

Bi-Weekly Z-GRAM 6 March 2009

www.IOOS.noaa.gov

The Z-gram is an informal way of keeping you up-to-date on IOOS® activities. Please advise of additional addressees, or if you are receiving and no longer want to receive. If you think others could benefit from the Z-gram please pass it on. To see previous Z-grams go the IOOS Website under program updates

IOOS® - Our Eyes On Our Oceans, Coasts and Great Lakes.

Programmatics:

- NOAA IOOS Program:
 - Farewells: We said goodbye to Tracey McCray and Kurt Nelson who were both on detail with us. Tracey McCray will now work within NOAA's CIO's office. Kurt returns to the Oceanographer/Navigator of the Navy Staff. We really enjoyed having Tracey and Kurt as valuable members of the IOOS Program and the projects they worked on helped us to move the IOOS program forward. Thank you.
 - Hail: We welcome Nicole Giancursio, my new administrative assistant, who took Melanie's place. Nicole hails from New York and, when not with us in IOOS, is completing a masters in international studies at American University.
- Congressional Report: Remains under review with the Department of Commerce
- FY09: A new CR was passed and lasts through this upcoming week. The conference report was passed by the House and is publicly available. Given the numbers contained in that report, we will begin to process the Regional competed cooperative agreements. NOAA/CSC will continue to help the IOOS office process these awards for this year and the due date remains 29 March. The RA planning agreements, as we have stated before, will be funded at FY08 levels and since that is 100% no additional effort is needed by the Regional Associations. Within NOAA, I need to wait until I have FY09 accounting lines to process these agreements. We will have NOAA/CSC and my lead Gabrielle contact each of the PI's to outline what needs to be done in the next 21 days to fund these awards to the FY08 levels. This should not be a surprise as we have been talking about this potential scenario since our December 2008 Regional meeting. Let me say thank you in advance to the effort you will expend over the next 2 weeks to get all of this paperwork in by the end of the month.
- FY10: The Administration released its top level FY10 budget, details will be released in April.
- FY11-15: **No change**
- FY12-16: **No change**

Initial Operating Capability - Data Management and Communications (DMAC) subsystem of IOOS®

In FY09 we are focused on 6 areas for this subsystem: (1) Data Integration Framework (DIF) support to Customer Applications: Harmful Algal Blooms forecast system (HAB-FS), Integrated

Ecosystem Assessments (IEAs), Coastal Inundation (CI), and Hurricane Intensity; (2) DIF Regional Implementation; (3) DIF Evolution & Enhancements; (4) Development of the best approach to DMAC; (5) High Frequency Radar (HFR) – A National Network, and; (6) Continue strong support, with the Interagency Working Group on Ocean Observations (IWGOO), to the IOOS DMAC Standards Process and working with the DMAC Steering team and the first 5 areas.

- IOOS DMAC Standards Process: DMAC Steering Team meeting will be held in May 2009: Get Involved: <http://ioosdmac.fedworx.org/ioos/dmac.nsf/WhatsNew?OpenForm>
- What the DIF: For all documents and information, please visit the www.ioos.noaa.gov website and hit the button that says IOOS Data.
 - Coastal Inundation Project: The SLOSH display has been enhanced with time series plots of Center for Operational Oceanographic Products and Services (CO-OPS) water level predictions, an option to display time series plots of water levels in either NAVD88 or MLLW, and time series plots of National Data Buoy Center (NDBC) winds. Customers can now see time series plots of water level observations and predictions on the same display as time series plots of winds from two sources - NDBC C-MAN stations and CO-OPS winds at tide stations. Previously, users had to call up and plot each of these sources separately and visualize how the data should be combined. The next step will be to add the storm surge file to the SLOSH display and add coastline details, labels for towns and cities, and other TPC requirements. Rich Signell, Marcia Weaks, and Mary Erickson met to discuss delivery of IOOS regional forecast data to the National Hurricane Center as CF-compliant OPeNDAP (DIF/DMAC standard).
 - Coordination Conference call for Regional IOOS-Funded Coastal Inundation Project: The IOOS Program Office, in collaboration with National Federation of Regional Association's (NFRA) Josie Quintrell, initiated a monthly coordination conference call for the Principle Investigators and interested partners of regional IOOS-funded coastal inundation projects. All key PIs attended the first call, as well as several NOAA inundation/surge experts.
 - **DIF Enhancements - Guide for DIF Data Providers:** Updates are being made on the data providers guide based on recent discussions, Carmel/Alex have researched potential methods for establishing a wiki for the Data Provider Guide; established two such wikis on the public internet for test. **Ocean Color Test Plan:** Work is progressing toward a finalized Ocean Color Test Plan. **Draft Metadata Template:** A draft Template for summary metadata about water level network data was provided by Jeff. This needs to be finalized and implemented at CO-OPS.
 - **Data Provider Implementation:** We have finalized the statement of work with NDBC to include the following tasks: Access to data from multiple stations in single request; Efficient support for data harvesting by Google Oceans, and; Automated sending of data to subscribers for tsunami alerts.
- DMAC “**Industry Day**”: The goal of this industry day is provide a program status to industry and set the stage for follow-on market research by the program. The Announcement published: NOAA/NOS Grants & Acquisition posted an official announcement on Dec 30th on the Federal Business Opportunities (FedBizOps) website for the public meeting we will

