project (SCCWRP), Scripps Institution of Oceanography, the Universidad Autonoma Baja California (UABC), and Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (CICESE).

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Southeast Coastal Ocean Observations Regional Association (SECOORA)
Southeast Coastal Ocean Observations Regional Association (SECOORA): Building a Regional Association Framework for the Coastal Ocean Observing System of the Southeastern United States

Date Project Initiated: October 2003

Recipient Institution: South Carolina Sea Grant Consortium

The overall goal of this project is to develop a functional and cost-effective governance mechanism—SECOORA—to ensure that coastal ocean observing system efforts in the southeastern U.S. are well coordinated, science based, stakeholder driven, linked to the national backbone, and sustained for the future. This project provides for a two-way exchange of information among a broad range of regional data providers (e.g., observation and monitoring programs, modeling groups), and between data providers and targeted stakeholders to ensure continuous input and feedback from and with user groups. Year one of this effort is focused on cultivating the interest and support of a broad base of stakeholders in conceptualizing and designing the initial organization of the regional association. The year one goal is to form a provisional regional association with a signed charter to carry the association forward. Years two and three of this project will focus on strengthening SECOORA by further integrating Coastal Ocean Observing System (COOS) elements and additional stakeholders, and developing and implementing full operational capabilities.

Accomplishments to Date:
- Hired program coordinator, Sandy Eslinger.
- Established initial project team/advisory group for planning efforts.
- Conducted series of one-on-one and small-focus-group stakeholder and user interviews.
- Participated in Integrated Ocean Observing System (IOOS) industry workshop.
- Developed project Web site.
- Developed and coordinated initial recommended priorities for national backbone enhancements.
- Developed informational materials for stakeholders.
- Conducted a pre-organizational workshop consisting of observation system providers and various stakeholder groups to develop regional priorities and establish a strategy for addressing association governance.

Current Year Objectives:
1. Undertake a review of existing organizational models for regional governance, both within and outside the marine science arena, and identify features and functions of those models that could provide the elements essential to the development of SECOORA.
2. Identify and document public and private organizations and associations, business, industries, universities, laboratories, and agencies of government with involvement or interest in generating or using data and information from observing systems in the southeastern U.S. coastal ocean.
3. Contact and brief representatives of the organizations identified in Objective 2 on the current status of coastal ocean observing system efforts in the southeastern U.S. and gauge their interest in participating in the formation of SECOORA.
4. Maintain and augment an active dialogue with representatives of Ocean.US and adjacent regional associations through the National Federation of Regional Associations (NFRA) to ensure that SECOORA protocols for governance, information management and delivery, and administration are consistent with those being established at the national and regional levels.
5. Plan and convene a pre-organizational workshop involving representatives from the organizations identified in Objective 3 to discuss and reach consensus on the most appropriate organizational, management, governance, and operational elements for formalizing SECOORA.

6. Plan and convene an organizational "summit" to form a provisional regional association with a signed charter to carry the development of SECOORA forward.

Partners:

Partner Entities and Organizations:
Southeast Atlantic Coastal Ocean Observing System (SEA-COOS)
South Atlantic Bight Synoptic Offshore Observational Network (SABSOON)
Carolinas Coastal Ocean Observing and Prediction System (Caro-COOPS)
Coastal Ocean Research and Monitoring Program (CORMP)
Neuse River Remote Monitoring and Data Acquisition Project
FerryMon
West Florida Coastal Ocean Monitoring and Prediction System (COMPS)
Physical Oceanographic Real-Time System (PORTS)
SEAKEYS/C-MAN Project
East Florida Shelf Information System (EFSIS) & Explorer of the Seas
South Florida Ocean Measurement Center
Florida Inshore Marine Monitoring and Assessment Program (IMAP)
National Estuarine Research Reserve System (NERRS)
Florida Department of Environmental Protection
U.S. Army Corps of Engineers (USACOE) Field Research Facility Data Program
Institute for Marine Remote Sensing (IMaRS)
South Carolina Estuarine and Coastal Assessment Program
Gray's Reef National Marine Sanctuary
U.S. Geological Survey (USGS) Center for Coastal and Watershed Studies
USGS Water Resources Division
Sebastian Inlet Observations
Florida Keys National Marine Sanctuary
NOAA Atlantic Oceanographic and Meteorological Laboratory (AOML)
Coastal and Oceanographic Engineering Program
Guana Tolomoto Matanzas National Estuarine Research Reserve
Southeast Regional Climate Center
Hurricane Research Division, NOAA AOML
Florida Department of Environmental Protection
Coast Guard Marine Safety
Florida Fish and Wildlife Conservation Commission
North Carolina Department of Environment and Natural Resources
Georgia Department of Natural Resources
South Carolina Ocean and Coastal Resource Management
Florida Department of Environmental Protection
Florida Department of Health
Science Applications International Corporation
The Weather Channel
Applied Science Associates, Inc.
Harris Maritime Communications Service
Southeastern Universities Research Association
Southern Association of Marine Laboratories
South Atlantic Fisheries Management Council
NOAA Southeast Fisheries Science Center
Clemson University College of Engineering and Science
South Carolina Department of Natural Resources Marine Research Institute

