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Modelling oceanographic data for precision navigation applications

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Operational Forecast Systems (OFS) are U.S. national networks of operational nowcast and forecast models to support the National Oceanic & Atmospheric Administration's (NOAA's) mission goals and priorities. An OFS consists of the automated integration of observing system data streams, hydrodynamic model predictions, product dissemination and continuous quality control monitoring. Nowcasts and forecasts are scientific predictions about the present and near future states of a coastal marine environment or region. OFS models generally output water levels, currents, salinity and sea surface temperature in a coastal marine environment. The data are available in NetCDF format from the following site: https://tidesandcurrents.noaa.gov/models.html

The Coast Survey Development Lab within NOAA has been working on a project to make OFS data available in formats that have been adopted by the International Hydrographic Organization (IHO) and which are easily ingested by navigation systems, such as Electronic Chart Display and Information Systems (ECDIS), portable pilot units (PPU), and electronic charting systems (ECS). These data not only have the potential to display nowcasts and forecasts in real time on a navigation system display, but will also be beneficial for Precision Navigation applications and to optimize route planning. Ultimately, these model forecast data will be available in a machine to machine format, with data file sizes small enough to be able to be delivered from shore to vessel over existing communications networks. The Coast Survey Development Lab is currently converting surface current information in netCDF files to HDF5 format that are also compliant with the International Hydrographic Organization's S-111 standard format for surface currents. Additional parameters such as water levels, salinity, and sea surface temperatures will be incorporated in the near future.