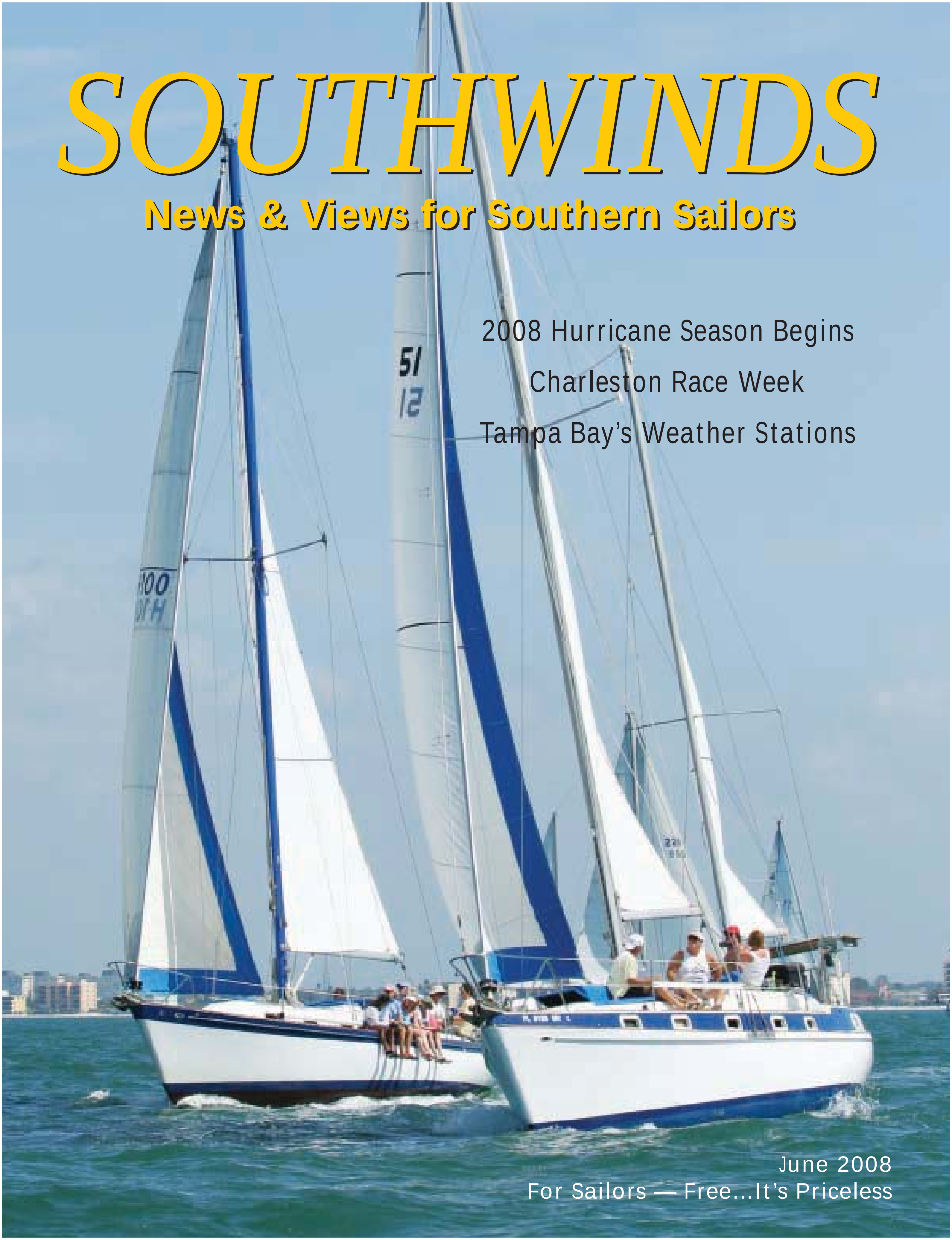
SOUTHWINDS

News & Views for Southern Sailors



2008 Hurricane Season Begins

Charleston Race Week

Tampa Bay's Weather Stations

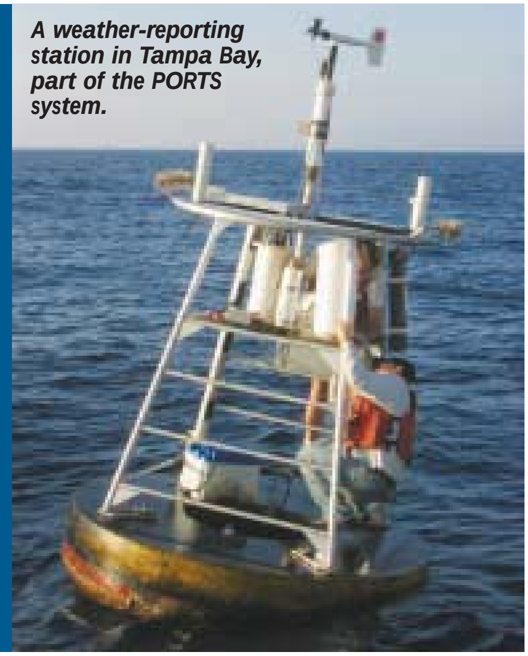
June 2008

For Sailors — Free...It's Priceless

PORTS, Tampa Bay's Real-Time Weather Reporting Stations: *Motivated by Disaster*

By Ali Hudon and Chris Simoniello

Photos by Chris Simoniello



A weather-reporting station in Tampa Bay, part of the PORTS system.

As the saying goes, necessity is the mother of invention. This was precisely the case leading to the creation of the Tampa Bay Physical Oceanographic Real-Time System (PORTS), a monitoring and prediction system designed to aid mariners traveling the shipping channel between the Port of Tampa and the Gulf of Mexico.

The original steel-cantilevered Sunshine Skyway Bridge opened in 1954, a 15-mile span of two lanes running in opposite directions from St. Petersburg to Bradenton. At this time, the ship channel had a vertical clearance of approximately 150 feet above the water and a width of approximately 750 feet. By 1971, a second parallel span was completed to compensate for increased traffic.

Preceding the infamous collision that destroyed the bridge in 1980, at least five weather-related incidents occurred in the immediate area of the Sunshine Skyway Bridge. Four of these were non-fatal, resulting only in minor damage to the bridge. The worst, however, was the