Florida Department of Health
Southeast Center for Ocean Sciences Education Excellence (COSEE)
Florida COSEE
North Carolina Sea Grant
South Carolina Sea Grant Consortium
Georgia Sea Grant
Florida Sea Grant

Initial Project Team:

M. Richard DeVoe	South Carolina Sea Grant Consortium Director
Sandy Eslinger	SECOORA Program Coordinator
Robert H. Bacon	Sea Grant Extension Leader, South Carolina
James (Jim) C. Cato, Ph.D.	Sea Grant Director, Florida
Madilyn Fletcher, Ph.D.	Program Manager, Caro-COOPS
Keith W. Gates	Sea Grant Extension Director, Georgia
Richard A. Jahnke, Ph.D.	Member, Oceans.US Workshop Steering Committee
Mark E. Luther, Ph.D.	Member, U.S. Global Ocean Observing System Steering Committee
Christopher N. K. Mooers, Ph.D.	Program Manager, SEFCOE
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Project Web Site: http://www.secoora.org/

Northwest Association of Networked Ocean Observing Systems (NANOOS)
Building Regional Association Partnerships in the Northwest: A Proposal to Continue Ongoing Efforts

Date Project Initiated: January 2004

Recipient Institution: University of Washington

The goal of this project is to foster and enhance Pacific Northwest Regional Partnerships to grow constituencies that will allow for the eventual installation and long-term maintenance of a Pacific Northwest Regional IOOS. We proposed to foster the development of strong Regional Association partnerships through proactively engaging, educating and entraining stakeholders throughout the Pacific Northwest in the benefits of an integrated regional ocean observing system.

Accomplishments to Date:

- Workshop I: Held the "Pacific Northwest Regional Ocean Observing System Workshop" on 23-24 October 2003 at Portland State University, OR. At the conclusion of the workshop a charter was signed by over 30 people creating the Northwest Association of Networked Ocean Observing Systems (NANOOS) and appointing the above five individuals as the NANOOS Interim Steering Committee.
- Outreach: Numerous outreach talks/briefings given by Interim Steering Committee to several and diverse audiences (elaborated below).
- Pilot Project: Submitted two complementary pilots for NANOOS; one was funded: "A Pilot Coastal Ocean Observatory for the Estuaries and Shores of Oregon and Washington" (A. Baptista, PI) to focus on regional integration and expansion of existing but disparate observation and modeling capabilities for the estuaries and shores of Oregon (OR) and Washington (WA).
- Workshop II: Held the "NANOOS Governance Structure and Observing Priorities Workshop" on 5-7 May 2004, Oregon H&S Univ. Beaverton, OR. Specific output was general consensus on governance structure (501-c3) and other design characteristics, as well as prioritized lists for observing capabilities in both the National Backbone and for NANOOS.

