Data Sharing and Data Quality of Ocean Currents and Temperature towards an Operational Data Management System for the Southeast Region

Southeast Regional Data Management Workshop
March 9-10, 2006
in Chapel Hill, NC

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Current Affiliations:
DMAC Steering Team (NFRA Rep.)
ORION Cyberinfrastructure Committee
GCOOS-RA DMAC Technical Lead
TABS Nowcast/Forecast System

Data Management Gurus at Work
“Grass ROOTS IOOS”
Update on Federal Funding for the Integrated Ocean Observing System (IOOS)

February 8, 2006
Stolen from Glen Mandigo
# Ideal IOOS Funding Profile

## Table 26.3 Proposed Annual Costs for Implementation of the IOOS

Assuming start-up in fiscal year 2006, this table shows the Ocean.US cost estimates for the IOOS for each year through fiscal year 2010. These figures do not include the costs for some essential components, including satellite observations, that could add another $100–$250 million per year.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>$138 million (start-up costs)</td>
</tr>
<tr>
<td>2007</td>
<td>$260 million</td>
</tr>
<tr>
<td>2008</td>
<td>$385 million</td>
</tr>
<tr>
<td>2009</td>
<td>$480 million</td>
</tr>
<tr>
<td>2010</td>
<td>$500 million (fully operational system)</td>
</tr>
<tr>
<td>Total for first five years</td>
<td>$1.8 billion</td>
</tr>
<tr>
<td>Out years</td>
<td>$500 million/yr (to keep system operational, not accounting for inflation)</td>
</tr>
</tbody>
</table>

Source: Ocean.US, Arlington, VA.

## Table 26.4 Proposed Start-up Costs for the IOOS

In fiscal year 2006, the proposed start-up cost of $138 million is based on expenditures for four distinct components.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost to Perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerate the implementation of the U.S. commitment to the Global Ocean Observing System</td>
<td>$30 million</td>
</tr>
<tr>
<td>Develop data communications and management systems for the national IOOS</td>
<td>$18 million</td>
</tr>
<tr>
<td>Enhance and expand existing federal observing programs</td>
<td>$40 million</td>
</tr>
<tr>
<td>Develop regional observing systems</td>
<td>$50 million</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$138 million</strong></td>
</tr>
</tbody>
</table>


OMB and Agencies

- Funding for ocean observing spread among federal agencies: NOAA, Army Corps, EPA, NSF, USCG, DoD, DHS.
- NOAA has the primary mission responsibility for IOOS. NSF has primary mission responsibility for OOI/Orion.
- NOAA has stated repeatedly that IOOS is a top NOAA budget priority for FY ’07 and out-years, but no funds in the budget yet.
- Ocean observing community is looking for at least a $138 million FY ’07 request for IOOS from NOAA.
March __, 2006

The Honorable Richard Shelby  The Honorable Barbara Mikulski
Chairman  Ranking Member
Senate Appropriations Committee  Senate Appropriations Committee
Subcommittee on Commerce, Justice  Subcommittee on Commerce, Justice
and Science  and Science
Washington, DC 20510  Washington, DC 20510

Dear Mr. Chairman and Senator Mikulski:

We are writing to request your assistance to include $138 million in the Fiscal Year 2007 Commerce, Justice and Science Appropriations bill for the Integrated Ocean Observing System (IOOS). We greatly appreciate your leadership and support for this valuable initiative.

Ocean Observing is the essential first step to improving understanding, prediction and forecasting, stewardship, and use of the oceans and our US coastal waters. Deployment and operation of an Integrated and Sustained Ocean Observing System will: (1) improve the safety and efficiency of marine operations, (2) improve prediction of natural hazards (including tsunamis and storm surges) to reduce resulting damages and costs, (3) improve predictions of climate change and its socio-economic consequences, (4) improve national security, (5) reduce public health risks, (6) help protect and restore healthy ecosystems, and (7) sustain and restore living marine resources. Immediate returns are expected in maritime safety and efficiencies for shipping, fishing, energy, tourism, and other industries; search-and-rescue; national security; and monitoring and clean-up of discharges and spills in ocean and Great Lakes waters.

The FY06 CJS Conference report included language promoting a transition to a single IOOS program line. A funding level of $138 million will maintain support for existing ocean observation programs while seeking greater uniformity in ocean observation capacity among all coastal regions and the Great Lakes. This request is consistent with the recommendations of the Ocean Commission and will promote critical objectives including: (1) the data communications and management system to connect information from regional observing networks to federal and state agencies; and (2) infrastructure and operational support for Regional Associations to manage and deliver ocean data products to user groups. These enhancements will ensure that the American public receives the greatest return for its investment in the form of a nationally consistent system for useful ocean date, reliable forecasts, and timely warnings.

