

Office of Coast Survey

Utilizing GIS to improve navigation safety

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Who is Coast Survey?



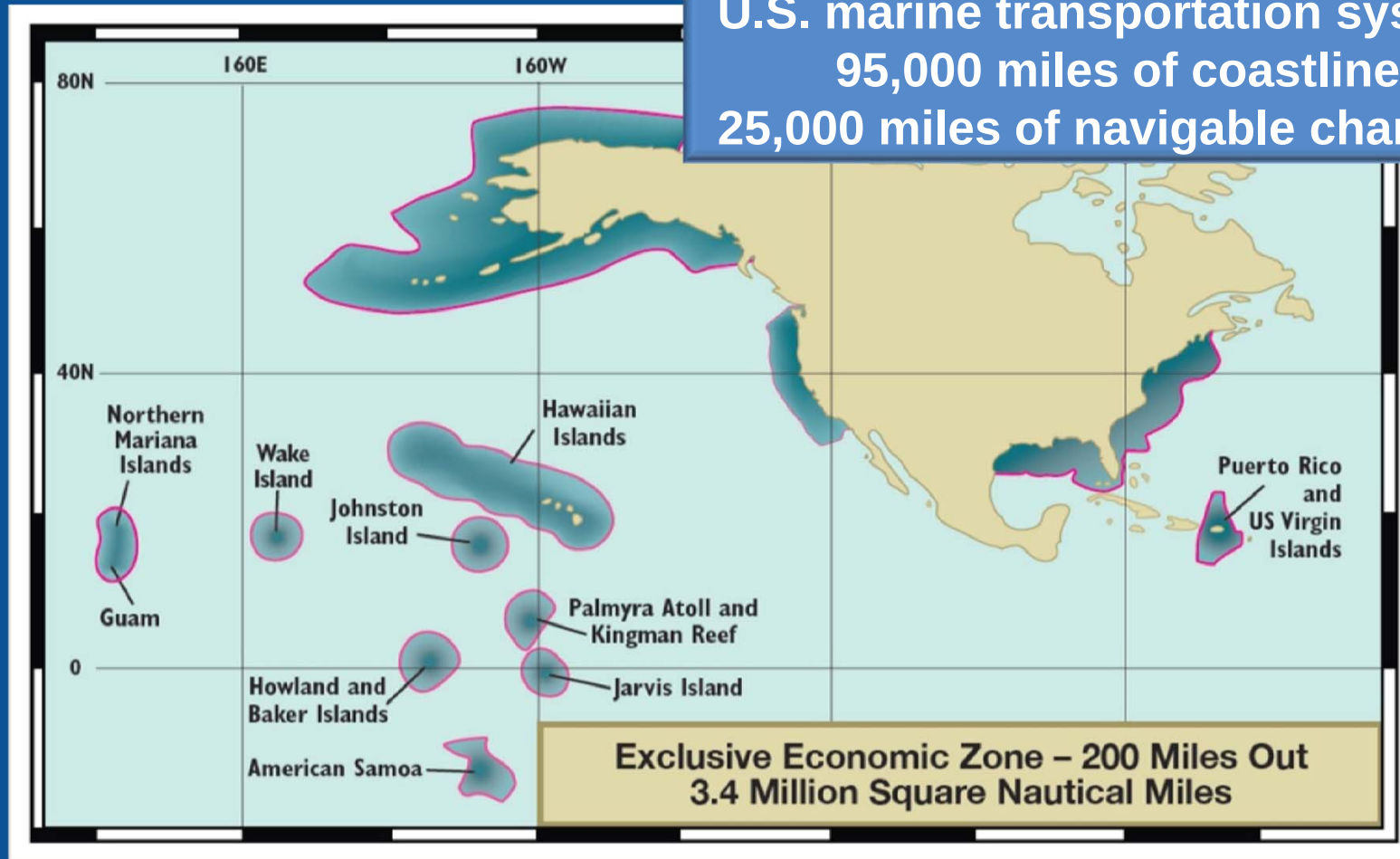
- First science agency of the U.S.
- Responsible for surveying 3.4 million square nautical miles
- Creates and Updates Nautical Products
- Speeds re-opening of ports after hurricanes and other disasters
- Develops hydrodynamic models for coastal management
- Provides global hydrographic leadership