Current Year Objectives:

- **Identify the full spectrum of stakeholders** having significant interests in the waters of the Pacific Northwest to ensure their views and opinions are fully recognized and taken into account, and that this partnership building effort takes advantage of their scientific, economic, social, cultural and operational expertise.
- **Proactively engage the regional ocean science community** in this partnership-building project to ensure their expertise helps guide the eventual design and evaluation of the system. This approach will ensure the PNW Regional IOOS evolves to take advantage of new knowledge and technology as they are developed.
- **Obtain input about sub-regional scale oceanographic concerns** by engaging with local stakeholders in advance of a major Regional Workshop and to ensure these factors are addressed at the Regional level. NANOOS will work within these smaller groups to build a sense of community and partnerships at the sub-regional scale and then translate this into strong regional partnerships through larger gatherings and workshops.
- **Obtain consensus agreement on the overall process to define a Governance structure** for a Pacific Northwest Regional Association based on the partnerships developed in this project.
- **Build international and inter-Region partnerships** by engaging with Canadian colleagues and other western Regional Association efforts to build bridges to these efforts and ensure seamless integration of these efforts.

To achieve these objectives, NANOOS will proceed with two major efforts over the next two months:

NANOOS coordinator: First, and most importantly, NANOOS wants to hire a coordinator whose focus will be to work on enhancing the partnerships and planning efforts that have been started by the five co-principle investigators. Second year funding from NOAA will allow for hiring the full-time coordinator with the intent of substantially accelerating the NANOOS efforts.

Third NANOOS Workshop on scientific system design: The second major effort in the near term will be to hold the third Workshop focusing on the scientific system design of the Pacific Northwest Regional Coastal Ocean Observing System (RCOOS) that NANOOS will eventually manage. This highly technical Workshop will continue the process of obtaining user group buy-in to planning that began in the first Workshop and highlighted in the second Workshop. NANOOS is committed to continuing the open, inclusive process used at our Workshops to obtain the widest consensus possible from the various ocean community stakeholders in the Pacific Northwest.

Partners:

- University of Washington
- Oregon State University
- Oregon Health and Science University

Primary Contact:

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Regional Pilot Projects

Gulf of Maine Ocean Observing System (GoMOOS) Marine Resource Management Pilot Project

A Regional Association Project to Observe Ocean Climate in the Gulf of Maine in Support of Marine Resource Management: A Sentinel Buoy in the Northeast Channel with Predictive Tools for Shrimp Stocks and Marine Mammals

This project was funded in FY03, but all project work is being conducted in FY04

Date Project Initiated: October 1, 2003

Recipient Institution: Gulf of Maine Ocean Observing System (GoMOOS)

The Gulf of Maine Ocean Observing System (GoMOOS) has three fundamental and interconnected goals in carrying out this project:

1. To create a new suite of information products supporting fisheries management and adaptive management practices in the Gulf of Maine;
2. To augment existing ocean observing activities—GoMOOS buoys and NOAA National Marine Fisheries Service (NMFS) surveys—with a critically located climate sentinel buoy in the Northeast Channel; and
3. To implement a real-time distributed information network that will leverage and coordinate existing ocean observing activities at GoMOOS and NOAA NMFS.

GoMOOS will accomplish these goals by extending its existing partnerships to include scientists at National Marine Fisheries Service Northeast Fisheries Science Center, University of New Hampshire, and Cornell University. The information network will apply new OpenGIS Consortium (OGC)-compliant Web protocols to extend spatial coverage of new products from the Gulf of Maine to Cape Hatteras.

Marine resource managers in the Gulf of Maine, and the fishermen whose livelihoods they affect, stand to benefit from the coordinated ocean observing, information product development, and distributed data and information management activities proposed in this project.

This project will also serve the IOOS community by demonstrating a coordinated data-exchange activity that can be implemented in other regions and will demonstrate the power of geographic information systems (GIS) in creating useful information products.

Accomplishments to Date:

- GoMOOS successfully deployed a deep-water mooring in the North East Channel in June 2004 and has been relaying hourly information to the public, free-of-charge, through the GoMOOS websiteWeb site.
- Dr. Jeffrey Runge at the University of New Hampshire is working with Dr. Ann Richards at the North East Fisheries Science Center to identify environmental factors relating to shrimp recruitment, including a search of historical data. To date he has compiled an extensive record of monthly temperature and wind series data by depth for the past 20 to 30 years and historical shrimp data from NMFS in the Gulf of Maine and from the Canadian Department of Fisheries and Oceans on the Gulf of St. Lawrence.
- Dr. Andrew Pershing at Cornell University is analyzing data to modify models to predict slope water type from the North Atlantic Oscillation, *Calanus* sp. abundance from slope water, and the Northern Right Whale calving from *Calanus* to use data from the Northeast Channel mooring. He is completing a reanalysis of his original models using four more years of data. His preliminary

findings indicate that his original conclusions are holding up. They are now engaged in an analysis of historical data from mooring location to recalibrate the models to the new data source.

