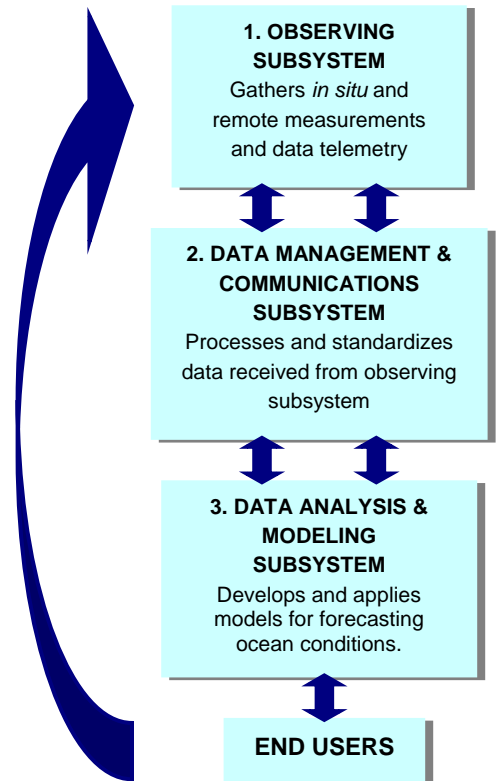


# IOOS and United States Coast Guard Oil Spill Response

## What does IOOS do?

IOOS (Integrated Ocean Observing System) is a **multidisciplinary** system designed to provide ocean and coastal data in the formats, rates, and scales required for decision-making, based initially on the **integration** of existing private, federal, state, and local systems. For example, IOOS information on surface currents can help marine transportation in the oil and gas sector, and can be used to track the movement of oil spills. Consisting of three major subsystems (see figure at right), IOOS will constantly evolve according to user needs.

Currently, numerous ocean and weather data collection systems are maintained by scores of federal, state, and non-governmental agencies and organizations. IOOS is gathering these useful but disparate and isolated data sources into integrated systems, giving users ready access to all ocean-related data gathered by all possible sources. In addition, IOOS will allow any compilation of data specified by the user to be manipulated using myriad existing forecasting models, thereby turning raw numbers into actionable information relevant to the user's specific concerns. Finally, IOOS is seeking new research and enhancements to add to its already-extensive catalog of products. In this way, IOOS becomes a flexible, adaptable system capable of keeping up with new developments while maintaining the reliable delivery of data, analyses, and forecasting results. IOOS will focus initially on a series of high priorities.



## How can IOOS Help Improve Oil Spill Response?

In the aftermath of Hurricane Katrina in 2005, state and federal agencies alike were criticized across the board for their lack of preparedness and their unsatisfactory response to the disaster. However, the USCG was consistently praised by the media and Congress, and President George W. Bush awarded the entire service the Presidential Unit Citation for “gallantry, determination, and *esprit de corps* in accomplishing its mission under extremely difficult and hazardous conditions.”<sup>1</sup> Among the actions of the USCG that earned such accolades were strategically positioning essential people and resources several days before landfall, activating hundreds of reservists and deploying about 5,300 personnel, rescuing over 30,000 stranded people, and assisting with the response to nine reported oil spills.<sup>2</sup> Although a large part of any USCG disaster-response effort goes to search and rescue (SAR) activities, as demonstrated post-Katrina, the USCG must also find, repair, and/or replace aids to navigation (e.g., buoys, channel markers), locate and salvage damaged vessels, work with other agencies to re-establish safe and secure waterborne commerce, and help with the response to **disaster-related pollution** (e.g., oil spills). This last responsibility is one for which IOOS can be a beneficial enhancement for the USCG.

Off the coast of Texas, an array of nine current-measuring buoys makes up the **Texas Automated Buoy System (TABS)**. The primary mission of TABS is to **facilitate oil spill response and trajectory forecasting by providing real-time, near-surface offshore current observations and forecasts**. Originally deployed in 1995, TABS buoys report half-hourly observations every 3 hours under normal conditions and hourly during spill events. The buoys are also networked with hydrodynamic models, including the Princeton Ocean Model and the Regional Ocean Modeling System, which enable analysts to forecast the trajectory of the spill plume. This in turn enables the **more accurate deployment of response**