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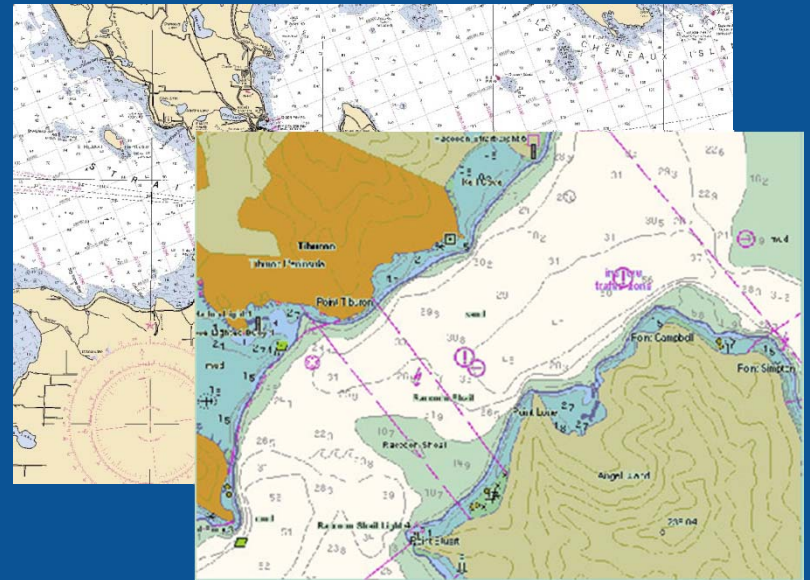


Scope of coverage

U.S. marine transportation system:
95,000 miles of coastline
25,000 miles of navigable channels



Producing navigational information for diverse groups of users



- 1022 traditional paper charts
- 1022 raster navigational charts (NOAA RNC®)
- 958 electronic navigational charts (NOAA ENC®)
- 1007 Print-on-Demand charts, sold by OceanGrafix
- Updated on a weekly basis for critical corrections

Meeting legislative & regulatory mandates

- Coast and Geodetic Survey Act of 1947
 - Authorized Coast Survey to support maritime commerce with nautical charts & products
 - Authorizes Director of Coast Survey as the National Hydrographer
 - Represents the United States at the International Hydrographic Organization
- Title 33 of Code of Federal Regulations
 - Mandated that NOAA nautical charts, *U.S. Coast Pilot*, and tidal and current information be carried on all self-propelled vessels bigger than 1600 gross tons, including passenger vessels
- IMO Safety of Life at Sea – Chapter V
 - Nautical chart or nautical publication is a special purpose map or book, or a specially compiled database... that is issued officially or on the authority of a Government, authorized Hydrographic Office ... and is designed to meet the requirements of marine navigation



IHO and IMO



- International Hydrographic Organization
 - 80 Member States
 - Support safety of navigation through standardization
 - S-57 – Electronic Navigational Chart
 - S-100 – Universal Hydrographic Model
 - S-101 – New Electronic Navigational Chart Specification
- International Maritime Organization
 - 160 Coastal States
 - Responsibility for the safety and security of shipping
 - Electronic Chart Display and Information System (ECDIS) Performance Standard



ECDIS

- Computer based Navigation System
- Integrated AIS and RADAR
- Must use an official ENC for primary navigation
- Improves the safety and efficiency of marine operations
 - Depending on the navigation scenario alarms and warnings are triggered based on the ships draft and surrounding chart elements
- SOLAS (V) was amended in 2012 that ships of certain size must carry and ECDIS