conduct on March 12, 2009 in the NOAA Auditorium. The announcement can be accessed at:

https://www.fbo.gov/spg/DOC/NOAA/AGAMD/IOOS_DMAMC_Briefing/listing.html

- NOAA along with Senior Staff from Environmental Protection Agency (EPA), United States Army Corps of Engineers (USACOE), United States Geological Survey (USGS), and US Navy will provide briefings on IOOS and related activities.
- The High-Level Functional Requirements & DMAMC Con-Ops reports are now available on the IOOS website: <http://ioos.noaa.gov/dif/> under the header Data Management and Communications Documents.

Interagency Project Collaboration: The Z-grams are certainly focused on providing information on IOOS connections to these projects and it is not intended to provide programmatic updates of these specific projects because all of them have project leads.

- **Army Corps of Engineers collaboration on a National Waves Plan:** I know we keep promising the plan and we are going to get there, we need to take time to do the final edit changes to ensure this first plan is correct.
- **GODAE Server MOA:** No change
- **Interagency Working Group on Ocean Observations (IWGOO) Sponsoring "Small Sea Changes: Big Business Impacts" Workshop:** The IWGOO is sponsoring a workshop in Silver Spring, Maryland on 14 April 2009 entitled "Small Sea Changes: Big Business Impacts". The purpose of this workshop is to engage private industry and communicate the value of ocean science and ocean observations to business decision-making. The target audience is senior decision makers from the agriculture, aviation, construction, energy, finance, fishing, health care, insurance, leisure and tourism, manufacturing, mining, retail, transportation and utility sectors. This workshop will explore the improved business decision support that IOOS can facilitate. For the ocean science community, this workshop provides an opportunity to identify a cadre of industry professionals willing to support the need for ocean science and the Integrated Ocean Observation System. For industry, this workshop will explore the opportunities for better business decisions through examining the connection between weather forecasts, climate projections, and ocean observations. The workshop flyer, registration, and additional information are available at <http://www.oceanleadership.org/iwgoo>.
- **Interagency Modeling Activities:** Rich Signell created a Google Group for discussing IOOS Model Data Interoperability. A place for technical discussion of standards, APIs, servers and clients for model data interoperability, including but not limited to CF Conventions, THREDDS Data Server installation and configuration, the use of NcML and NetCDF-Java, Matlab CF Toolbox and more. This was created for the RA modeling reps, but an invitation is extended to anyone interested in promoting model data interoperability. Visit http://groups.google.com/group/ioos_model_data_interop to join. Rich also set up a new THREDDS Server in the SECOORA region at NC STATE to serve Nowcast/Forecast ROMS results of the South Atlantic Bight and Gulf of Mexico.
- **High Frequency Radar:**
 - HFR plan - Jack Harlan is hard at work addressing the many comments we have received.
 - ROWG meeting registration site will up soon.

- Jack is also working with the Office of Radio Frequency Management (ORFM) and the Department of Defense Frequency Spectrum Office over objections to the NOAA HFR.
- **IOOS and Links to the National Water Quality Monitoring Network:** During our monthly conference call, discussions continue to improve interoperability and integration of water quality data. On the most recent call, EPA identified a need to improve on present capability for handling time-series data. This discussion led to an agreement that EPA should be more involved with ongoing NOAA IOOS DIF-USGS-CUAHSI (WaterML) discussions to provide input on requirements they may have for time-series data as we move toward possible convergence. Jeff DLB will draft an email to CUAHSI to learn if other forums exist, which this group can engage, that are holding similar conversations.