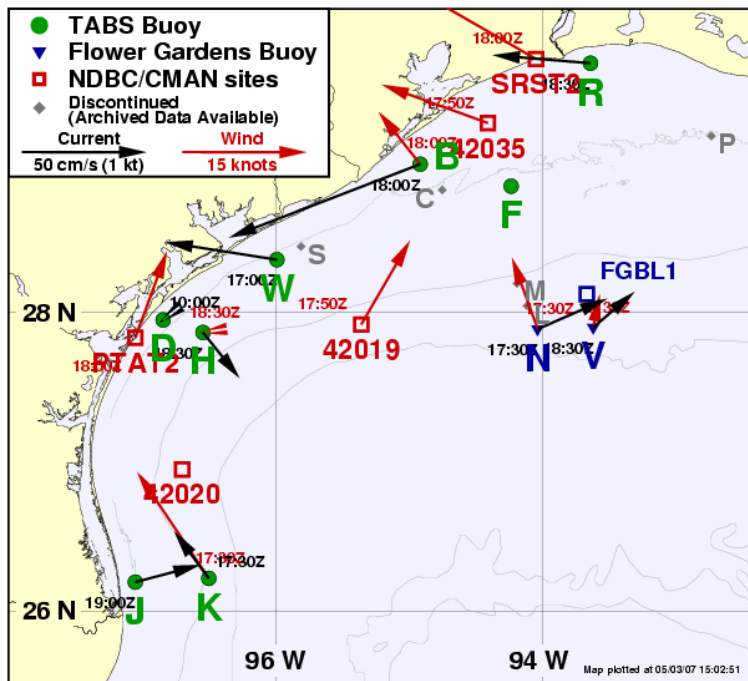
<sup>1</sup> USCG. 2006. Award of the Presidential Unit Citation to the Coast Guard. All Coast Guard (ALCOAST) Message 317/06.

[http://www.cgaux.info/g\\_pcx/publications/alcoast/alcoast-317-06.html](http://www.cgaux.info/g_pcx/publications/alcoast/alcoast-317-06.html)

<sup>2</sup> USCG. 2007. Fact Card: Coast Guard Response to Hurricane Katrina. [http://www.uscg.mil/hq/g-cp/comrel/factfile/Factcards/Hurricane\\_Katrina.htm](http://www.uscg.mil/hq/g-cp/comrel/factfile/Factcards/Hurricane_Katrina.htm)

**teams, thereby saving time and money.** A public website provides easy access to real-time data as well as immediate data analysis (see example map below).

Since 1995, the TABS network has provided critical data and analysis for more than 24 spill events, including the 1996 Buffalo Marine Barge spill near Galveston Bay. Due to prevailing wind and current patterns, the 3,000 barrels of spilled oil began moving originally to the southeast, then suddenly shifted to the northeast, putting Sabine Pass, Texas, in the bull's-eye. While contingency plans were being enacted in Sabine Pass, the TABS network detected another current shift within 2 hours of its occurrence, which moved the slick southwest. Modelers determined that this current pattern would hold for several days, allowing planners to focus their efforts back to the Galveston area. Without TABS data, 24 hours would have passed before the southwesterly current shift was detected, potentially leaving Galveston vulnerable and Sabine Pass unnecessarily protected from the spill impact. Estimates have put the **potential cost of unnecessary deployment to an area not at risk at \$225,000.**<sup>3</sup>



TABS Data from May 3, 2007 at 4:02pm,  
indicating wind speed and direction and current data.

Source: <http://tabs.gerg.tamu.edu/Tglo/>

TABS is not a stand-alone system; it represents breakthroughs enabled by a collection of integration efforts. Currently, TABS, NOAA's National Data Buoy Center (NDBC), oil platform operators, and sensor manufacturers cooperate to produce data and forecasts for emergency situations. Synergy occurred over time as Acoustic Doppler Current Profiler (ADCP) vendors, such as Teledyne RD Instruments, worked with oil industry representatives and government agencies to agree upon data reporting and exchange protocols that now achieve interoperability of recordings from a wide array of sites owned by different organizations. The General NOAA Oil Modeling Environment (GNOME) oil spill trajectory model used by NOAA's Office of Response and Restoration (OR&R) Emergency Response Division (ERD) makes some of these same observations available to responders, benefiting their work.

## What Can USCG and Other Maritime Operations Stakeholders Do?

The value added from the integrating and sustaining power of IOOS will only be realized with regional association **participation** and **data sharing**.

**Participation:** Maritime operators should get involved with an IOOS Regional Association (RA) ([www.ocean.us/regional\\_associations](http://www.ocean.us/regional_associations)). RAs are critical for engaging private and public user groups to identify regional data and information needs. Additionally, RAs can be high-value entry points for a user to get involved with specific IOOS pilot projects (many of which are happening right now) through which users help improve and refine IOOS. Pilot projects and RAs can facilitate data sharing, the cornerstone of IOOS, between previously unconnected parties. Even by sharing small amounts of data, users can reap significant benefits.

**Data Sharing:** Maritime operators should share data (e.g., weather information from vessel-based instruments or observations from offshore platforms) with federal, state, and local agencies. For instance, many oil platform operators already participate in sharing ADCP data in coordination with the NDBC and the TABS. These types of common data reporting and exchange protocols are key to helping IOOS achieve interoperability of data with broad utility without sacrificing protection of proprietary information.

<sup>3</sup> Guinasso, N., Yip, J., Reid, R., Bender, L., Howard, M., Lee, L., Walpert, J., Brooks, D., Hetland, R., and R. Martin, 2001. Observing and Forecasting Coastal Currents: Texas Automated Buoy System (TABS). MTS/IEEE Oceans 2001 Conference Proceedings.