FY 2006 Coastal Observation Technology System Projects

TABLE OF CONTENTS

Alliance for Coastal Technologies (ACT)

University of Maryland Center for Environmental Sciences

The Alliance for Coastal Technologies (ACT) concept emerged in 1999 from discussions of the NOAA Coastal Services Center, the U.S. GOOS Steering Committee, and leaders in coastal resources management and marine technology development and manufacturing. There was a consensus that there was a genuine user demand for real-time data and comprehensive information products on coastal ocean conditions worldwide, but their development had been slow. Underscoring the urgent need to integrate new technologies into ocean observing systems, the U.S. Commission on Ocean Policy in its Final Report, "An Ocean Blueprint for the 21st Century," delivered to the President and Congress on September 20, 2004, stated**:**

> "The implementation of a sustained national Integrated Ocean Observation System (IOOS) is overdue and should begin immediately."

The vision of ACT is to facilitate the recommendation that:

> "the latest, innovative, and most effective technologies are continuously integrated into the national IOOS at all levels."

ACT is committed to overcome the challenges to make this vision a reality, providing technology users with the choices and certainty they require for making knowledgeable decisions, enhancing communications between technology stakeholders, and building and strengthening the enabling environment and thus the capacity for technology innovation and adoption.

ACT was launched in May 2001 with initial funding provided to the Chesapeake Biological Laboratory (CBL) by the NOAA Coastal Services Center (CSC). During this first phase, ACT organized as a collaborative, networked laboratory, comprised of a Headquarters unit to coordinate all ACT activities, partner research institutions distributed throughout the country to conduct field and laboratory work and regional outreach activities, and mechanisms for stakeholder input and participation by the Stakeholder Council and Alliance Members. A pilot operational period followed, during which ACT established, documented, implemented, and assessed its governance structure, technical functions and tasks, and mechanisms for products and services delivery to ACT customers. With its organizational and operational structure in place, ACT began full implementation of all program activities in from May 2003 to April 2004, including the inaugural ACT technology verification begun in October 2003 on *in situ* dissolved oxygen sensors.

Alaska Ocean Observing System (AOOS)

Seward Association for the Advancement of Marine Science
dba Alaska SeaLife Center

The Alaska Ocean Observing System's (AOOS) mission is to provide quality processed data and use these to generate information products and model forecasts to meet the needs of stakeholders including commercial, subsistence and sport fishermen, oil and gas developers, shipping interests, Alaska Native communities, resource managers, and researchers. The AOOS products will be provided through a distributed, web-based information network and span a hierarchy of spatial scales from local to regional to hemispheric, and range temporally from real-time to seasonal and longer. The focus of this proposal is on sustainability of Alaska's vast marine resources, mitigation of impacts due to coastal erosion, and improved navigation safety and search and rescue operations. New information products developed through AOOS will be accessible and understandable and encourage growth of comprehensive knowledge of ecosystem function, form and dynamics. Such knowledge gives managers and policy makers the best information available to make informed decisions regarding the preservation of ecosystem services (e.g., foods, fuels and fibers that also provide spiritual, recreational, educational, and other nonmaterial benefits to people), the challenges of climate change induced coastal erosion, and the best strategies for navigation safety and search and rescue operations.

This proposed work will enhance the present AOOS by:

• Developing statewide capacity in data management, modeling and product visualization by establishing a data management team and a Modeling and Analysis Center located at the University of Alaska Fairbanks in conjunction with the Arctic Regional Supercomputing Center.

• Implementing the Prince William Sound (PWS) Ocean Observing System as a pilot project, which includes enhanced observations, models and real-time products. This will serve as the AOOS demonstration project with techniques and knowledge that can be transferred to other regions in Alaska.

• Establishing observational components of an Arctic Ocean Observing System and initiating product development for stakeholders.

• Establishing observation components of a Bering Sea/Aleutian Islands Ocean Observing System by monitoring boundary conditions (currents and water properties) where flow enters (Amukta Pass) and exits (Bering Strait) the eastern Bering Sea, and enhancing ongoing biological monitoring activities throughout the region.