ECDIS Components

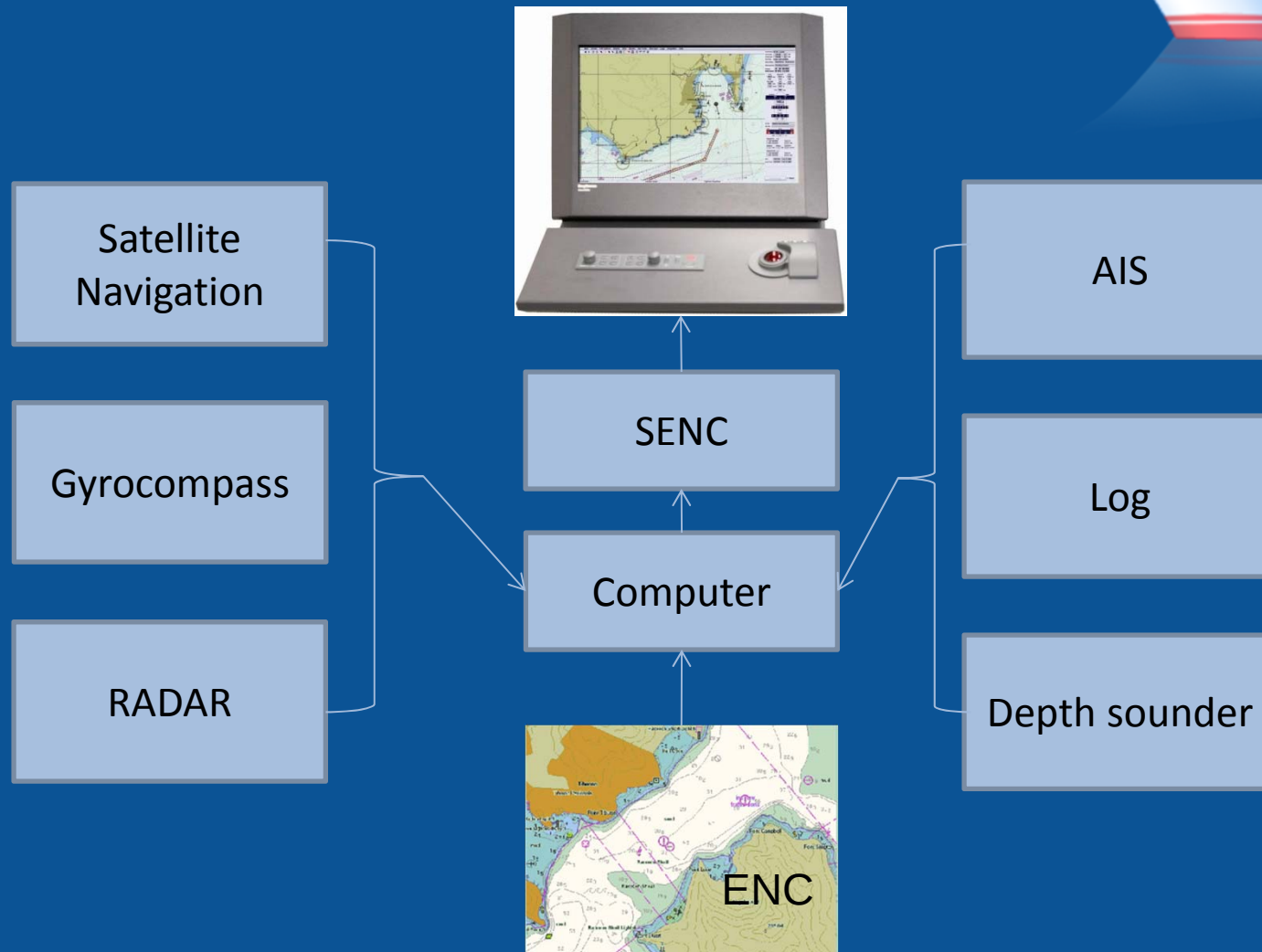
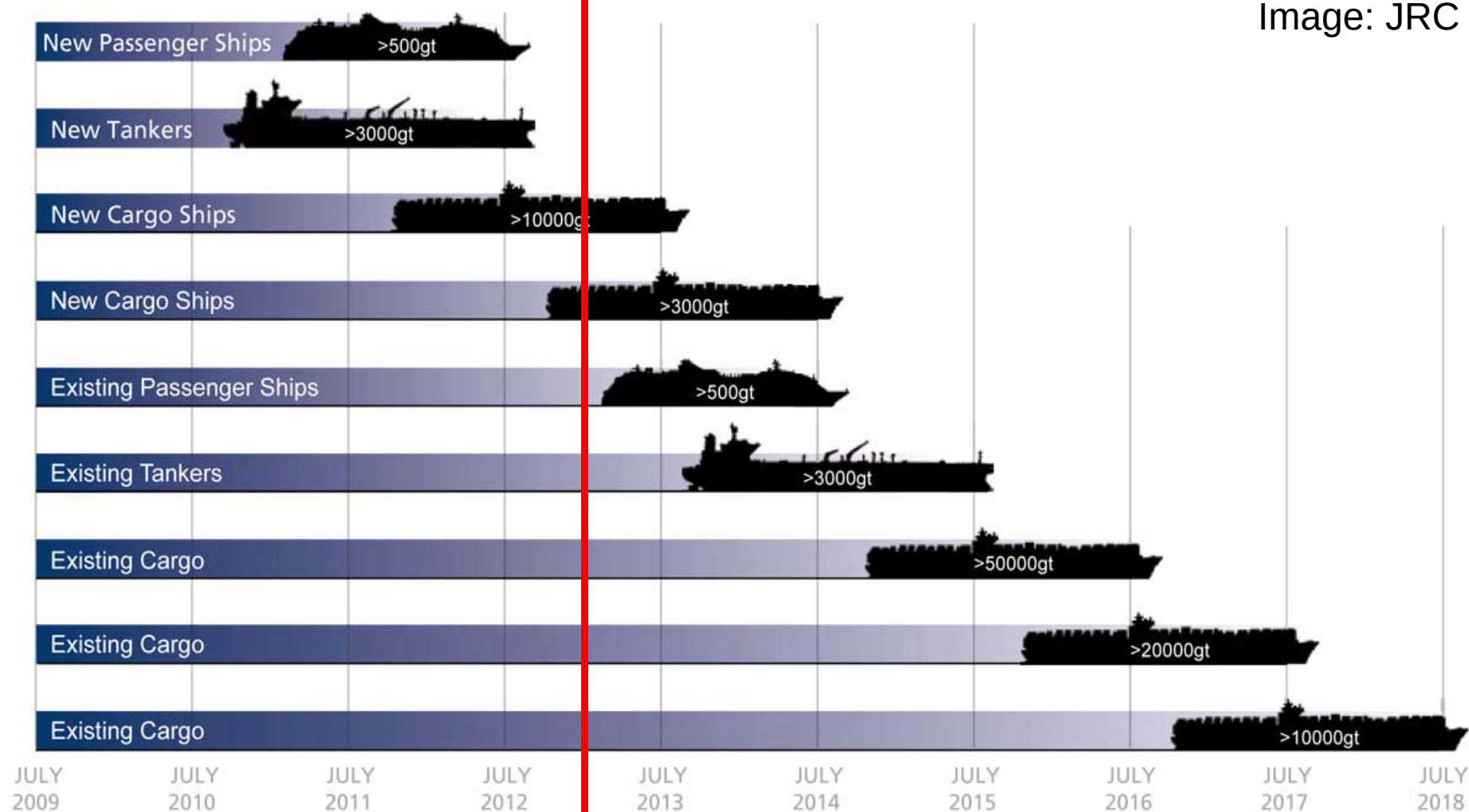