- GoMOOS is now hosting the Gulf of Maine Ocean Data Partnership to bring together the data providers in the region to resolve the technical and institutional issues related to the dynamic sharing of data. Dr. David Mountain of NMFS is the president of the partnership, and GoMOOS is supporting the development of a work plan to help resolve issues such as serving data outside agency firewalls. The GoMOOS staff has been working closely with staff members at NMFS on this issue.
- The North East Channel buoy data isdata are now reporting hourly on the GoMOOS websiteWeb site. Additional data products on the websiteWeb site are anticipated once the analysis of the correlation between the North Atlantic Oscillation and its affect on slope water, shrimp, *Calanus*, and right whales is complete.

Current Year Objectives:

- Northeast Channel Sentinel Buoy Deployment
- Information-Product Development
    - *Develop predictive indices relevant to fisheries management from existing research projects*
    - *Develop algorithms to compute predictive indices or reasonable proxies, from buoy data*
    - *Incorporate the predictive algorithms into the data management system*
    - *Develop "the story" that will go along with the data and information*
    - *Integrate these products into the Shrimp Project and other aspects of the Web site*
- Distributed Data Management and Visualization
    - Augment the OPeNDAP data sharing capacity at Northeast Fisheries Science Center
    - Develop hydrographic data products into GIS Format
    - Implement an OpenGIS-compliant data serving capacity
    - Implement the data-aggregation and visualization capability at GoMOOS

Partners: University of Maine, University of New Hampshire, Cornell University, and NOAA National Marine Fisheries Service.

Primary Contact:

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Coastal Ocean Observatory for the Pacific Northwest

A Pilot Coastal Ocean Observatory for the Estuaries and Shores of Oregon and Washington

Date Project Initiated: July 2004

Recipient Institution: Oregon Health and Science University

As a step toward an operational coastal ocean observatory for the Pacific Northwest, this project proposes the integration and expansion of existing but disparate observation and modeling capabilities for the estuaries and shores of Oregon and Washington. In particular, the project will explore issues of governance and coordination, certification and quality control, maintenance, expandability, and data dissemination. Observations will concentrate on five estuaries (South Slough, Columbia River, Willapa Bay, Grays Harbor, and Puget Sound) and on two littoral cells (Columbia River and Rockaway). Modeling will extend to the entire Pacific Northwest. Information systems will aim at providing quantifiably reliable information to the right user, at the right time, in the right format, with initial focus on products needed to address: (a) estuarine water quality; (b) estuarine ecosystem management and restoration; and (c) coastal storms and erosion.

Accomplishments to Date:
Fiscal year 2004 will mark the first year of funding for this project

Current Year Objectives:

- Engage coastal communities.
- Begin integration of existing subcomponent observatories.
- Acquire and install equipment to fill gaps in existing observatories.
- Create a regional modeling framework.
- Begin routine electronic distribution of Northwest Association of Networked Ocean Observing Systems (NANOOS)-branded data and products.

Partners: Oregon Health and Science University, Oregon Department of Geology and Mineral Industries, Oregon State University, South Slough National Estuarine Research Reserve, U.S. Geological Survey, University of Washington, and Washington Department of Ecology.

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Project Web Site: http://www.ccalmr.ogi.edu/NANOOSpilot/

West Florida Coastal Observing Systems
A Pilot Project for Integration of the West Florida Coastal Observing Systems

Date Project Initiated: July 1, 2004

Recipient Institution: Florida Institute of Oceanography, University of South Florida

The Everglades National Park maintains 33 stations in Florida Bay and adjacent Gulf Coast estuaries that record depth, specific conductance (salinity), and temperature at all stations and rainfall at all but 2 stations. The data from these stations are relayed daily to park headquarters via radio telemetry. Due to changes in transmission regulations, this will no longer be possible. Additionally, the data are not available to the general public in near real-time and cannot be integrated with other monitoring networks in regions such as the Coastal Ocean Monitoring and Prediction System (COMPS) along the west coast of Florida and the SEAKEYS network in the Florida Keys National Marine Sanctuary. The objective of this program is to equip 25 of the 33 stations with satellite transmitters to have the data available in near real-time. The data will be posted hourly on the COMPS Web site and made available to researchers, managers, and the general public.