• Establishing observational components of a Gulf of Alaska Ocean Observing System (which includes Prince William Sound) by enhancing existing monitoring capacity in the Southeast and Seward/Cook Inlet/Kodiak subregions.

A comprehensive plan for development of AOOS is under construction and includes administrative infrastructure and governance, education and outreach, science advice and implementation planning, and a Data Management and Communications Committee.

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

University of South Carolina Research Foundation

The central goal of Caro-COOPS is prediction of coastal ocean processes. The ultimate objectives are to 1) integrate information on the causal biological, chemical, and physical processes in the Carolinas' coastal ocean to provide a thorough understanding of how physical forcing and biological responses are coupled on regional to local spatial scales and event, seasonal, inter-annual, and decadal time scales; 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 and for informed decision-making and planning. 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 the Carolinas; 2) a comprehensive data management system, essential for aggregation, organization, standardization, visualization, and dissemination of high quality, real-time data; and 3) an advanced suite of integrated models that will markedly improve the predictive capacities of 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 analyses 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 for a pilot project that applies coastal ocean data and predictions capabilities to the development of tools that support commercial and recreational fisheries and their management.

Implementation of Caro-COOPS involves collaborative interactions with other observing systems programs, particularly the Coastal Ocean Research Program (CORMP) at University of North Carolina at Wilmington, the multi-institutional SouthEast Coastal Ocean Observing System (SEACOOS), and the emerging Southeast Coastal Ocean Observations Regional Association (SECOORA) promoted by OceanUS.

Central Gulf of Mexico Ocean Observing System (CenGOOS): Integration and Enhancement of Observing System Elements

University of Southern Mississippi

A major recommendation of the U.S. Commission on Ocean Policy (USCOP) and an area targeted for funding by the National Oceanic and Atmospheric Administration (NOAA) and other agencies is the development of coastal and ocean observation systems. A key element in this effort is the establishment of regional ocean observation networks, which will contribute to an evolving national integrated ocean observing system (IOOS). Since 2004, The University of Southern Mississippi's Department of Marine Science (DMS) has been providing leadership and expertise in the development of a Governance and Business Plan for the Gulf of Mexico Coastal Ocean Observation System Regional Association (GCOOS-RA). In addition, DMS launched the initial phase of the Central Gulf of Mexico Ocean Observing System, or CenGOOS, by the establishment of a three-meter ocean observing buoy south of Horn Island, MS. This buoy is equipped to monitor and report a variety of ocean and meteorological observations. Installation of this buoy has provided experience with instrumentation, data telemetry, and logistics of deployment and maintenance.

Furthermore, this effort has led to a working partnership between DMS and the NOAA National Data Buoy Center (NDBC) at the John C. Stennis Space Center. NDBC is providing assistance for Quality Assurance and Quality Control (QA/QC) of meteorological data collected from the buoy and subsequent distribution to the National Weather Service for use in forecasting, prediction, and emergency management. Additional observational data are received, processed, and made available to the public locally through the DMS website (www.cengoos.org) and via the GCOOS data stream.

This project seeks to expand coastal observational efforts in the northern central Gulf Coast, to integrate these activities with other regional observation networks in the Gulf by working through the GCOOS-RA, and to establish partnerships with a broad user community. Collaboration with NOAA NDBC and other agencies (e.g., NOAA National Coastal Data Development Center) will enable the data stream from our observations to be incorporated into the national IOOS backbone. Specific goals for this first phase of the enhancement and integration of CenGOOS will involve installation of coastal high frequency (HF) radar sites for surface current measurement. An additional buoy will be deployed at a strategic location on the shelf in the Mississippi Bight. A close collaboration with modeling expertise at the Naval Research Laboratory will provide a physical and ecological framework for interpretation of observational data. Episodic ship surveys and maintenance cruises will also be performed in the Mississippi Sound and Bight.

Subsequent phases of CenGOOS will involve installation of additional buoys and other sensors, such as, instrumented drifters, autonomous underwater vehicles (AUV), and autonomous profilers. These efforts will be closely coordinated with other central Gulf organizations and agencies to enhance both regional and national IOOS capabilities.