collision of the freighter *Capricorn* and the U.S. Coast Guard cutter USS *Blackthorn* that resulted in the deaths of 23 crew members aboard the *Blackthorn*. The untimely fate of so many professional sailors emphasizes how treacherous navigating Tampa Bay waters can be.

Fatal Blow

The fatal blow to the original Sunshine Skyway Bridge came on the morning of May 9, 1980, at 0738. An unpredicted violent rain squall producing winds up to 40 knots left Capt. John Lerro, pilot of the phosphate freighter *Summit Venture*, with zero visibility. Finding himself more than 700 feet from the center of the channel, the vessel slammed into the #2 south pier of the southbound span, knocking 1261 feet of center span, cantilever, approach and roadway into Tampa Bay. Tragically, 35 people, most of them onboard a charter bus, plunged 150 feet to their deaths.

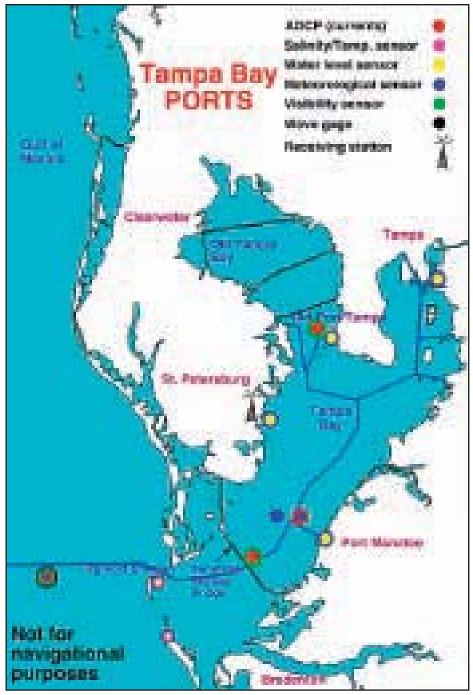
For seven years following the accident, traffic was rerouted onto the two-lane northbound span. Then, in April 1987, the new cable-stayed Sunshine Skyway Bridge opened with its recognizable golden triangles on the main span. With a vertical clearance of 193 feet and a main span of 1200 feet, it is equipped with 36 large concrete bumpers called dolphins, built to withstand impact from errant ships in the vicinity of the bridge's piers. Today, the original bridge serves as a fishing pier, with debris and rubble from the demolition providing reef structure.