Other:

- **Southern California Coastal Ocean Observing System (SCCOOS) - Strategic Advisory Group meeting 24 February:** Well done to SCCOOS. I was only able to participate during the morning but I was pleased to see the morning briefings that set up SCCOOS activities and how they can support regional stakeholders. The briefs in the morning were about understanding SCCOOS current support and setting up questions for the afternoon breakout sessions. Dr. Russ Davis discussed the current Climate Observations available through SCCOOS and leveraged ocean observation programs and the importance of data assimilation on the ability to infer habitat and using High Frequency Radar (HFR)'s to describe Bight-wide current patters for larval dispersion. Dr. George Roberston discussed the need for long term observations and monitoring and how it can provide a foundation for infrastructure funding decisions. He highlighted the use of SCCOOS data for routine monitoring for water quality and plume tracking. Dr. Dave Caron described the efforts that the SCCOOS RCOOS cooperative agreement is supporting for the Harmful Algal Bloom monitoring and data management efforts for a HAB portal and how this leverages the National HAB programs. Dr. Eric Terrill, talked about the need for ocean data in the planning, response and post-event scenarios for oil spills. Ocean observing data and information is critical to all phases, but Eric discussed the importance of ensuring that IOOS is included in the National and State procedures in a way that is useful for them. Dr. Steve Ramp, Director CeNCOOS talked about the great cooperation between SCCOOS and CeNCOOS and the commitment to share all products and services that are developed. Dr Julie Thomas completed the morning discussing the importance of IOOS data and information to the Maritime Transportation community from very large ships clearing Long Beach, Harbor with only inches to spare, to the need for wind and wave information for the Catalina Island ferry. I was able to stay for the very pleasant short sail on the Spirit of Dana Point. The SAG then spent the afternoon in really drilling down to that next level of required support. For more information and a copy of the slides please visit <http://sccoos.ucsd.edu/DanaPointFeb2009-SAC.html>
- **Great Lakes Stakeholders Roundtable - 25 February:** I joined Jack Dunnigan, NOAA's Assistant Administrator for Oceans and Coasts, and Jack Hayes, NOAA's Assistant Administrator for the National Weather Service, along with 3 of my fellow office directors as we listened to the Great Lakes Stakeholders needs. This event was sponsored by NOAA's Great Lakes Regional Collaboration and supported by IOOS - Great Lakes Observing System (GLOS). It was a wonderful session for us to listen to the

needs of the stakeholders, in particular from the maritime transportation community and the States' resource managers.