Center for Integrative Coastal Observation, Research and Education (CICORE)

San Jose State University Foundation

CICORE is dedicated, through a combined program of research, education and public outreach, to addressing California coastal research, regulatory and management issues to ensure sustainable use of the coastal zone. Taking advantage of the statewide distribution of California State University (CSU) campuses, CICORE 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. These technologies include (1) high-resolution seafloor bathymetry and habitat mapping, (2) hyperspectral imaging of benthic, shallow water and coastal environments to improve resource management in critical coastal and wetlands areas and (3) *In situ* monitoring at fixed locations to provide a state-wide observatory of time-varying water quality parameters. In addition to serving the state needs, CICORE is integrated with other observatory programs locally, regionally and nationally to help satisfy the mandate of the US Integrated and Sustained Ocean Observing System (IOOS) as articulated by Ocean.US and other state and Federal programs. This program contributes to California's national leadership in promoting these mandates.

Accomplishments to date:

- First high-resolution bathymetric survey of the entrance of the Golden Gate conducted since the 1950s.
- Documentation of sediment erosion and deposition in the Monterey Submarine Canyon head.
- Co-location of bathymetric and hyperspectral imagery for creating bathymetry and bottom type maps to from deep water in to the shoreline.
- Hyperspectral imaging of 5460 km^2 at seven sites to bring the total area of hyperspectral imaging to 9775 km^2 of coastal and shallow water areas.
- Incorporation of a multispectral imager with four times greater spatial resolution with the hyperspectral imager.
- Development of a kelp coverage product and increased wetlands hyperspectral coverage.
- Expansion of *in situ* monitoring from four to six sites with the inclusion of South San Francisco Bay and Long Beach Harbor.
- Data delivery structured to conform to Ocean.US Data Management and Communications Steering Committee recommendations, including FGDC compliant metadata and adopting the Marine Extension of CDL form.
- Increase the number of partner members from eight to 10 with the inclusion of CSU Long Beach and San Diego State University.
- Restructuring of the governance to include both a board of directors whose members are the presidents of the participating California State University campuses and an advisory council whose membership represents a broad spectrum of external scientific experts, official representatives of local, regional, state and Federal governmental organizations, and interested non-governmental organizations.

Center of Excellence in Coastal Ocean Observation and Analysis (COOA)

University of New Hampshire

The goal of this project is to create a monitoring system for the coastal marine ecosystem of the Western Gulf of Maine as part of the Integrated Ocean Observing System. Research conducted by the University of New Hampshire's Coastal Observing Center is laying the foundation for an observing system with the capability to detect, model, and ultimately forecast changes in the ecosystem. Our research will lead to a mechanistic understanding of the factors controlling the ecosystem, and thus will play a role in decisions related to ecosystem-based management.

The system is designed to serve the information needs of fisheries and coastal resource managers, educators, and scientists. The Western Gulf of Maine region is centered at the entrance to the Great Bay Estuary at Portsmouth Harbor, and extends north to the Kennebec River Estuary and south to Cape Cod. The figure directly right illustrates this region. Partners include: the Gulf of Maine Ocean Observing System (GoMOOS), Gulf of Maine Ocean Data Partnership, Martha's Vineyard Coastal Observatory, Northeast Fisheries Science Center, Northeast Center for Ocean Science Education Excellence (COSEE), Gulf of Maine Council, Cooperative Institute for Coastal and Estuarine Technology (CICEET), Regional Association for Research on the Gulf of Maine (RARGOM), Great Bay and Wells National Estuarine Research Reserves, Seacoast Science Center, and the Northeast Consortium.

Benefits from the observing system include:

- Information generated will facilitate ecosystem-based fisheries management
- Effects of climate and human-induced influences on the ecosystem will be understood
- Methods demonstrated can be translated to other coastal ocean observing systems

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 our data as well as other information including historical archives and inventories of monitoring programs
- Modeling and analysis: Coupled physical-biological models for the region and other products created will benefit scientists, resource managers, teachers and students

Center for Integrated Marine Technologies (CIMT)

University of California Santa Cruz

The Center for Integrated Marine Technologies' (CIMT) mission is to create a coastal ocean observing and forecasting system that provides a scientific basis for the management and conservation of the Monterey Bay National Marine Sanctuary, and serves as a model for all of California's coastal marine resources and the U.S. Integrated Ocean Observing System (IOOS).

