



**Committee on Transportation and Infrastructure
U.S. House of Representatives**

Bill Shuster
Chairman

Washington, DC 20515

Nick J. Rahall, III
Ranking Member

Christopher P. Bertram, Staff Director

January 31, 2014

James H. Zoia, Democrat Staff Director

SUMMARY OF SUBJECT MATTER

TO: Members, Subcommittee on Coast Guard and Maritime Transportation
FROM: Staff, Subcommittee on Coast Guard and Maritime Transportation
RE: Hearing on “Finding Your Way: The Future of Federal Navigation Programs”

PURPOSE

On Tuesday, February 4, 2014, at 10:00 a.m., in 2253 Rayburn House Office Building, the Subcommittee on Coast Guard and Maritime Transportation will hold a hearing to examine the future of federal navigation programs. The Subcommittee will hear from the United States Coast Guard, the United States Army Corps of Engineers (Corps), the National Oceanic and Atmospheric Administration (NOAA), and stakeholders representing industry and academia.

BACKGROUND

A safe, secure, and efficient marine transportation system is critical to the U.S. economy. Waterborne cargo and associated commercial activities contribute more than \$649 billion annually to the U.S. gross domestic product and sustain more than 13 million jobs. Nearly 100 percent of the volume of overseas trade enters or leaves the United States by vessels navigating the marine transportation system. Additionally, more than 22 million recreational boats in the United States generate an annual economic value of \$121.5 billion and support 964,000 direct and indirect American jobs. To facilitate the efficient movement of goods, protect the environment, and ensure the safety and security of the marine transportation system, the navigable waters of the United States are charted, marked, and maintained to assist in vessel navigation. The Coast Guard, the Corps, and NOAA each play integral roles in operating and maintaining the U.S. navigation system.

A major challenge facing the Nation is to improve the economic efficiency and competitiveness of the U.S. maritime sector, while reducing risks to life, property, and the coastal environment. The emergence of satellite and advanced telecommunication based navigation technologies presents new opportunities to improve the safety, security, and efficiency of the marine transportation system and reduce risks to the coastal environment. Implementation of these electronic navigation (e-navigation) technologies also poses challenges for both federal agencies and public and private maritime users.

NOAA

NOAA's National Ocean Service (NOS), specifically its Office of Coast Survey (Coast Survey), is responsible for conducting hydrographic surveys which measure the depths and bottom configurations of water bodies, translate survey data into nautical charts, manage the collection of such charts, and publish the charts for commercial and recreational vessel owners. The Coast Survey collects hydrographic survey data from NOAA's own fleet of survey vessels, from contracted private sector survey firms, and from other governmental navigation partners such as the Corps. The hydrographic survey data the Coast Survey collects is used to generate over a thousand nautical charts covering 95,000 miles of shoreline and 3.4 million square nautical miles of waters within the U.S. Exclusive Economic Zone.

Nautical charts provide mariners information on channel depths and configurations, natural and manmade obstructions to navigation, regulated navigation areas, security zones, and other information critical to safe navigation. The Coast Survey makes nautical charts available in several formats, including traditional paper charts and as downloadable data for incorporation into electronic chart systems. On January 2, 2014, the Coast Survey published a notice in the *Federal Register* informing the public that effective April 13, 2014, it will no longer publish charts, but will make "print-on-demand" charts available to the public on its website (FR 2013-31378).

