

## **National IOOS HF Radar Steering Team Inaugural Meeting**

### **Meeting Notes**

**July 28 2010**

### **Consortium for Ocean Leadership offices in Washington, DC**

#### **Steering Committee Attendees:**

Larry Atkinson	(Regional representative)
Don Barrick	(Technical expert and private industry representative)
Bill Birkemeier	(US Army Corps of Engineers)
Patrick Burke	(NOAA CO-OPS)
Bill Burnett	(NOAA NDBC)
Scott Glenn	(Regional representative)
Jack Harlan	(NOAA IOOS)
Ming Ji	(NOAA NWS Ocean Prediction Center)
Mike Kosro	(Technical expert)
Rich Patchen	(NOAA Coast Survey Development Lab)
Jeffrey Paduan	(Regional representative)

#### **Other Attendees:**

Josie Quintrell	(National Federation of Regional Associations for Coastal and Ocean Observing; until first break)
Suzanne Skelley	(NOAA IOOS; until first break)
Josh Young	(Consortium for Ocean Leadership; afternoon session)

Note that three of the six regional coastal ocean observing systems (RCOOS) representatives were unable to attend.

#### **Deepwater Horizon Overview**

After introductions, Jack Harlan and Suzanne Skelley gave an overview of some of the legislative and budgetary activities that have occurred due to the Deepwater Horizon spill. The Team had numerous questions and much discussion was held.

Here are brief summaries of those events:

- May 3: 1) NOAA asked to gauge requests for supplemental funding  
i.e., unanticipated expenses for FY10 e.g. staff time for responders  
2) Spill-related projects in future; need for 8 more radars in GoM

Jun 9: Doug Helton (OR&R) briefs House COMMITTEE ON SCIENCE AND TECHNOLOGY RESEARCH AND TECHNOLOGY NEEDS FOR OIL SPILL RECOVERY

Testimony (written) mentions HF and GCOOS efforts;  
need for more HF and other obs

Jun 15: Dave Kennedy (NOS Asst Admin) briefs House Natural Resources Committee's Subcommittee on INSULAR AFFAIRS, OCEANS, AND WILDLIFE

Testimony (written) mentions HF, GCOOS, SECOORA AND IOOS  
Future impact of a growing network.  
Not a request-for-funds venue.

Jul 20: Navy-NOAA memo re assets for cleanup available; Jane Lubchenco to Sec of the Navy Mabus

Congress: CLEAR (Consolidated Land, Energy, and Aquatic Resources) Act H.R.3534 which may have language to apportion some funds from a tax (ORCA) on oil that would go towards improved ocean research

National Endowment for the Oceans (Senators Whitehouse (D-RI), Snowe (R-ME), and Rockefeller (D-WV), sponsors)

Intended to provide a stable funding source to support stewardship of our oceans  
Funded from fines collected for violations of Federal law that occur in the oceans, interest from the Oil Spill Liability Trust Fund, and revenues from offshore energy development

President's National Ocean Policy where IOOS is essentially mentioned as one (#9) of the "national priority objectives".

### **Terms of Reference**

The Terms of Reference document was discussed and modified extensively. The primary substance of the document was agreed upon and Jack Harlan was tasked to do some further editing and then to distribute it among the Steering Team for review before a final version is accepted.

### **Afternoon Session**

The two topics indicated in the original Agenda, Freshwater HF Radar and Wave Measurement by HF Radar, were discussed in the afternoon session.

### **Freshwater HF Radar**

The Team discussed some of the existing body of 35+ years of research done in freshwater including the Fernandez et al (2000) paper that describes field work in Lake Michigan and Lake Tahoe; the work done by Vesecky, Meadows and others in Lake

Michigan; and the work done by Babakov et al (2009) in the Baltic Sea. It was also proposed that NOAA CO-OPS provide expertise and experience in evaluating non-HF radar sensors for Great Lakes surface current measurement.

A tiger team of the following members was proposed:

Jeff Paduan (Lead, Naval Postgraduate School) who was a co-author on the Fernandez paper

Teresa Garner (Old Dominion University) who has done some recent work in low salinity conditions in Chesapeake Bay

Chad Whelan (Codar Ocean Sensors Ltd) who has extensive experience in data analysis of the Codar and OSCR radars

GLOS member(s) TBD; Jack Harlan will contact Jen Read, Exec Dir of GLOS, for candidates

This tiger team report was envisioned as a 3-month effort.