Specifically, CIMT is using off the shelf and newly developed technologies to investigate the 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. These data are being incorporated into hindcast and nowcast/forecast models of the marine environment.

This comprehensive approach will serve as a model for an integrated coastal ocean observing system and establish the scientific basis for effective monitoring and management of coastal fisheries and protected resources, especially for the Monterey Bay National Marine Sanctuary. It is a pilot project within the Central and Northern California Ocean Observing System (CeNCOOS; http://www.cencoos.org).

Accomplishments to Date:

- California Department of Health Services Biotoxins Program receives and uses population abundance and toxin analysis of toxic algal species from CIMT.
- Development of “rapid-response” remote sensing products with Dr. Richard Stumpf (NOAA) for the identification of potential HAB problems in California.
- CIMT data have been used in models, presentations, and reports on the food habits of sea lions and pinniped impacts on salmon stocks for Federal agencies
- CIMT personnel and data sets have been used in the development of Sanctuary Management Plan. We have developed working relationships with the Channel Islands, Gulf of the Farallones, and Cordell Banks National Marine Sanctuaries and the Point Reyes Bird Observatory to help in future management decisions.
- Direct collaboration with the developing regional Integrated Ocean Observation System (IOOS) the Central and Northern California Ocean Observation System.
- COCMP coastal current HF radar system is replicating CIMT technology, and taking over operational control of these efforts.
- 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.
- CIMT provides support, dissemination, and validation for remote sensing products in collaboration with NOAA, PFEL, the Tagging of Pacific Pelagics (TOPP) program, and the Monterey Bay Aquarium. This partnership includes public data access, dissemination to resource managers, and outreach.
- The Seymour Marine Discovery Center (located at UCSC Long Marine Laboratory) is bringing CIMT data to the general public, particularly teachers and K-12 students.

Coastal Ocean and Research and Monitoring Program (CORMP)

University of North Carolina at Wilmington

The Coastal Ocean Research and Monitoring Program (CORMP), begun in 2000 as an exploratory coastal ocean research program focusing on collection of data applicable to physical and ecological predictive models, fisheries sustainability, and habitat quality, is emerging as a comprehensive coastal ocean observing system serving the region's scientific research community and an established and growing constituency of public service and local users. During the proposed funding period, the CORMP observing array will be expanded to provide near real-time, quality assured oceanographic and marine meteorological data over a region extending from the South Carolina-North Carolina border to north of Cape Lookout, NC. These data will be web-available and compliant with the Ocean.US Data Management and Communication Subcommittee (DMAC) and SouthEast Atlantic Coastal Ocean Observing System (SEACOOS) data management standards, thereby ensuring integration and interoperability with other Integrated Ocean Observing Systems (IOOS) within and beyond the Southeastern Coastal Ocean Observing Regional Association (SECOORA). These efforts constitute a strong commitment by CORMP to provide a balanced regional observing system dedicated to serving a full spectrum of users who stand to benefit from CORMP in the region.

CORMP consists of four focus areas: ocean observations, data management, ecosystem research and modeling, and outreach and education. These focus areas operate synergistically to achieve programmatic objectives to**:**

1) provide a regional hub in a national observing system,

2) collect and disseminate physical and ecological data to establish baseline conditions, identify responses to stochastic events, predict and verify long-term trends, and

3) engage regional partners, stakeholders and end-users in the development and implementation of a sustainable ocean-observing program.