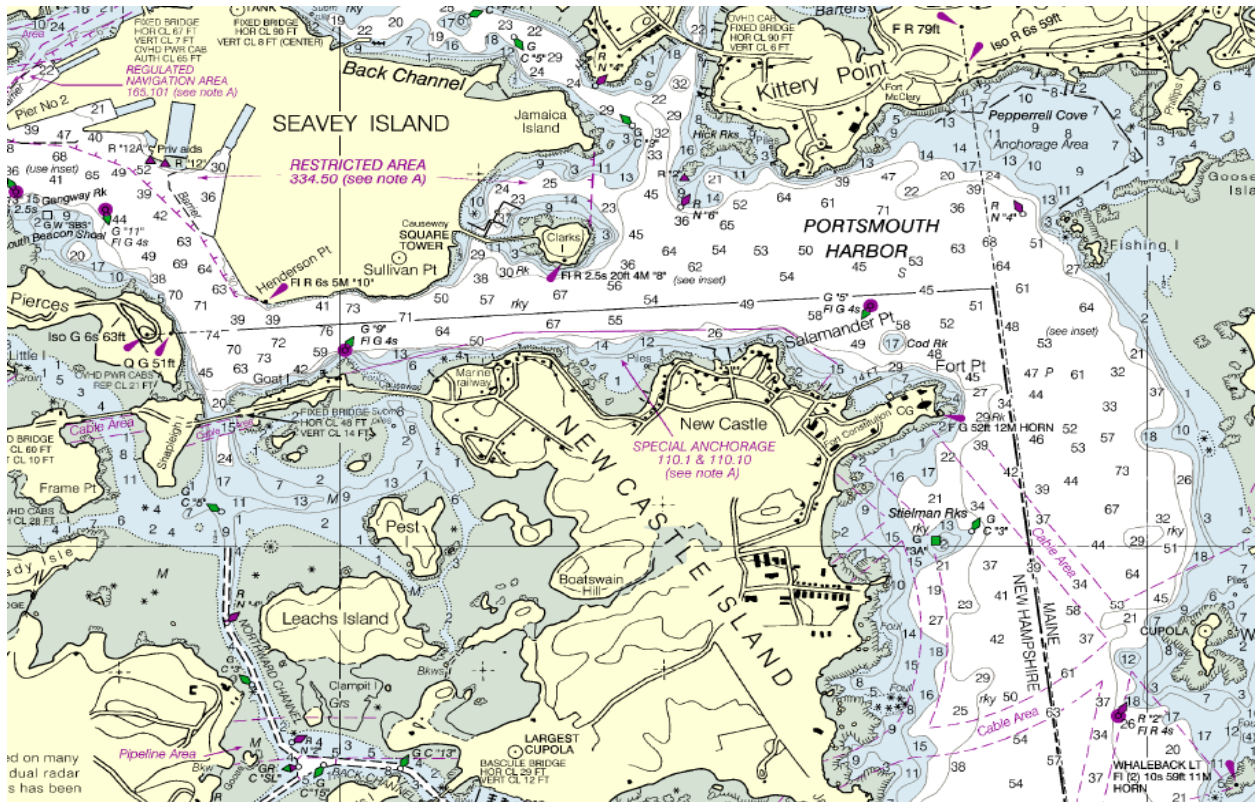
Since conditions on the water change constantly, the Coast Survey may update its collection of nautical charts 200 to 300 times a year. In addition to issuing updated chart information, the Coast Survey forwards the information about changes to its nautical charts to the Coast Guard for broadcast and publication in the Service's *Local Notice to Mariners*. This ensures mariners have the latest information about conditions on the water.

Two other NOS programs also provide important physical data and products that help inform and improve the accuracy and utility of NOAA's nautical charts:

- The National Geodetic Survey (NGS) - NGS develops and maintains the National Spatial Reference System, a national coordinate system that provides the foundation for transportation, navigation, land record systems, mapping and charting efforts, and a multitude of scientific and engineering applications. This system defines position (latitude, longitude, and elevation), distances, and directions between points, which are critical to navigation. Additionally, NGS implements a coastal mapping program to define the national shoreline and other features needed for updating nautical charts and providing visual aids to mariners.
- The Center for Operational Oceanographic Products and Services (CO-OPS) – CO-OPS gathers tide information along our Nation's coasts which enables CO-OPS to reliably predict and publish daily, monthly and seasonal tidal cycles for maritime users. Moreover, CO-OPS's technicians, scientists, and engineers collect real-time water level, current, and other oceanographic observations and monitoring data (such as tsunami warning data) that help to protect life, property, and the environment, and support safe navigation. A good example of a CO-OPS product is the Physical Ocean Real Time

System (PORTS), a decision support tool that measures and disseminates observations and predictions of water levels, currents, salinity, and meteorological parameters (e.g., winds, atmospheric pressure, air and water temperatures) that mariners need to navigate safely into and out of port.

In fiscal year 2013, NOAA spent over \$155 million on hydrographic surveys and other navigation related activities.



Nautical Chart of Portsmouth Harbor, NH

Corps

The Corps' navigation mission is to provide a safe, reliable, efficient, effective, and environmentally sustainable waterborne transportation system for movement of commerce, national security needs, and recreation. The Corps is responsible for dredging and maintaining the depth of nearly 25,000 miles of federal navigation channels throughout the country. The Corps also dredges 926 coastal, Great Lakes, and inland harbors. In addition to dredging channels, anchorages, and turning basins, the Corps operates and maintains 227 locks at 185 sites on the inland river system and is responsible for thousands of protective jetties and breakwaters throughout the country.

While NOAA conducts much of the hydrographic surveys of U.S. waters, the Corps is responsible for hydrographic surveys of all federal navigation channels, as well as the entire inland river system. The Corps uses its fleet of over 95 hydrographic survey vessels, as well as contracted vessels to ascertain the depth and condition of federal channels on a regular basis.

Hydrographic surveys are also conducted in conjunction with dredging activities to ensure channels are dredged to approved depths. The Corps forwards the results of these surveys to NOAA for inclusion on nautical charts.

In fiscal year 2013, the Corps spent over \$1.6 billion on the operation and maintenance of the navigation system. This includes maintenance dredging of channels, hydrographic surveys, and the operation and maintenance of locks and associated navigation infrastructure.

Coast Guard

The Coast Guard is responsible for providing a safe, secure, and efficient navigation system to support domestic commerce, international trade, and military sealift requirements for national defense. To carry out these responsibilities, the Service conducts numerous port and waterways management tasks. These include, maintaining physical aids-to-navigation (ATON), developing navigation standards and regulations, operating vessel traffic services, conducting icebreaking, permitting bridges over navigable waters, and the operation, implementation, and coordination of several electronic navigation technologies.