Image: JRC



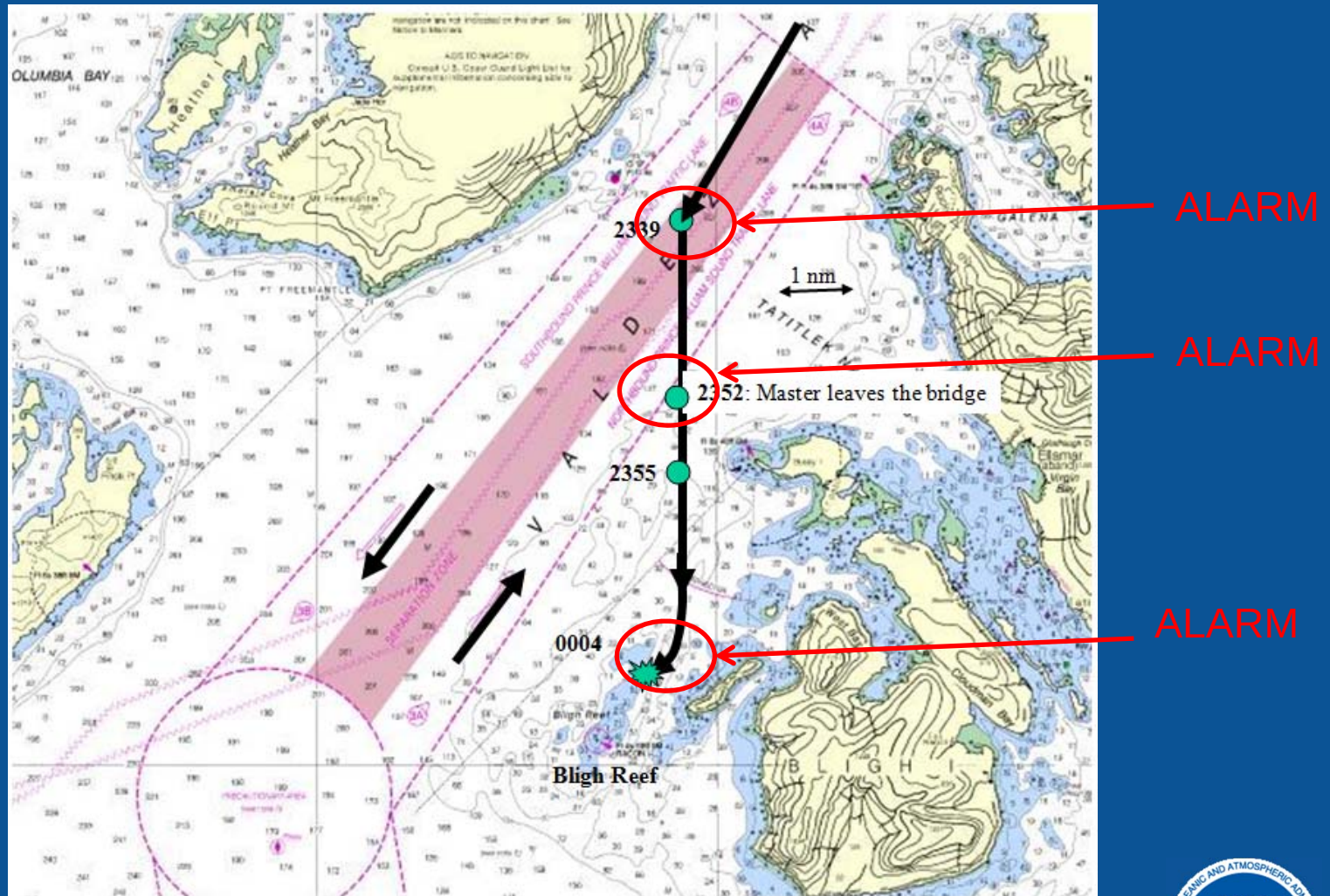
Based on IMO Circular letter issued December 2008. Please check www.thefutureofnavigation.com for the latest updates and news.

