

HYDROGRAPHIC SERVICES REVIEW PANEL

A federal advisory committee, advising the NOAA Administrator

Improving Access for U.S. Nautical Charts:

Using multiple data sources to produce more accurate and detailed charts

Maritime cargo activity accounts for 26% of the U.S. economy and generates nearly \$4.6 trillion in total economic activity.¹ Nautical charts are critical elements of our national infrastructure that support the maritime industry, but hydrographic surveying and nautical charts have changed radically in the past two decades. Multiple new survey techniques have been developed, and paper charts have evolved into sophisticated digital products. In the 21st century the public expects rapid and convenient access to data and products. As the agency responsible for U.S. nautical charts, the National Oceanic and Atmospheric Administration (NOAA) must balance the adoption of new data types and sources with the need to produce nautical charts from data that meet established standards. **NOAA needs to enable and expand the Office of Coast Survey's (OCS) efforts to ingest and evaluate data from multiple sources and to develop charting products that better meet 21st century needs and expectations for safe navigation.**

ISSUE AND STATUS

NOAA requirements for data usage on official charts are significant due to legal, liability, and technical standards. Establishing whether new data types (e.g. airborne lidar, radar, satellite derived bathymetry) can meet these requirements or international standards takes time and resources, and the data types and sources are expanding at a rate that is currently unmanageable. Simultaneously, there is an increasing need and demand to incorporate more types of data into digital charting products.

NOAA's Hydrographic Services Review Panel (HSRP) has heard from NOAA product customers for many years that there is an increasing demand for higher resolution, usable

hydrographic data in reliable and accurate formats. There is a real need to provide more detailed information to support digital charting applications. While NOAA charts are known as the foundational decision-making tools for navigators of all types, the frequency of chart updates and the way that channel conditions are charted are not satisfying NOAA customers. The public has also repeatedly requested that NOAA and U.S. Army Corps of Engineers (USACE) data be made more easily accessible in a centralized location.

In commercial harbors, ever-larger ships with smaller under-keel clearances make it only more important to provide the most up-to-date, detailed, and accurate data



For paper charts it was acceptable to have no printed soundings (left) in a harbor area that was cleared to a standard depth, but in the era of electronic navigational charts and Electronic Chart Display and Information Systems, users require detailed information (right) for navigation in waterways that reveals more detail as the user zooms in.

to all users. Many pilots and other professional customers routinely supplement NOAA-provided information with hydrographic data from other sources such as the USACE and local surveyors. The increasing number of commercial and recreational boaters using shallow-draft channels also requires access to up-to-date, detailed, and accurate channel condition information. Furthermore, there is a real desire and need for NOAA to find ways to assimilate data from additional non-NOAA and non-traditional sources such as crowd-sourced data in their products.

But when and where should data that may not meet established standards be used? Should the best available data be used or only data that meet certain standards? In remote areas that have not been charted in over 40 years, almost any additional recent data may be superior to the older data, even if the older data met hydrographic standards at the time they were collected. OCS has been able to incorporate a significant number of surveys from outside sources that were not necessarily conducted to IHO standards into nautical charts in the past 15 years, and has a goal of 30% inclusion of data from outside sources into new nautical charts.

International Hydrographic Organization (IHO) Standard S44 (2008) establishes a hierarchy of survey types and accuracies. In harbors and channels, Special Order and Order 1A surveys require both object detection and full bottom coverage. In deeper areas or those outside of channels and harbors, Order 1B or Order 2 standards apply.

RECOMMENDATIONS FOR NOAA ACTION

- Modernize the form of electronic navigational charts to incorporate more detail in channels based on the best available survey data. The panel does not make any specific recommendations on the form(s) this might take, but recommends to NOAA that robust stakeholder engagement should complement proposed changes. The panel recognizes that paper/raster charts may not be able to show the same detail.
- Evaluate additional sources of data for inclusion in nautical charts.
- Make all data and metadata used for charting available to the public in easily accessible formats and a central repository, rather than on numerous local web sites.

¹ Martin Associates, 2014 National Economic Impact of the U.S. Coastal Port System.

The Hydrographic Services Review Panel was established as directed by the Hydrographic Services Improvement Act of 2002, Public Law 107-372.

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