ATON Mission

The Coast Guard maintains a system of over 50,000 federal government-owned lighted and unlighted buoys, beacons, and other ATON that mark 25,000 miles of waterways and navigable coastal waters. The Service also oversees an additional 50,000 private ATONs. The Coast Guard's 65 Aids-to-Navigation Teams rely on a fleet of 68 buoy tenders and 184 small boats to service its ATON system. The Coast Guard uses hydrographic survey data from the Corps and NOAA to help determine where ATONs should be positioned. In fiscal year 2013, the Coast Guard spent over \$820 million to carry out its ATON mission.

E-Navigation

The Coast Guard's Navigation Center (NAVCEN) in Alexandria, Virginia is responsible for the collection, integration, dissemination, presentation, and analysis of maritime information by electronic means to enhance maritime navigation. NAVCEN manages the several e-navigation systems for the federal government including:

- Automatic Identification System (AIS) - AIS is a Very High Frequency (VHF)-based, short-range communication system that provides a means for vessels to electronically exchange data, including identification, position, course, and speed, with other nearby vessels and shore-based AIS receivers. Depending on signal strength, weather, geography, and receiver capability, AIS signals can generally be received up to 50 miles away.

AIS data is overlaid on electronic charts to provide vessel operators with near real-time information on vessel position, course, and speed. The Coast Guard is currently testing AIS to transmit information to vessel operators indicating where it has imposed temporary restricted areas and where ATON outages exist. The Service plans to augment

its physical ATONs with electronic ATONs and reduce where possible the number of physical ATONs that require regular or seasonal maintenance.

- Nationwide Automatic Identification System (NAIS) - The Coast Guard collects AIS signal data through its Nationwide Automatic Identification System (NAIS). NAIS consists of approximately 200 VHF receiver sites located along the coasts and inland river systems of the United States. NAIS allows the Coast Guard to collect data from AIS-equipped vessels traveling in the vicinity of the Nation's 58 largest ports.
- Long Range Identification and Tracking (LRIT) - LRIT is a worldwide, satellite-based automated tracking system for vessels on international voyages with 12 or more passengers, or over 300 gross tons. Unlike AIS, LRIT is a secure system in which vessel identity and position data is transmitted every six hours to data centers that distribute them to countries permitted to have the information. This system allows certain governments, such as the United States, access to flag, port, and coastal state LRIT information.
- Differential Global Positioning System (DGPS) – DGPS transmitters augment traditional GPS satellite signals to improve accuracy so that it can be relied upon for navigation. DGPS sites provide signal coverage to 92 percent of the continental United States, complete coverage of the coastline, as well as selected portions of Alaska, Hawaii, Puerto Rico, and the inland river system.

eLORAN

Electronic navigation systems like AIS rely heavily on the DGPS/GPS system to provide the positioning, navigation, and timing data necessary to properly function. However, GPS satellite signals are often subject to interference from space weather such as solar flares, as well as spectrum encroachment from radio emissions, and intentional and unintentional acts of GPS frequency jamming. When disruptions occur in GPS satellite signals, mariners are currently left to rely on physical ATONs to safely navigate.

In 2004, President George W. Bush issued a National Security Presidential Directive that tasked the Department of Transportation (DOT) to work with the Department of Homeland Security (DHS) to develop backup capabilities to mitigate disruptions to GPS signals (National Security Presidential Directive 39). In 2008, DHS proposed to upgrade the Coast Guard's antiquated Long Range Aids to Navigation (LORAN) system with an enhanced LORAN (eLORAN) system to act as a primary backup to GPS. eLORAN is a low frequency radio-based system capable of providing position, navigation, and timing information to users at levels of accuracy similar to GPS. Funding was not appropriated to begin the transition to eLORAN. In 2009, DHS announced plans to decommission LORAN and no longer sought funds to upgrade the system to eLORAN. In 2010, the Coast Guard terminated LORAN transmissions.

Section 219 of the Coast Guard Authorization Act of 2010 (P.L. 111-281) required the Secretary of DHS to study and determine whether a backup system to GPS is needed. Rather than study the issue, DHS conducted a survey of GPS users, but only users in the Coast Guard

and DOT, and came to the conclusion that a GPS backup would require further study (An Analysis of Whether a Single Domestic Backup Navigation System is Needed for GPS: Report to Congress. September 2011). In November 2013, the Government Accountability Office released a report finding that DOT and DHS had made limited progress in developing a backup for GPS and faulted both departments for failing to better collaborate on the issue (GAO-14-15).

WITNESSES

Panel I

Rear Admiral Joseph Servidio
Assistant Commandant for Prevention Policy
United States Coast Guard

Rear Admiral Gerd F. Glang
Director, Office of Coast Survey
National Oceanic and Atmospheric Administration

Jim Hannon
Chief, Operations and Regulatory Division
United States Army Corps of Engineers

Panel II

Dana Goward
President
Resilient Navigation and Timing Foundation

Dr. Larry Mayer
Professor and Director
Center for Coastal and Ocean Mapping/Joint Hydrographic Center

John Palatiello
Executive Director
Management Association for Private Photogrammetric Surveyors

Captain Lynn Korwatch
Executive Director
Marine Exchange of the San Francisco Bay Region