



Dear Friends and Members of MACOORA/MARCOOS. The following request for information might be of interest.

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration (NOAA)
Integrated Ocean Observing System (IOOS)

REQUEST FOR INFORMATION

NCNA0001-9-10755

April 9, 2009

1.0 INTRODUCTION:

The National Oceanic & Atmospheric Administration (NOAA) is seeking information (comments) from interested parties to help with market research to evaluate systems engineering and development approaches for implementing the national Integrated Ocean Observing System (IOOS) Data Management and Communications subsystem (DMAC). The intent of this request for information (RFI) is two fold: (1) to identify and evaluate comprehensive development strategies and concepts for the DMAC subsystem, and (2) to help inform optimal strategies for implementing a DMAC solution.

Please note, response to this notice is for NOAA's informational and planning purposes only, and does not constitute an Invitation for Bid or Request for Proposal, and is not to be construed as a commitment by the government. The government will not reimburse interested parties for any cost incurred for their participation in this survey. At this time, no solicitation exists. Consideration for a potential acquisition may occur in or after FY11. Response to this notice is NOT mandatory to be eligible to receive any potential solicitation. NOAA may conduct additional market research through additional RFIs, requesting interested party's capability briefings, and other means.

Interested parties are invited to submit responses to this notice (see Section 4.0 Information Requested, for a list of RFI questions). Responses should include a brief capability statement outlining the party's qualifications in system engineering and system development. Responses should also contain: the organization's name, address, point of contact(s), telephone number, and fax number.

Also, submit evidence documenting not to exceed 3 experiences on projects similar to DMAC sub system described below in Section 2.0 Background Information. Include the contract number, project titles, dollar values, a short description, and point of contact(s) with contact information. The NOAA will evaluate the responses to help plan and support the IOOS DMAC program.

All information received in response to this notice will be safeguarded accordingly. Non-disclosure statements will be signed by non-government advisors who view the responses to

this notice. Responses to this notice will not be returned. Please remember that though the NOAA will evaluate these statements, NOAA will NOT be eliminating any organization from any potential subsequent competitions based on the results of these statements.

Responses are to be submitted electronically in Microsoft Word (not to exceed 20 pages, including appendices, diagrams, and examples, in 12 pt Times New Roman font). Responses should be submitted electronically (using PDF or Microsoft word). NOAA must receive the submissions by email no later than 3:30 PM EST, April 30, 2009 at the following email address: joshua.s.helms@noaa.gov

For questions regarding this RFI you may also contact the contracting specialist at:

Name: Joshua S. Helms

Address: National Oceanic & Atmospheric Administration
1305 East West Highway
Suite 7604
Silver Spring, Maryland 20910

Telephone: (301)713-0820 x143

2.0 BACKGROUND INFORMATION:

2.1 IOOS Overview

The NOAA IOOS office and the Interagency Working Group on Ocean Observations (IWGOO) are charged with leading the inter-agency coordination to establish a National IOOS.

The NOAA IOOS mission is to:

lead the integration of ocean, coastal, and Great Lakes observing capabilities, in collaboration with Federal and non-federal partners, to maximize access to data and generation of information products to inform decision making and promote economic, environmental and social benefits to our nation and the world.

The U.S. IOOS is a coordinated network of people and technology that work together to generate and disseminate continuous data, information, models, products, and services related to our coastal waters, ecosystems, Great Lakes, and oceans. The oceans are global, dictating that IOOS must address local coastal and global scales through two interdependent components, a national coastal component and a global ocean component.

The national coastal component of IOOS includes U.S. observations, products, and services provided by federal agencies to monitor and manage the Great Lakes and the entire U.S. coastal ocean environment. The coastal component also includes a network of 11 regional associations that use regional coastal ocean observing systems to obtain data of particular interest to local communities.

The global component leverages a long history of U.S. participation in multinational ocean programs organized through such bodies as the World Meteorological Organization (WMO) and the Intergovernmental Oceanographic Commission (IOC). In this global perspective, IOOS is a coordinator for our nation's ocean contribution to international efforts to comprehensively monitor the Earth and transmit observations globally through GEOSS and the Global Ocean Observing System (GOOS).

IOOS stakeholders include federal agencies and interagency groups; state, local, and tribal governments; coastal zone managers; regional associations; academic institutions; public-sector data providers, users, and resellers; and other nations and international agencies.