- **Making a Difference: Why Coastal Observing Matters:** We had a great turn out on the Hill for this important event. We were joined by a number of Congressional staffers who were treated to an outstanding panel of users of IOOS. Sincere thanks to our panel members: Jay Titlow, WeatherFlowInc started off the morning discussing the importance to ocean observing for storm forecasting and the partnership between industry, government, and academia. Then Richard Glenn, Co-Captain, Subsistence Whaling Crew, Barrow, AK explained this is about a way of life - truly about lives and livelihood. Then we heard from Ed Sherlock, Director, Annapolis Office of Emergency Management and Ric Dahlgren, Annapolis Harbor Master, who explained that they are the ones who have to deploy mitigation measures when a storm threatens Annapolis, how each decision is made first and foremost on the safety of citizens, but there are financial repercussions to each decision. Then Gary White, Director of Environmental Health Services, Macomb County, MI talked to us about how important IOOS is to safe drinking water. And last, but certainly not least, Nancy Rabalais, Director, Louisiana Universities Marine Consortium, gave us a up close and personal look on issues associated with Harmful Algal Bloom and Hypoxia. Mother Nature, i.e. March snow storm, prevented Alan Blumberg, Director, Center for Maritime Systems, Stevens Institute of Technology from joining us, but Josie (NFRA) provided several pictures on the support by IOOS Partner data and its use to the assist the recovery of Flight 1549 from the Hudson River. I was pleased to kick off this very important event and Molly McCammon, NFRA and Alaska Ocean Observing System (AOOS), did an excellent job facilitating this event and providing context. My sincere thanks to CAPT Brad Kearse, NOAA Office of Legislative Affairs; Kim Cohen and April Black, NOAA IOOS, and; Josie Quintrell, NFRA for setting up this event. Thanks to all who attended and continue to help us get the word out on the importance of ocean observing.
- **NFRA Board meeting and demonstration by SAIC:** The NOAA IOOS Office joined the National Federation for Regional Association board meeting to discuss FY09 plans. This was followed by a demonstration of data management efforts by SAIC. Sincere thanks to the hospitality by SAIC and demonstrations of their IOOS efforts through NDBC - DIF/QA/QC and CeNCOOS.
- **Consortium of Ocean Leadership (COL) Public Forum:** Many of us attended and participated in this important forum. COL put together 3 outstanding panels - ocean energy, climate and oceans and human health. The day was kicked off by Admiral (Retired) Watkins, who led off with a challenge to the ocean community to continue pressing hard. The panel members included the NOAA Deputy Under Secretary, Mary Glackin; Jack Dunnigan, AA NOS, and; staffers from supporting Congressional committees. This forum offers an important opportunity to discuss national issues of importance to the ocean community with this year's forum focusing on ocean energy, ocean effects on climate change and human health, and enhancing energy security. For more information see <http://oceanleadership.org/>
- **National Oceanographic Partnership Program (NOPP) seeks research proposals:** NOPP and the President's Interagency Committee on Ocean Science and Resource Management Integration (ICOSRMI) are currently seeking proposals meeting the goal of partnerships between at least two of the following three sectors: academia, industry

(including NGOs), and government. Research proposals are being solicited for three topics:

- Improving Wind Wave Predictions: Global to Regional Scales
- Sensors for measurement of Biological, Bio-Optical, Optical or Chemical Properties of the Ocean
- Improving Cyclone Intensity Forecasting

Submission deadline is April 10, 2009. For more information, refer to the full Broad Agency Announcement: <http://www.onr.navy.mil/02/baa/> - BAA # 09-012. Up to \$21.5 M over four years may be available for this solicitation, subject to appropriation and final approval by the Interagency Working Group on Ocean Partnerships of the ICOSRMI. For more info: NOPPO@oceanleadership.org.

- **HEADS UP - REQUEST YOUR SUPPORT: Oceans 2009 – Biloxi, MS (October 26-29, 2009):** We began coordination with Dick Crout, heading the Technical Program about having a IOOS track during this meeting. We will be working with Dick and Bill Burnett on the details, but I would like to ask as many of the Regions who are able, to consider providing a paper on the IOOS products/services you are providing within your region. Details to follow soon.
- **Meeting with CEO of Atmocean, INC:** I met with Philip Kithil, CEO of Atmocean, on his project to provide free-drifting sea anchor stabilized buoys for ocean measuring. His next test will be off the coast of San Diego. Attached is a brief description of his project. For more information please contact Philip directly: Atmocean, Inc, www.atmocean.com; pkithil@earthlink.net; Voice/mobile: 505-310-2294

Congressional:

- S22: Remains on the House schedule.

Communications:

- Smithsonian Ocean Hall video - IOOS supporting the identification and forecast for Harmful Algal Blooms - went up in the museum kiosk on 1 March. Jennie is now working the formal process to get approval to use video for other purposes. Proposal for video #2 - IOOS supporting the better understanding of Sea Level Rise - was accepted by NOAA. We are working with NOAA's National Ocean Service (NOS) offices - National Geodetic Survey and CO-OPS.
- Check out NOS's website on IOOS partner support to the Miracle on the Hudson. This is also up on the NOAA World site http://www.noaaworld.noaa.gov/scitech/feb2009_scitech_6.html

Upcoming Meetings:

- 10-11 March: NOAA IOOS Regional DMAC Workshop, Silver Spring, MD
- 12 March: IOOS Industry Day - Silver Spring, MD - see above for details

- 23 March: Christening of "Scarlet Knight II" - Rutgers University, we have invited senior NOAA leadership and local Congressional delegation to join us to bid the Rutgers students second attempt to cross the Atlantic. Jennie and I will be on hand for this event
- 6-7 April: GLOS annual meeting - Zdenka will attend
- 14 April: Small Sea Change: Big Business Impacts - IWGOO IOOS sponsored workshop. Silver Spring - A workshop to explore how enhanced understanding of the oceans improves weather and climate prediction enabling better informed business decisions. For more information: <http://www.oceanleadership.org/iwgoo>

Cheers,
Zdenka

Project To Provide Economic Globally Distributed Ocean Observatories

Project Description. To document the interaction of mankind with the ocean ecology, many more observations of the ocean are needed, yet given the vast scale of the oceans, expensive moored 'science stations' cannot provide the desired widespread coverage within a reasonable budget.