CORMP will supplement its expanded observing capabilities by utilizing emerging technologies (i.e. Webb Glider; MODIS) to collect data at temporal and spatial scales needed to ensure quality control (i.e., independent validation of mooring data) and to support research, modeling and the development of user-driven end products. Further, CORMP will provide a seamless and sustainable two-way flow of information among its partners and end-users, SECOORA affiliates, and other national IOOS programs, thereby facilitating the program’s ability to adapt to evolving needs and emerging technologies. Through these efforts, CORMP will provide a model for a comprehensive coastal observing system that is fully integrated with user-driven needs and research to address issues of prime regional importance.

Gulf of Maine Ocean Observing System (GoMOOS): Sustaining the System

Gulf of Maine Ocean Observing System

The primary goal of the project is to maintain existing capabilities, including the flow of data upon which our users have grown to depend. Therefore, these funds will support core aspects of the observing subsystem and basic staff support for the organization and its Board of Directors. Priorities involve elements that have proven reliable in the past and/or serve well-defined strategic needs for regional users and the IOOS in general. The prioritized list includes the 3 basic subsystems: (1) data acquisition, (2) modeling, and (3) data management and communications (DMAC).

For the other vital aspects of the overall program, including user outreach, product development and analysis, Regional Association development, and data integration, we will pursue other sources of income. For example, the President of the Board is lead PI on a Regional Association Development Grant proposal that will allow regional interests to determine how GoMOOS should further evolve to meet a truly regional set of needs and objectives. To broaden regional participation and assure the data from regional providers are integrated and transformed into useful products, GoMOOS has been hosting and helping to develop the Gulf of Maine Ocean Data Partnership. Consistent with the Partnership objectives, GoMOOS is also developing a Memorandum of Agreement with the Federal Geographic Data Committee (FGDC) which includes a corresponding set of support activities. Finally, GoMOOS has been contracting with the Southeastern Universities Research Association (SURA) to provide support for the SURA Coastal Ocean Observing and Prediction (SCOOP) program. SCOOP partners, including GoMOOS, are working closely with the NOAA Coastal Service Center to help provide the "IT glue" that will hold together the various regional elements into a truly national system of systems for ocean observing, with the broader goal of becoming the oceanic component of the Global Earth Observing System of Systems (GEOSS).

Accomplishments to Date:

- Four years of sustained collection and delivery of data, with associated modeling and analysis,
- User-driven information product development targeting a variety of user sectors,
- Interoperability with the NDBC and regional Weather Service offices, which provide regular reporting of GoMOOS data on NOAA weather radio,
- On-line, decision-support tools for fisheries managers with GIS visualization,
- Support and hosting for the Gulf of Maine Ocean Data Partnership,
- Creation and hosting of the Gulf of Maine Mapping Portal (www.GoMMaP.org), which provides a single point of access for on-line GIS products that dynamically integrate data from dozens of organizations in the U.S. & Canada, and
- Ongoing support for, and contributions to, the nationwide interoperability demonstration at www.openioos.org.

Joint Center for Ocean Observing Technology

University of New Hampshire

We propose to establish the NOAA/UNH Joint Ocean Observing Technology Center to focus on the assembly of component subsystems to produce priority measurement and prediction services. The NOAA/UNH Joint Center for Ocean Observing Technology (herein called the "Center") will be a collaborative venture between the National Oceanic and Atmospheric Administration (NOAA), the University of New Hampshire (UNH), the Gulf of Maine Ocean Observing System (GoMOOS), and corporate partners such as Atmospheric and Environmental Research, Inc. (AER). The Center will work in concert with other NOAA-funded centers at UNH including the Cooperative Institute for Coastal and Estuarine Environmental Technology, the Center for Coastal Response Research, the Joint Hydrographic Center, and the Coastal Observing Center. This collaboration will leverage the expertise found in government agencies, universities, and commercial entities to provide weather, oceanographic, and climate products aimed at enhancing the quality of life and economical stability of the Gulf of Maine region.

The Center will develop and prototype new coastal and oceanic products that will enhance our understanding of the regional environment. The intent of these products, which will be developed for both the lay and experienced users, is to provide state-of-the-art short- and long-term weather, climate and other environmental information through the fusion of data from national and international satellite programs, regional *in situ* observation systems, and advanced data assimilation and modeling techniques.