Accomplishments to Date: Funding will not start until July 2004.

Current Year Objectives: Refit 25 of the Everglades National Park Marine Monitoring Network stations with satellite transmitters to allow for real-time data acquisition.

Partners:
SEAKEYS, Florida Institute of Oceanography
Coastal Ocean Monitoring and Prediction System, University of South Florida
Everglades National Park
Institute for Marine Remote Sensing, University of South Florida

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Project Web Site: None established as yet

Appendix 8. National Oceanographic Partnership Program Award for Excellence in Partnering

8.1 CRITERIA FOR THE EXCELLENCE IN PARTNERING AWARD

One of the stated objectives of NOPP is to identify and carry out partnerships among Federal agencies, academia, industry and other members of the ocean sciences community in the areas of data, resources, and education. The purpose of these partnerships, as specified in the National Oceanographic Partnership Act, is "to promote the national goals of assuring national security, advancing economic development, protecting quality of life and strengthening science education and communication through improved knowledge of the ocean."

The NOPP Award for Excellence in Partnering has two purposes: 1) to recognize the successful efforts of the partners in conducting a superior project and 2) to identify to the ocean sciences community and its supporters what constitutes a successful NOPP effort. The award will be given annually* to a completed NOPP-funded project that best exemplifies the partnership objectives of NOPP and successfully addresses at least one of the national goals put forth in the National Oceanographic Partnership Act.

Award recipients are selected based on the degree of and commitment to partnering, the success of the partnership effort, and the impact of the partnership on the ocean research community. The criteria are:

- Ocean sector diversity among the partners;
- Level of effort/involvement by partners;
- Long-term commitment of the partners beyond the NOPP-funding period;
- The success of the partnership in meeting its project objectives; and
- Impact of the effort to the ocean research community.

*Awards do not have to be made annually if it is judged that there are no suitable candidates.

8.2 2004 EXCELLENCE IN PARTNERING AWARD PROJECT SUMMARY AND PARTNER LIST

Estimating the Economic Benefits of Regional Ocean Observing Systems

PIs:
Dr. Hauke L. Kite-Powell, Woods Hole Oceanographic Institution
Dr. Charles S. Colgan, University of Southern Maine
Partners:
Mark J. Kaiser, Louisiana State University
Michael Luger, University of North Carolina at Chapel Hill
Thomas Pelsoci, Delta Research Co., Chicago, Illinois
Linwood Pendleton, University of California at Los Angeles
Allan Pulsipher, Louisiana State University
Katharine F. Wellman, Northern Economics, Seattle, Washington
Kenneth Wieand, University of South Florida

The NOPP-sponsored project on estimating the potential economic benefits from new investments in regional coastal ocean observing systems in US waters was a two-year (2002-2004) effort involving a team of researchers from around the country. The team developed techniques for estimating potential economic benefits from coastal ocean observing information, and applied these to a set of industrial and recreational activities in ten regions encompassing all coastal waters of the United States. The following table summarizes the findings.

		Magnitude of potential annual benefits (m$/yr)	Regions with greatest expected benefits
Recreational Activities	Recreational Fishing	100s	Great Lakes, Gulf of Mexico
	Recreational Boating	100s	Great Lakes, Gulf of Mexico, Atlantic
	Beaches/Shore Recreation	100s	Florida, California
Transportation	Transportation-Freight	10s	Florida, Mid Atlantic
	Transportation-Cruise Ships	10s	Florida
Health and Safety	Search & Rescue	10s	All
	Oil Spill Response	10s	All
	Tropical Storm Prediction	10s	Atlantic, Gulf of Mexico
Energy	Electricity Load Planning	10s to 100s	Great Lakes, California, Atlantic
	Ocean Structures	10s	Gulf of Mexico
Commercial Fishing	Commercial Fishing	100s	Alaska, New England

These findings suggest that annual benefits to users from the deployment of ocean observing systems are likely to run in the multiple $100s of millions of dollars per year.