Because IOOS is a system of multidisciplinary systems, it is vital that all IOOS stakeholders understand the following key tenets:

- IOOS will integrate existing (legacy) and new observing systems, data, organizations, and products. IOOS will (1) efficiently link environmental observations, data management and communications, data analyses, and models; (2) provide rapid access to multidisciplinary data from many sources; (3) supply data and information required to achieve multiple goals that historically have been the domain of separate agencies, offices, or programs; and (4) involve crosscutting partnerships among federal and state agencies, private-sector entities, and academic institutions.
- IOOS will provide data to modeling systems and modelers. IOOS data will allow modelers to increase the data sets used in models, incorporating new and additional data into algorithms, enabling the development of new models and algorithms, and to increase quality control, comparing data expected to determine whether data fall within expectations or require additional review.
- IOOS will provide mechanisms for aggregating (and buffering) data streams over useful spans of time and space. Data aggregation is any process in which a data set is generated by joining in some manner data held in more than one data set, possibly in more than one file, possibly at more than one site. In this manner data are replicated, not restructured.

Fully implementing IOOS means not only increasing the number, type, and geographical coverage of observations but also doing the following:

- Collecting data based on meeting a requirement from modeling and analysis systems that deliver products to support societal needs or related research.
- Standardizing data and the associated metadata. Standardization requires consideration of the data format and transmission format, among other things, so that the data can be readily used by all who need it.

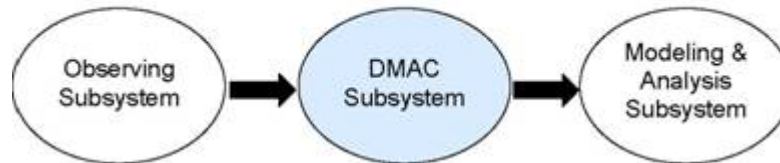
Implementing mechanisms to promote discovery and access to the data and to manage data over time.

The IOOS goal is to “provide continuous data on our open oceans, coastal waters, and Great Lakes in the formats, rates, and scales required by scientists, managers, businesses, governments, and the public to support research and inform decision-making.” To realize the goal, the national IOOS has three subsystems:

- *Observing subsystem.* This subsystem comprises the collection of non-sensor and sensor (remotely sensed and in situ) measurements and their transmission from regional and national backbone platforms.
- *Data management and communications (DMAC) subsystem.* This subsystem comprises the information technology infrastructure such as national backbone data systems, regional data centers, and data assembly centers (DACs) connected by the Internet and using shared standards and protocols.
- *Modeling and analysis subsystem.* This subsystem consists of evaluation and forecasting of the state of the marine environment based on assimilated measurements; it also includes decision support.

Each of the subsystems consists of a set of functions, hardware, software, and infrastructures that are managed by a variety of entities and programs. Figure 1-1 shows how the three IOOS subsystems interact to enhance the nation's ability to collect (via the observing subsystem), deliver (via the DMAC subsystem), and use (via the modeling and analysis subsystem) information about the oceans, coastal areas, and Great Lakes.

Figure 1-1. IOOS Components



2.2 DMAC Overview

Currently, thousands of observing systems (including sensor and non-sensor systems that collect physical, biological, chemical, geological, fisheries, social-economic data, etc.) are operating in U.S. waters (with many more planned) including in the oceans, Great Lakes, and in coastal waters. These systems are owned and operated by a variety of federal, regional, state, and tribal agencies; private-sector entities; nongovernmental organizations; and academic organizations. These observing systems and the associated data collection and analyses are typically funded and fielded to support very specific research, tools, and services. Generally, each system functions as an independently owned and operated entity, with the owning organization responsible for the funding stream required to field and maintain the system.

The end users or consumers of the data collected by the legacy observing systems also are a variety of entities, including modeling and analysis organizations, product and service providers, and decision makers. In some cases, the data collecting organization is also the primary data user. In some cases, the data collection is done for a mix of users. Each legacy system is optimized for the needs of a specific subgroup of the broader user community.