The United States and the world are facing critical decisions about the future stewardship and management of the oceans and fresh water resources including the Great Lakes. Improved data resulting from IOOS provide crucial to support these decisions. We urge you to provide a full $138 million for IOOS in FY07.

Respectfully,
Current IOOS Budget

• No Agency has yet come forward with significant budget request for IOOS.

• Congress provided limited start up funding to NOAA for regional ocean observing systems in FY ‘02-’04 and then rolled regional systems into larger IOOS funding in FY ’05 and FY ’06.
FY ’06 IOOS Funding Breakdown

• Approximately $87 million appropriated for IOOS in NOAA FY ’06 budget.
  – Approximately $32 million for regional systems, which is about $6 million less than in FY ’05.
  – $13 million for ARGO, TAU, PIRATA.
  – $23 million NDBC.
  – $14 million for NOAA coastal buoy acquisition and upgrade related to IOOS.
  – $5 million for tsunami buoy work.

$50M-regional    $40M-federal    $18M DMAC
$32M regional    $55M-federal    $0M DMAC
Emphasis has been on NOAA as the lead agency for IOOS. In the absence of a budget request for IOOS, Congress has been appropriating on the order of $40 to $50 million for regional coastal ocean observing over the past couple years. We are in a transition period where there is a need to continue short-term funding for ICOOS and regional observing systems until a NOAA baseline budget for IOOS appears in FY ‘08. Efforts are underway to transition from regional earmarks to single ICOOS line item in FY ’07 for at least $75 million.
$75M Start-Up Funding for IOOS in ‘07

• The Commission on Ocean Policy outlined a budget profile for IOOS that was developed through broad community and agency input.

• The Commission recommended $75 million for the two components that are essential to establish IOOS:
  – Data communications and management system that would connect the regional associations and integrate ocean observing data from the associations and other ocean observing assets for the national ocean observing system.
  – Infrastructure and operational support for Regional Associations to manage and deliver ocean data products to user groups.

$18M - forecast need for National DMAC
How Will Money be Dispersed?

• RAs determine spending priorities as outlined in their business plans.
• Below are from the draft GCOOS Business Plan
  • 10% Research projects
  • 35% Pilot & Preoperational projects
  • 43% Operations
  • 10% Education and Outreach
  • 2% Administrative Costs
Regional Share in ‘07

- $75M - $18M = $57M
- ~11 RAs = $5.2M for each RA
- $5.2M X 0.43 = $2.2M (Operations Share)
- $2.2M X 0.10 = $220K (Data Management Share)
- $220K X 0.50 = $110K each RA (50% indirect)
- What’s that? 1-2 FTE for each RA?
- How many observing groups in your RA?
Anticipated IOOS Support for Data Management at the Individual Observatory Level

- Can you implement DMAC in your shop with current resources?
- There will be less money than you planned on getting.
- There will be less money than you need.
- You will have to compete with your own to get it.
DMAC Plan

• Draft May 2004
• Extensive Review
• Released March 2005
• Concrete Guide to Data Providers
• Updated Annually
• http://ocean.us
• 318 pages (at least read the Executive Summary - only 8.5 p)
DMAC and Related Activities

Expert Teams:
- Metadata & Discovery
- Archive
- Transport & Access

Caucuses:
- Private Sector
- International
- Modeling
- Regional

Working Groups:
- IT Security (not yet formed)
- On-Line Browse (not yet formed)
- Systems Engineering
- Standards & Protocols (not yet formed)

Next Meeting in May 2006

- MMI - (Proposal in to NSF)
- QARTOD (IV in June or September)
- NOAA CSC (just announced)
  - IOOS Data Community Information Repository
  - IOOS Data Transport Laboratory (to implement, evaluate, & deploy candidate data technologies that can be used to improve capacity of IOOS regional partner information systems)
What’s up at DMAC?

• Mostly Volunteers
• Meetings, email, ET & Caucus membership
• Conference Calls - monthly, now biweekly
• Personnel Changes (Altalo, Dantzler, Cohen)
• Vacant Expert Teams
• No funds until 2007? National Focus First?
• Outside Engineering Studies (Raytheon, Lockheed +Martin+SURA+JOI)
• NOAA is doing their own Standards Study
DMAC RA Caucus

• Input from RA’s
• Mechanism for 2-way direct communication
• Membership for Tech Types
• Maybe $20K for one face-to-face
• Highly effective, or just another meeting?
NFRA

• Meeting 9-10 March 2006 in D.C.
• Bylaws, Election of Officers
• RA Needs Assessment
• Draft Certification Process
  – Levels of certification
  – Performance objectives
• IOOS Accomplishments & Goals
It it likely that

• IOOS resources for regional Data Management activities will be limited.
• Detailed DMAC specifications will be slow to arrive.
I’m tired of waiting. Let’s go kill something.