The project results should be considered first-order estimates that are subject to considerable refinement as the parameters of regional observing systems are better defined, and as our understanding of user sectors improves.

Acronyms and Abbreviations

AATSR	Advanced Along-Track Scanning Radiometer
ACT	Alliance for Coastal Technologies
ADCP	Acoustic Doppler Current Profilers
AEP	Auditory Evoked Potentials
AGU	American Geophysical Union
AOML	Atlantic Oceanographic and Meteorological Laboratory
AOOS	Alaska Ocean Observing System
ASLO	American Society of Limnology and Oceanography
BAA	Broad Agency Announcement
BSOP	Bottom Stationed Ocean Profiler
Caro-COOPS	Carolinas Coastal Ocean Observing and Prediction System
CCR	Central Contractor Registry
CDHS	California Department of Health Services
CEE	Controlled Exposure Experiments
CeNCOOS	Central and Northern California Ocean Observing System
CEQ	Council on Environmental Quality
CFDA	Catalog of Federal Domestic Assistance
CFRE	Cape Fear River Estuarine
CICESE	Centro de Investigación Científica y de Educación Superior de Enseñada
CI-CORE	California Center for Integrative Coastal Ocean Research
CILER	Cooperative Institute for Limnology and Ecosystems Research
CIMT	Center for Integrated Marine Technologies
COMPS	Coastal Ocean Monitoring and Prediction System
COOA	Coastal Ocean Observing and Analysis
CO-OPS	Center for Operational Oceanographic Products and Services
COOS	Coastal Ocean Observing System
CORE	Consortium for Oceanographic Research and Education
CORMP	Coastal Ocean Research and Monitoring Program
COSEE	Centers for Ocean Science Excellence in Education
COTS	Coastal Observatory Technology Systems
CPFF	Cost-Plus-Fixed-Fee
CPR	Continuous Plankton Recorder
CSU	California State University
CTD	Conductivity-Temperature-Depth
DARPA	Defense Advanced Research Projects Agency
DHS	Department of Homeland Security
DMAC	Data Management and Communications
DoC	Department of Commerce
DoD	Department of Defense
DODGARS	Department of Defense Grant and Agreement Regulations
DoE	Department of Energy
DoS	Department of State

DRC	Delta Research Co.
DTAG	Digital recording Tag
ECCO	Estimating the Circulation and Climate of the Ocean
EEZ	Exclusive Economic Zone
EFSIS	East Florida Shelf Information System
EPA	Environmental Protection Agency
ESPIS	Environmental Studies Program Information System
EXCOM	Ocean.US Executive Committee
FAR	Federal Acquisition Regulation
FOFC	Federal Oceanographic Facilities Committee
GCOOS	Gulf of Mexico Coastal Ocean Observing System
GEM	Gulf of Alaska Ecosystem Monitoring
GEOSS	Global Earth Observation System of Systems
GFE	Government Furnished Equipment
GHRSST-PP	GODAE High-Resolution SST Pilot Project
GIS	Geographic Information System
GODAE	Global Ocean Data Assimilation Experiment
GoMOOS	Gulf of Maine Ocean Observing System
GOOS	Global Ocean Observing System
HAB	Harmful Algal Bloom
HD	High-Definition
HPCMP	High Performance Computing Program
ICOSRMI	Interagency Committee on Ocean Science and Resource Management Integration
IMAP	Inshore Marine Monitoring and Assessment Program
IMaRS	Institute for Marine Remote Sensing
IOOS	Integrated Ocean Observing System
IPCC	Intergovernmental Panel on Climate Change
IRB	Institutional Review Board
IWG	Interagency Working Group
IWGEO	Interagency Working Group on Earth Observations
JIMO	Joint Institute for Marine Observations
JSOST	Joint Subcommittee on Ocean Science and Technology
LIS	Long Island Sound
LISICOS	Long Island Sound Integrated Coastal Observing System
LSU	Louisiana State University
MARA	Mid Atlantic Research Association
MBARI	Monterey Bay Aquarium Research Institute
MBCORC	Monterey Bay Crescent Ocean Research Consortium
MBNMS	Monterey Bay National Marine Sanctuary
MERHAB	Monitoring and Event Response for Harmful Algal Blooms
MISST	Multi-sensor Improved Sea Surface Temperature
MLML	Moss Landing Marine Laboratory
MMS	Minerals Management Service
NANOOS	Northwest Association of Networked Ocean Observing Systems