Today

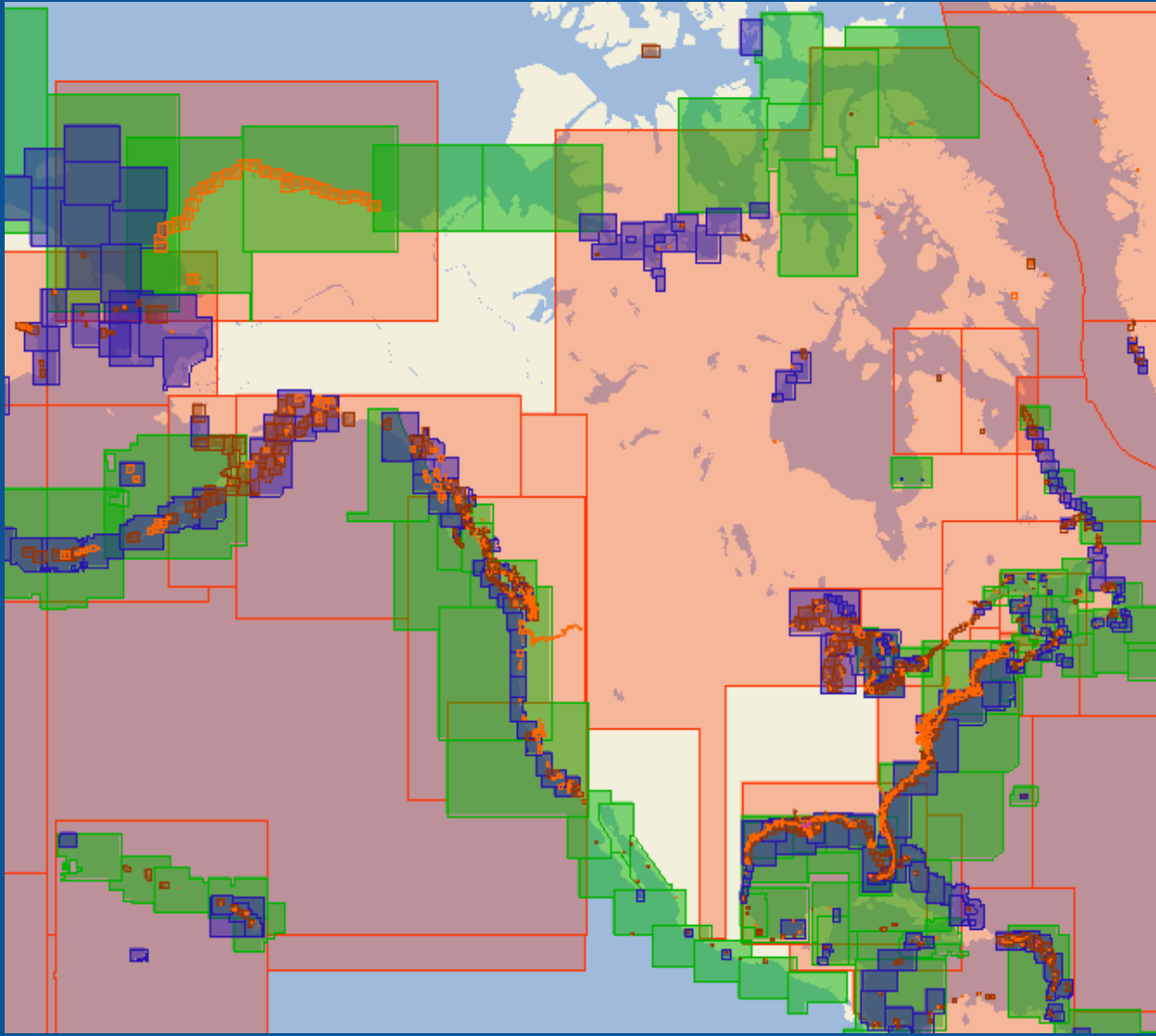
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Exxon Valdez – what if it had an ECDIS?