The initial focus of the proposed Center will be to demonstrate pre-operational system-of-system prototypes by maximizing the extraction and integration of regional information from existing or planned observational platforms; enhancing and compositing diverse regional atmosphere-ocean-land observing system data; and coupling advanced regional modeling systems with visualization methodologies to produce better and more useful environmental predictions. Specific goals are to: (1) create and serve Web-based products designed for targeted user communities by fusing/synthesizing observations and model-generated results; (2) establish the Isles of Shoals Observatory as a test-bed facility for infusing new observing technology into the Gulf of Maine regional observing network; and (3) develop a regional-scale prototype system of systems for observing / modeling ocean-atmosphere-terrestrial interactions.

Long Island Sound Integrated Coastal Observing System (LISICOS)

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.

Major components of LISICOS will include:

- a coherent and sustained time-series observation program coupled with short periods of more intensive process studies,
- the development of a data center,
- development of forecast products for mariners and managers,
- development and assessment of models of oxygen and nutrient cycles, circulation, and water properties, and
- outreach programs to enhance of partnerships with State, Federal and local governments and citizens.

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, and
- Analysis of existing hydrography to infer exchange between LIS, the Hudson River, and the shelf waters.

Oregon Coastal Ocean Observing System (OrCOOS)

Oregon State University

The Oregon Coastal Ocean Observing System (OrCOOS) is a new partner in the Nation's efforts to develop an Integrated Ocean Observing System (IOOS), a key recommendation of the US Commission on Ocean Policy. OrCOOS is part of the Northwest Association of Networked Ocean Observing Systems (NANOOS), which is recognized by the National Oceanic and Atmospheric Administration (NOAA) as the regional association for the Pacific Northwest.

OrCOOS represents the integration of a wide variety of ocean observing and modeling systems that will provide knowledge services for scientific, management, and educational purposes. OrCOOS will consist of instrumentation deployed in and near the coastal ocean and returning data shoreside in real-time along with data from satellites and shore-based sensors. Data from profiling moorings, undersea autonomous vehicles, land-based surface current mapping systems and wave detection radars, coupled together with computer models of the coastal ocean circulation and waves, will be available via a public web portal. OSU, through internationally recognized programs in oceanography, atmospheric sciences, engineering, fisheries and wildlife, and nearshore ecology, is implementing a coastal observing and prediction system for the benefit of Oregon's citizens. The Hatfield Marine Science Center in Newport provides a unique partnership of science, resource agencies, and education for Oregon's coastal ocean. Oregon Sea Grant will play a key role in both education and outreach as well as in connecting OrCOOS with the coastal community. Ocean products and services, for example maps of sea surface temperature, ocean currents, and wave heights and directions as well as ocean predictions, will be made available in user-friendly formats.

Southern California Coastal Ocean Observing System (SCCOOS): Shelf to Shoreline Observatory Development

Scripps Institution of Oceanography

SCCOOS was initiated in September 2004, to implement and evaluate new sensor and information technologies to facilitate the creation of an integrated, multi-disciplinary coastal observatory in the Southern California Bight. The predominant goals are to provide policy makers and managers with a better scientific basis to evaluate and design new management strategies and to manage risks. Real-time observations, model/data-based forecasts, and a flexible information distribution system will provide critical information to these users. To achieve these goals, a consortium of eleven Southern California universities and laboratories that surround the Southern California Bight (SCB) created the Southern California Coastal Ocean Observing System which brings together agencies, managers, and data provider/user groups with the implementers of the observatory within a single regional association. SCCOOS will integrate data and projects from local, state, and Federal and individual institutional efforts to create an integrated, multidisciplinary coastal observatory in the SCB. We propose to continue pilot activities within the COTS program for the next 3 years to further the development and maturation of a functioning coastal observatory in Southern California. While this project will occur over the next three years, we are submitting only a one year detailed budget at this time due to the uncertainty in funding which results from the dependence of the COTS programs on yearly Congressional support.