One positive outcome of one of the worst bridge disasters in history was the installation of the Tampa Bay Physical Oceanographic Real-Time System, or PORTS, in 1992. PORTS is a marine information acquisition and dis-

PORTS, Tampa Bay's Real-Time Weather Reporting Stations

semination system developed by the National Oceanic and Atmospheric Administration's (NOAA's) National Ocean Service (NOS) in collaboration with the maritime community and the University of South Florida College of Marine Science.

PORTS consists of a network of 11 stations in and around Tampa Bay, including the Port of Tampa, Port Manatee, the Sunshine Skyway, and the C-Cut marker in the shipping channel. Each station collects real-time data on meteorological and/or water conditions, such as wind speed and direction, air and water temperature, current speed and direction, and water level. These data are collected every six minutes and are available in a variety of user-friendly formats, including telephone voice response and Internet.



The PORTS map showing the weather stations. This is taken from the PORTS Web page. You can click on a weather station to see the current conditions at that point.

Accurate Data Critical

Accurate wind and water level data are crucial, especially considering that traditional NOAA tide prediction tables account for astronomical tides and currents, but not the effects of water flow, wind, or other meteorological factors. These non-tidal forces in Tampa Bay can result in deviations from the predicted tides by as much as 100 minutes and up to 2.5 feet (0.762 meter)! Because the bay's tides and currents are strongly influenced by these non-tidal forces, PORTS provides important real-time information to both recreational boaters and professional mariners navigating the bay.

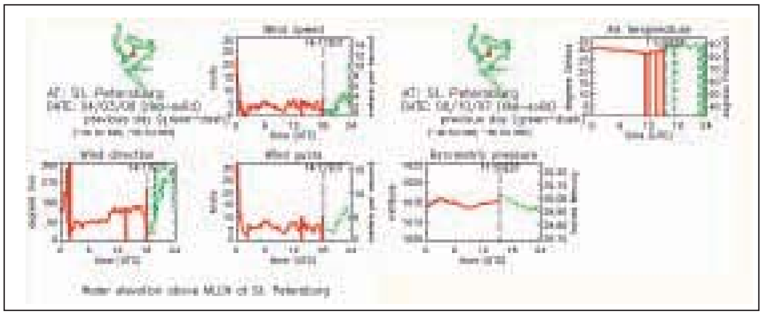
PORTS data are used routinely by environmental managers, industry, and maritime transportation companies in Tampa Bay. Access to real-time data allows port authorities and shipping operations to maximize the cargo load (and resulting profit) by taking into account the available clearance to the bottom, as well as the transit time. In fact, since becoming operational in 1992, PORTS has reduced the total number of ship groundings in Tampa Bay by 60 percent, improving navigational safety and protecting the environment.

Port authorities and the U.S. Coast Guard also make use of PORTS data in the Cooperative Vessel Traffic Service (CVTS), an international waterway management agreement. PORTS data routinely aids the Coast Guard in search-and-rescue missions, as well as environmental spill containment, and is currently being integrated into the Automatic Identification System (AIS) used to identify and track vessels. Additionally, PORTS provides data for numerical models to generate operational nowcasts and forecasts for water level.

Just One Example

Tampa Bay PORTS is just one example among many coastal ocean observing systems, or COOSs, that have been implemented or are being designed around the nation to support a variety of scientific, economic, management, and environmental needs. A COOS is a combination of instruments on coastal stations, buoys, satellites, ships, underwater vehicles (such as gliders or ROVs), and radars that are used to make observations of the ocean and the atmosphere at the air-sea interface. As with PORTS, many COOSs combine data with computer models to better understand and forecast marine conditions. The real-time *in situ* data not only provide local information, but serve to ground-truth the numerical models, which ultimately improves the accuracy and area of coverage over which forecasts can be made. Such systems that collect and disseminate accurate real-time information are becoming increasingly important, particularly for Florida and other states whose economies rely so heavily upon coastal-based tourism and marine industry (including boating, fishing, and aquaculture). Dr. Harvey Seim, chief operating officer for the Southeast Atlantic Coastal Ocean Observing System, summed it up best when he said "…the tremendous benefit in marrying satellite remote sensing and ship-based operations with offshore measures is that you can get all the information in one place in a consistent fashion."