NOAA ENC Coverage



- 1997 – First ENC
- 2012 – Complete Coverage

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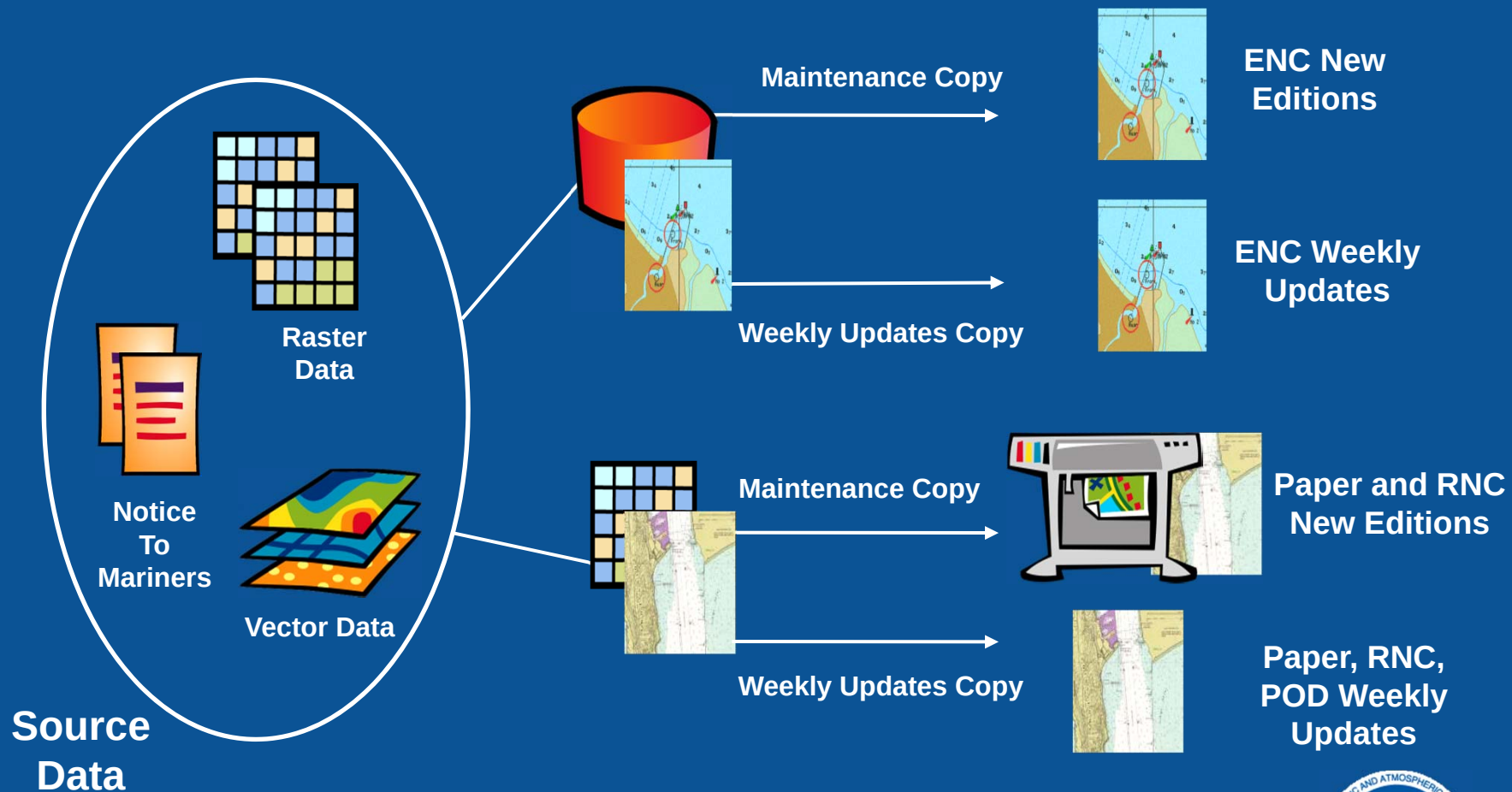