NASA	National Aeronautics and Space Administration
NCSU	North Carolina State University
NEOS	NorthEast Observing System
NERRS	National Estuarine Research Reserve System
NESDIS	National Environmental Satellite, Data, and Information Service
NFRA	National Federation of Regional Associations
NIST	National Institute of Standards and Technology
NMFS	National Marine Fisheries Service
NMMP	Navy Marine Mammal Program
NOAA	National Oceanic and Atmospheric Administration
NOPP	National Oceanographic Partnership Program
NOPPO	National Oceanographic Partnership Program Office
NORLC	National Ocean Research Leadership Council
NOS	National Ocean Service
NOSB	National Ocean Sciences Bowl
NPOESS	National Polar-orbiting Operational Environmental Satellite
NPS	Naval Postgraduate School
NSF	National Science Foundation
NWLON	National Water Level Observation Network
NWLP	National Water Level Program
NWP	Numerical Weather Prediction
OASIS	Ocean-Atmosphere Sensor Integration System
OBIS	Ocean Biogeographic Information System
OGC	Open GIS Consortium
OGSA	Open Grid Services Architecture
OMB	Office of Management and Budget
ONR	Office of Naval Research
OOI	Ocean Observation Initiative
ORAP	Ocean Research Advisory Panel
ORION	Ocean Research Interactive Observatory Networks
OSTP	Office of Science and Technology Policy
PCR	Polymerase Chain Reaction
PFEL	Pacific Fisheries Environmental Laboratory
PI	Principal Investigator
POES	Polar-orbiting Operational Environmental Satellite
PORTS	Physical Oceanographic Real-Time System
RA	Regional Association
RCOOS	Regional Coastal Ocean Observing System
RDAC	Regional Data Assembly Center
RFLP	Restriction Fragment Length Polymorphism
RFP	Request for Proposals
SABSOON	South Atlantic Bight Synoptic Offshore Observational Network
SBIR	Small Business Innovative Research
SCB	Southern California Bight
SCCOOS	Southern California Coastal Ocean Observing System

SCCWRP	Southern California Coastal Water Research Project
SCDNR	South Carolina Department of Natural Resources
SCOOP	SURA Coastal Ocean Observing and Prediction
SEA-COOS	South East Coastal Ocean Observing System
SEAMAP	Spatial Ecological Analysis of Megavertebrate Populations
SECOORA	Southeast Coastal Ocean Observations Regional Association
SIMoN	Sanctuary Integrated Monitoring Network
SOEST	School of Ocean and Earth Science and Technology
SOW	Statement of Work
SSC SD	Space and Naval Warfare Systems Center in San Diego
SSH	Sea Surface Height
SST	Sea Surface Temperature
SURA	Southeastern Universities Research Association
SWFSC	Southwest Fisheries Science Center
SWSS	Sperm Whale Seismic Study
TB-PORTS	Tampa Bay Physical Oceanographic Real-Time System
TOPP	Tagging of Pacific Pelagics
TOS	The Oceanography Society
UABC	Universidad Autónoma Baja California
UCI	University of California Irvine
UCLA	University of California Los Angeles
UCSB	University of California Santa Barbara
UCSC	University of California Santa Cruz
UNCW	University of North Carolina-Wilmington
UNH	University of New Hampshire
UNOLS	University-National Oceanographic Laboratory System
USACE	United States Army Corps of Engineers
USC	University of South Carolina
U-SCAN	U.S. Coastal Area Network
USCG	United States Coast Guard
USF	University of South Florida
USGS	United States Geological Survey
USM	University of Southern Maine
WAVCIS	Wave Current Surge Information System
WHOI	Woods Hole Oceanographic Institution
WLAN	Wireless Local Area Network
WLS	Water Level Station