Accomplishments to Date:

- Began the fabrication and installation of 3 multidisciplinary moorings in Santa Barbara, Santa Monica, and San Diego. Other in-situ observations (gliders, drifters, CTD) are being prepared for deployment,
- Initiated an automated shore station data collection program based upon sites established by state and Federal funding. 8 sites are presently available,
- Began a CALCOFI cruise in-shore to coincide with stations occupied by water quality managers,
- Developed educational outreach program to 5th grade science students to meet State science requirements,
- Initiated the collection of data from NPDES monitoring data and shoreline water quality data,
- Began coordinating the installation of a long range CODAR in San Diego and San Clemente Island with USCG and USN personnel, and
- Initiated the construction of an operational regional ocean model and surf zone transport model. Testing conducted in San Diego and Los Angeles regions.

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

The Southeastern Universities Research Association

The overarching goal of the SURA Coastal Ocean Observing and Prediction (SCOOP) Program is to create a service-oriented architecture (SOAP) to advance the science of environmental prediction and hazard planning for our nation's coasts. The SCOOP approach to accomplish this goal is to integrate diverse efforts in coastal ocean observing and modeling and enable a virtual community to share tools, resources, and ideas. In addition to serving as an integrating component of the Integrated Ocean Observing System (IOOS), it is also intended that this program will provide a portable suite of methodologies for managing and visualizing observed and modeled information on coastal phenomena.

In September of FY2004 the SCOOP program received funds from NOAA that were applied to four primary initiatives: 1) developing and implementing data standards; 2) creating a "data grid" demonstration of interoperability; 3) deploying a "model grid" demonstration of coupled modeling; and 4) community building through support of regional coastal ocean observing system (RCOOS) pilot projects and ocean education. These projects are intended to merge into a seamlessly integrated system that will support the implementation of the Ocean.US DMAC plan published in March 2005 (http://dmac.ocean.us/dacsc/imp_plan.jsp).

A Continuation of the Ocean-Atmosphere Sensor Integration System Project (OASIS): A Wallops Coastal Ocean Observation Laboratory Project

Virginia's Center for Innovative Technology

This collaborative effort between Virginia's Center for Innovative Technology (CIT), NASA Wallops Flight Facility (WFF), NOAA and a number of academic institutions will monitor the influence of the Chesapeake Bay on the adjacent coastal ocean margin ecosystems through the development, deployment and use of various ocean observation tools. Coastal regions within the Mid-Atlantic Bight (MAB) are directly influenced by regional freshwater fluxes that emanate from several large bay systems (Delaware and Chesapeake Bays). The outflows from these bays have high sediment loads and high levels of nutrients, particulate and dissolved organic matter that heavily influence the adjacent coastal margin ecosystems.

The focus of this project is to establish an ocean observing system along the coastal ocean regions of Virginia, Maryland and Delaware. This will be accomplished by developing, testing, and deploying new sensors, platforms and applications to support NOAA and NASA coastal ocean remote sensing activities and products. This includes a fleet of solar-powered surface autonomous vehicles called the Ocean-Atmosphere Sensor Integration System (OASIS) being commercialized with support from NASA's Small Business Innovation Research (SBIR) program. Software is being developed for command and control of multiple OASIS platforms to support real-time dynamic mapping capabilities. A Coastal Bio-Optical buoy (COBY) will be deployed and maintained during biweekly cross-shelf surveys.

The project proposes to continue investigating the interactions between biology and physics in this ocean margin system. In the first year of this effort, an objective is creation of a full surface current product for the Mid-Atlantic Coastal Ocean Regional Association (MACORA) by maintaining a system of three long-range and two standard-range high frequency (HF) radars for measuring surface currents. Finally, the project is establishing and fostering new collaborations with regional partners and is developing strong educational and outreach efforts. Field observations will be obtained using standard protocols. Real-time observations will be archived onto our CODAAC data handling system and made available to the public using OpenDAP protocols.

Project partners include: NASA, NOAA/ETL, NOAA/National Ocean Service (NOS), Old Dominion University, Rutgers University, Donald L. Blount & Associates, DLBA Robotics, Emergent Technologies, EG&G Services, SGT, University of Maryland, Virginia Marine Science Consortium, and Pacific Gyre and Noesis.