NOAA ENC Distribution

- Two Methods
 - Available for free download on the internet
 - www.nauticalcharts.gov
 - Or through a Certified ENC Distributor
 - PRIMAR
 - UKHO
 - Jepessen
 - Chart World
 - Maris
- Updated to the latest Notice to Mariners



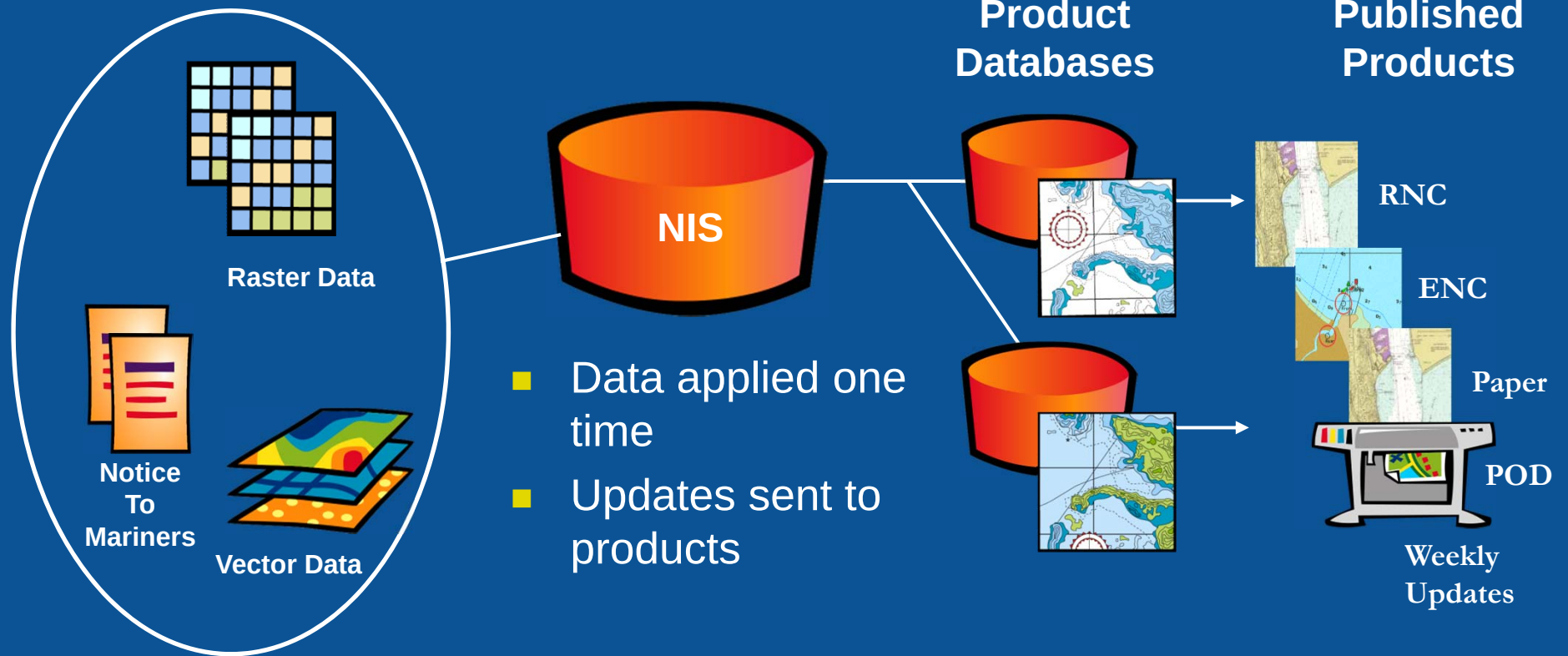
NOAA Chart Production – pre 2012



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NOAA Chart Production – moving to a GIS