### **Wave Measurement with HF Radar**

The Team discussed some of the existing body of research on the extraction of waves from the 2nd-order portion of the HF radar Doppler spectrum. It was pointed out that the 2nd-order portion of the spectrum fades in amplitude with distance from the radar causing the wave measurement capability to be applicable for much shorter distances than that for ocean current measurement. Additionally, the averaging and processing time for wave extraction is much longer than for currents which may hinder its practicality for operations. Spatially, there are limitations, especially with a Codar SeaSonde system, which provides a single measurement at a single range.

While the IOOS National Waves Plan calls for, at a minimum, the first five Fourier coefficients of the wave directional spectrum, there was agreement that presently HF radars have not shown that capability in an operational sense despite decades of research effort. However, the capability to provide some reduced capability for wave parameters such as peak wave height, wave period or wave direction was seen to be of potential value and should be investigated by the tiger team.

It was also suggested that, in some areas, waves are a more important parameter to the maritime community than are currents. Another suggestion was that even the reduced wave parameters from HF could inform wave model forecasts. Additionally, it was noted that the relatively long term wave measurements from some HF radars may have applicability for the climate modeling community.

A tiger team of the following members was proposed:

Don Barrick (Lead, Codar Ocean Sensors, Ltd)

Bill Burnett NOAA NDBC who was a co-lead on the IOOS National Waves Plan

Josh Kohut Rutgers who has experience in evaluating Codar SeaSonde-derived wave data

Brian Haus U Miami-RSMAS who has experience in evaluating WERA-derived wave data

Pat Burke NOAA CO-OPS who has experience with operational *in situ* wave buoys

One of the following three:

- 1) Hendrik Tolman NOAA NCEP who is probably the leading NOAA wave modeler
- 2) Bill O'Reilly UCSD-CDIP who has a west coast wave model that assimilates RT wave buoy data
- 3) Bob Jensen USACE who was a co-lead on the IOOS National Waves Plan and has extensive experience

This tiger team report is seen as a 6-month effort.

### **Additional Topics**

During the afternoon break, two additional Tiger Team topics were proposed and later brought before the entire Steering Team. These were:

- 1) Model & Assimilation of HF radar data
- 2) Creating a document outlining the technical reasons for a national HF radar network

### **1) Modeling & Assimilation of HF radar data**

Some of the points to be considered by the tiger team are:

- Impacts to model results
- Multiple time scales for forecasts
- National Surface Current Mapping Plan as a starting point
- 2010 Meeting of the Americas session in Brazil on coastal forecasting & HF radar

Rich Patchen (Lead, NOAA Coast Survey Development Lab)

Brian Zelenke (Cal Poly San Luis Obispo)

Yi Chao (NASA Jet Propulsion Lab)

John Wilkin (Rutgers)

Alan Blumberg (Stevens Institute of Technology)

Alex Kurapov (Oregon State)

John Allean (Oregon State)

Changsheng Chen (U Mass-Dartmouth)

Jim Cummings (NRL-Monterey) (added by Harlan who had been in contact with Jim prior to the HF Steam mtg)

CO-OPS (Pat Burke will canvass CO-OPS for an operational modeling rep)

This tiger team report is envisioned as a 6-month effort.

## **2) Technical reasons for a national HF radar network**

The operative word is "national" rather than having a collection of regional networks of varying capability. The benefits include having a uniform capability for regional spill response and for search & rescue. Part of the impetus for this was the consensus opinion that having a specific budget line dedicated to HF radar would be beneficial to a robust network.

A lively debate ensued about how programmatic and technicals overlap. In the end, it was decided that this topic could be addressed in a reasonable manner from a technical viewpoint. This report was identified as something that needs to be finished while the DWH spill issue is still at the forefront.

Some of the points to be addressed include:

- Lessons learned wrt DWH
- Lessons learned update wrt National Surface Current Mapping Plan
- National budget line separate from RCOOSes

### Members

Scott Glenn (Lead)

Stephan Howden

Jack Harlan

Dick Crout

Rich Patchen/Pat Burke

Eric Terrill

Entire ST will be asked to have input

This tiger team report is envisioned to require, at most, 3 months.

### **References**

Fernandez, D.M., L.A. Meadows, J.F. Vesecky, C.C. Teague, J.D. Paduan and P. Hansen, Surface Current Measurements by HF Radar in Freshwater Lakes, *IEEE J. Oceanic Eng.*, vol. 25, pp. 458-471, October 2000.

Babakov, A., B. Chubarenko, V. Gorbatsky, V. Sivkov, E. Gurova, [Surface currents at Kaliningrad oblast coast according to Codar remote sensing data](#), Baltic Sea Science Conference, Tallin, Estonia, 2009.