With acknowledgement and apologies to Gary Larson of the Far Side.
Regional Operation Center

Suggested Functions and Elements of a Regional Operations Center within an IOOS Regional Association

General Functions of a Regional Operations Center (ROC)

The primary function of the GCOOS ROC is to monitor and report the availability of all near real-time data streams and regularly-produced products offered by provider members of the GCOOS-RA.

The ROC will be staffed twenty four hours a day, seven days a week (24/7) and act as a central point of information, contact, and feedback for users and providers on all issues related to the current availability, inventory, and status of the region's data and product generating elements.

The centralized monitoring function of the ROC will ensure that each provider's implementation of the DMAC Plan's system architecture and best practices meets the interoperability requirements of IOOS. In this regard the ROC can act as a test bed for new and established contributors to test their delivery systems for conformance with DMAC requirements.
The ROC, in concert with the GCOOS-RA DMAC Coordinator, will foster usage and interoperability by making technology transfers to providers and users with limited Information Technology (IT) resources, and by striving to harmonize the ways in which all providers offer their data and products.

The ROC will generate metrics on both the availability of and access to data and products and will compile feedback regarding levels of satisfaction and experiences derived from users and providers. These metrics will be used to gauge the effectiveness of the system and to generate reports.

In the course of serving its primary function, the ROC will be involved in various aspects of quality-control/assurance (QA/QC) as well as generation and use of detailed metadata. It can offer useful services to both users and providers.
Regional Operations Center (cont.)

The ROC is not a data center, assembly center, archive center, modeling center, nor science products generating center. The ROC will not serve data or model output. The ROC will play no role in legacy data sets. However, because the ROC will attempt to harmonize access to data and products and will maintain a comprehensive set of web links to data and products, it should become a popular access point to data and products. While this is valuable to the consumer, it also has the potential to obscure the sources. Most providers require a certain amount of visibility to satisfy their sponsors and promote continued funding. With that requirement in mind, any public web pages hosted by the ROC will emphasize and credit the organization providing the data or products.
Operations Centers

Aggie, Rutgers, NWS
I believe...

• there is a considerable amount of IT talent resident in the observatories.
• this talent is agile & able, but dispersed & has limited extra time.
• groups like this one and OOSTech can take the reigns and lead the way.
• in the power of networking
• we are going to have to do this ourselves.
Metadata is Central to Interoperability - Why is it such a problem?

• The person in the best position to produce metadata has the least need for it.
• Creating detailed metadata is boring, labor intensive, and not in the budget.
Things we should do now.

• Inventory your observatory down to the sensor level - put this information in a flat ASCII file.
• Consider using similar nomenclature for measured parameters.
• Get your real-time data online via a web service - Currents first if you have them.
• Lobby for adequate funding for DM
Things to do tonight.

• Visit the bar before and after dinner.
• Make NEW friends.
• Tell each other your strengths and desires.
• Make and keep a promise.
• Stone Soup
The Story of Data Soup

Once upon a time, somewhere in the post-dotcom bust in the South Eastern U.S., there was a great famine in which people jealously hoarded whatever data they could find, hiding it even from their friends and neighbors. One day a wandering data manager came into a village and began asking questions as if he planned to stay for the night. "There's not a byte to download in the whole province," he was told. "Better keep moving on."

Oh, I have all the data I need," he said. "In fact, I was thinking of making some products to share with all of you." He pulled an laptop from his wagon, opened it up, and plugged it in. Then, with great ceremony, he drew an ordinary-looking USB stick from a velvet bag and plugged it into the port on the side.

By now, hearing the rumor of data and products, most of the villagers had come to the square or watched from their windows. As the manager typed and licked his lips in anticipation, hunger began to overcome their skepticism. "Ahh," the manager said to himself rather loudly, "I do like a beautiful bathymetry. Of course, data soup with current vectors -- that's hard to beat." Soon a villager approached hesitantly, holding a URL he'd retrieved from its hiding place, and added it to the list. "Capital!" cried the manager. "You know, I once had data soup with current vectors and wind fields as well, and it was fit for a king." The village met dude managed to find some wind fields . . . and so it went, through SST’s, moored data, geochemical variables, wave heights, and so on, until there was indeed a delicious display for all. The villagers offered the manager a great deal of money for the magic USB stick, but he refused to sell and traveled on the next day. The moral is that by working together, with everyone contributing what they can, a greater good is achieved.