

# Will Hydrographic Offices Rise to the Challenge Of Precision Navigation?



As the size and capacity of vessels entering our ports continue to increase, mariners are challenged with navigating in increasingly constrained spaces. Mariners are demanding more accurate and higher resolution data as ports push the limits of their sea room to compete for megacarriers. This demand creates an opportunity for Hydrographic Offices to provide new products for precision navigation. The demand calls out for the standardisation of data formats to enable interoperability.

*Rear Admiral Gerd Glang, Office of Coast Survey, National Oceanic and Atmospheric Administration, USA.*

For NOAA's Office of Coast Survey, building a product that provides decision-making tools necessary for precision navigation means going beyond our traditional foundational information. We must provide port-scale ENC's that are interoperable with a suite of high-resolution data including bathymetry, forecast and observed water levels, currents, winds, waves, salinity, and geophysical models to underpin sub-decimetre positioning. Data must also be readily available in internationally recognised data formats and disseminated by robust means for use at the point of decision.

This level of precision, allowing the mariner to know their vessel's current and future position in three dimensions within a decimetre of uncertainty, requires increased standardisation. The International Hydrographic Organization's S-100 universal hydrographic data model provides the framework to develop new products that will be interoperable on the bridge of a ship and conform to the International Organization for Standardization (ISO) standards. Drafts of the first of many needed S-100 product specifications — such as S-111 surface currents and S-102 high-resolution bathymetry — are currently under development. However, we still need more involvement of Hydrographic Offices in furthering the development of standards.

Coast Survey is currently testing several precision navigation products in the ports of Los Angeles and Long Beach, allowing us to examine them under at-sea conditions. Ultra large crude carriers (ULCC) entering the Long Beach channel must contend with potential winter storm swells where a single degree of pitch may increase a 1000-foot ULCC's draft by as much as ten feet. An under keel clearance system is being developed at the Port of Long Beach to determine the probability of grounding for all ULCCs entering the channel. Once validated, this system will guide pilots to make risk-based decisions before beginning a transit into port. This tool is enabled by a new nearshore wave model and wave observation buoys. Also available are large-scale S-57 ENC overlays based on new high-resolution bathymetry. These decision support tools and high-resolution navigation products will improve port efficiency and increase vessel safety.

The success of precision navigation services ultimately depends on commercial vendors' willingness and ability in achieving an integrated platform. Our precision navigation product development gives industry the data needed for emerging technologies, and we are encouraged by the enthusiasm generated during discussions about the possibilities of high-resolution data fusion.

An integrated data stream for precision navigation brings a heightened opportunity — and challenge — for Hydrographic Offices to supply their valuable data for new uses, where it is needed.