Mike Watson, manager and lead forecaster for the East Coast office of Surfline.com, a comprehensive online provider of surf reports and forecasts from locations around the world, understands just how important wind and water measurements are to his customers. "Accurate wave measurements for the recreational beachgoer and surfer alike are vitally important. Not only are these important for the safety of the general public, these observations are important for the surfing population, often dictating which particular beach will or will not see breaking waves or surf." Likewise,



A typical current weather report at the PORTS Web page broadcasting information from a weather station in Tampa Bay.

commercial and recreational fishermen and charter services rely on real-time data, such as sea surface temperature, to more effectively focus their limited time and resources.

Coastal ocean observing systems are also being employed in the ongoing efforts to detect and track harmful algal blooms (or HABs) like red tide. Recently, the USF College of Marine Science and Mote Marine Laboratory signed an agreement to create the Mote Marine Research Institute at USF – a partnership aimed at addressing issues critical to the health of the state's coastal and ocean waters. Among these issues: expanding coastal ocean observing systems and creating new sensor technologies that increase our understanding of the causes of red tide blooms. The "Breve Buster," a continuous, automated detector that takes in water samples and identifies red tide by its light-absorbance pattern, is one example of a biological sensor that is being employed as part of a COOS. Developed by a team representing Mote Marine Lab, the Florida Marine Research Institute and the U.S. Department of Agriculture, it demonstrates the inter-organization collaboration needed for COOS to succeed.

Challenging Task

It is a challenging task to integrate so many different elements and form a merged information system, but that is exactly what is required to truly become integrated across territorial boundaries and across different academic and institutional cultures. In Florida, the Florida COOS Consortium was formed to knit together the diverse monitoring programs like PORTS operating along our coast. The consortium, a cooperative effort among academic and research communities, government and regulatory officials, and private sector providers, actively engages these groups in productive dialogues to identify funding and collaboration opportunities, and to provide a forum for the discussion of current and planned policy initiatives. To this end, the Florida COOS Consortium was actively involved in the development of the Florida Oceans and Coastal Resources Council's statewide prioritized research plan, which ranked funds for increases in the number and capabilities of coastal ocean observing system assets high on their list.

We've come a long way from the days of the Sunshine Skyway disaster, especially in terms of what information is available and who can access it. Today, sailors regularly call upon Tampa Bay PORTS to provide them with the most up-to-date wind speeds, and harbor pilots entering the bay on cargo ships view real-time PORTS data on shipboard computers. However, the story doesn't end here; in fact, it's just beginning. There are national and global efforts under way to develop an integrated network of offshore and coastal ocean observing systems and an equally impressive arsenal of new and exciting technologies to support these. The systems serve a variety of scientific and societal needs, among these more and better information to increase efficiency of marine transportation, enabling more informed decisionmaking that affects our lives, our property and our living and non-living marine resources.

For access to the PORTS weather buoy information, go to http://ompl.marine.usf.edu/PORTS/index.html. For Gulf weather stations, click on COMPS on that page.

Next time: Sharks, ships, and shores: how COOSs are being used around the nation and in our own backyard.

• Ali Hudon is the education and outreach coordinator for the Ocean Monitoring and Prediction Lab (OMPL) at the University of South Florida (USF) College of Marine Science. She is also the education and outreach coordinator for the Gulf Coast Partner of the Alliance for Coastal Technologies (ACT).

• Dr. Christina Simoniello has a Ph.D. in biological oceanography. She has conducted research in the Gulf of Mexico, Florida Keys, Exumas, and Southern Ocean and was on the faculty in the University of Florida Sea Grant College Program. She presently serves as the education and outreach coordinator for the Gulf of Mexico Coastal Ocean Observing System.