An efficient and effective DMAC subsystem is therefore crucial because it will provide the services and infrastructure required to link observational data to the modeling, analysis, and decision-support services that will use the data to provide products to support national needs. Other NOAA offices and various federal and nonfederal partners are responsible for continuing and extending their current roles in management of observation and modeling and analysis products and services, including revising or building tools to capitalize on the expanding set of data that IOOS will provide.

A DMAC solution is envisioned that brings together data from multiple observing systems and provides the intermediate services necessary to make standardized data available to a broad community of users. In short, DMAC will enable data-using organizations to locate all the data they need from a single access point. Further, each modeling and analysis organization will be able to feed their post-processed data back into the DMAC repository for use by other entities.

The DMAC subsystem will aggregate and integrate (public and potentially proprietary) data from thousands of independently owned and operated collection sensors as well as non-sensor or manual collection programs (e.g., surveys, human observation and interviews) and make the data available to hundreds of equally diverse users who use the data for modeling and analysis, as well as for decision support. This exchange of data requires that data collectors and users speak the same language in terms of data definition, structure, and transmission both within and across components. Therefore, the DMAC cannot consist solely of hardware, software, and communications infrastructure. To ensure that the data are interoperable across a national and global community, DMAC and all IOOS partners must also incorporate standards for data collection and management and for metadata. In addition, the DMAC will be compliant with both the Federal Enterprise Architecture, the NOAA common infrastructure, Federal information security requirements, and other

applicable federal standards.

The following describes the DMAC role in the IOOS—observing organizations across the United States will send the data they have collected to initial data assembly centers. At the DACs, the data will undergo quality control (to ensure data validity) and will then be pushed to the DMAC subsystem. The DMAC will store the data so that they can be readily retrieved by interested users. User requirements for data may be recurring—for example, regular provision of data to modeling, analysis, and decision-support organizations that produce products and services—or they may be ad hoc. After using the data, modeling, analysis, and decision support entities may opt to push their processed to DMAC. When this occurs, DMAC will perform limited quality control and will store the data.

The general public, and other registered users, will have access to the IOOS data through a portal. This web-enabled tool will provide the same data discovery, access, and transport capabilities that are provided to the modeling, analysis, and decision support entities.

In the target environment, the DMAC subsystem will acquire data collected by participating observing organizations. The DMAC will work with the observing organization to ensure that the data are presented in a unified manner based on agreed-upon standards. Generally, the observing organization will be responsible for forwarding the data in accordance with the standards, although in some cases the DMAC may modify the data to meet the standards. The DMAC will provide data to modeling and analysis centers in accordance with the approved standards.

2.3 DMAC Requirements

The IOOS office is focusing on implementing a robust DMAC subsystem. The DMAC will provide data to modeling and analysis centers in accordance with approved standards. DMAC's specific functions are as follows:

- Data transport. DMAC will provide transparent, interoperable access and delivery of measurements and data products from computer applications across the Internet or other communication network.
- Data assembly and quality control, transformation (standardization), and workflow management. DMAC will verify that all IOOS data adheres to the IOOS standards and to the extent possible can be understood by other users.
- Data access. DMAC will provide tools and support both recurring production transmissions and ad hoc requests for data: including data discovery and metadata management, and data access operations (data extraction tools, online browsing, and modeling).
- Data storage. Based on data collected and access needs, DMAC will organize the data to facilitate data discovery.
- Data archiving. DMAC will provide secure, long-term storage or archival capability of raw and processed data either directly or in cooperation with NOAA's existing data archive capability (e.g., NODC, National Oceanographic Data Center).
- Information assurance. DMAC will ensure that IOOS and its data are safe from a wide range of threats; address concerns about proprietary information, and comply with government regulations.
- Support service such as governance, oversight, and coordination. DMAC will support its services to the other IOOS components. Those services include maintaining data standards and governance, establishing service level agreements, user support, system administration and monitoring, and providing general training.

3.0 ADDITIONAL REFERENCE DOCUMENTATION:

- The following documents can be found at: http://www.ocean.us/oceanus_publications
 - a. IOOS Conceptual Designs (Lockheed Martin and Raytheon versions)
 - b. First Annual Integrated Ocean Observing System (IOOS) Development Plan
 - c. DMAC Plan
- NOAA, Integrated Ocean Observing System, Data Management and Communications Concept of Operations, January 2009

Regards,
Judith T. Krauthamer
Executive Director, MACOORA
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