We propose a network of free-drifting sea-anchor-stabilized buoys which are economic by virtue of simple design, and financially supported by multiple public and commercial funding sources.

Reminder of the Scale of the Ocean Sensing Challenge

38,500 fixed-location ocean observing stations distributed across earth's 385 million km² of open ocean would provide, on average, one station per 10,000 km² – an area slightly less than one degree of latitude and longitude at the equator. Even were the cost of such stations in the \$50,000 range, the total cost to obtain this degree of coverage in the open ocean would be unaffordable at close to \$2 billion. Reasonable cost can only be achieved by both allowing the buoys to free-drift, and finding a way to subsidize their cost from commercial use.

By renting space on our buoys for scientific instruments, echosounders, CO₂ measurements, and other ocean measuring needs, the project accrues revenues from several sources so each user pays much less than they would pay for their own dedicated mid-ocean sensor platform.

By providing a platform for "measurements-of-opportunity", this project can significantly increase scientific knowledge of the oceans, to improve accuracy of ocean models and gain better understanding of climate change effects, improving fisheries management, atmospheric-oceanic interaction, weather forecasting, and much more.

By stabilizing the drifting buoys using the proposed Atmocean upwelling sea anchor, a much slower drift rate is expected since the currents are averaged from surface to 200m depth.

Ocean Observatory Description. Each buoy consists of closed cell foam formed in a cylinder 5' diameter by 6' long, with approximate buoyancy of 6,500 pounds. The top side of each buoy will be outfitted with GPS and telemetry. The bottom side of each buoy will have attached Atmocean's upwelling sea-anchor, comprising approximately 10 pairs of horizontal plates linked by a ~200m galvanized vinyl-coated steel cable. This sea anchor will insure the GPS/telemetry on the top of the buoy remains upright even when subjected to large waves. The horizontal plates, spaced at ~15m intervals from -50m to -200m, are hinged to allow the buoy to rise and fall on each wave, and to provide



slight upward mixing of nutrients. Delivery of nutrients to the euphotic zone over time could help replenish phytoplankton, the base of the ocean food chain.

Telemetry Driven Data Collection and Sensor Opportunities

Commercial applications will include basic sensing needs as well as more advanced sensing such as pCO₂ (surface and at depth), nutrient concentrations (nitrate, phosphate), and plankton mapping.

Experience With Free Drifting Instrumented Buoys. We have conducted 20 ocean tests of our free-floating buoys & gear, gaining practical experience and adopting improvements. The buoys and underwater components are relatively simple. The buoy, constructed of closed cell foam, readily allows insertion/attachment of various instrument groupings. The buoys are kept upright by the sea anchor effect of the apparatus suspended beneath. In previous sea trials, data collection was executed using data loggers and the buoys were retrieved to collect the stored data. The proposed system will instead log data for efficient satellite transmission.



Figure 2a. Buoys at assembly site



Figure 2b. Lifting buoys onto ship



Figure 2c. Buoys ready for deployment.

Seen in figures 2a-b-c are the buoys used in recent sea trials. Sensors included two types of temperature sensors (Onset Computer Corp. HOBO Tidbit and RBR), and a 3 axis acoustic current meter (MAVS3). In these tests the units were recovered two weeks after deployment, using Argos locating device and beacon. These and previous tests have established the deployment strategies and costs, retrieval techniques, and the basic durability of the buoy design.

Summary. A novel approach is proposed where free-floating buoys, deployed primarily for commercial applications, are instrumented to collect and return scientifically significant data via satellite-based telemetry providing a subsidized and therefore affordable strategy to achieve high ocean coverage. The data acquired can supplement that obtained from more detailed, and more expensive, fixed location ocean sensing projects, as well as space-based platforms.

For more information, please contact:

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