Source
Data

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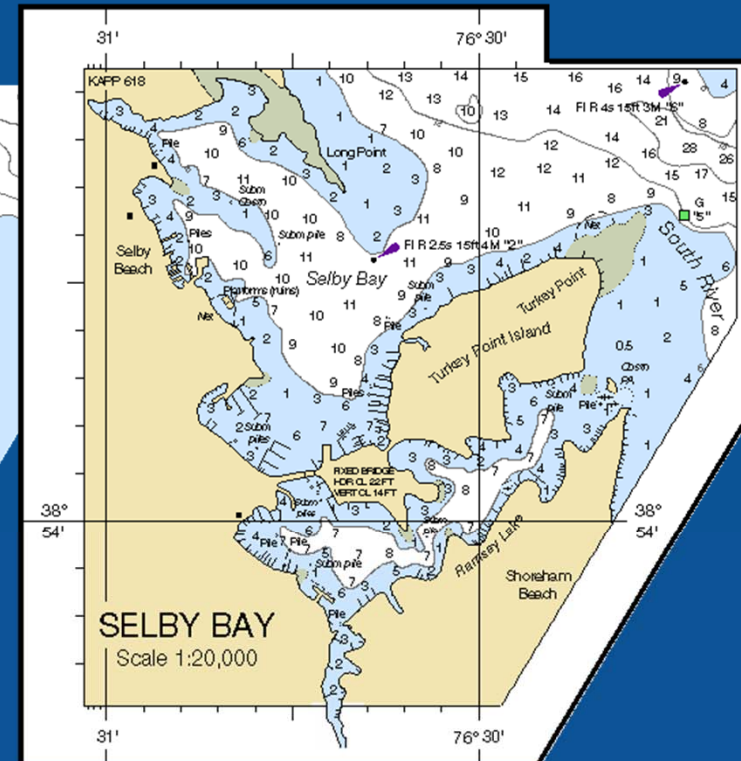
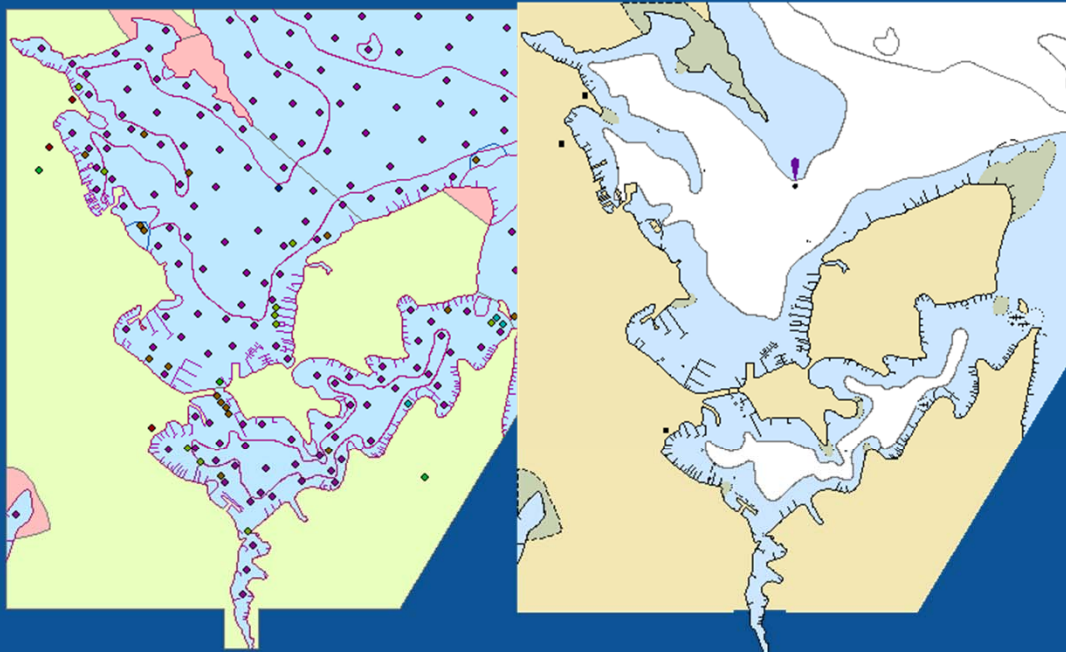


Why a GIS based approach?

- Increase the efficacy of the production system
 - One time source load, evaluation, and application
 - Variety of formats supported
 - Workforce trained on multiple products, versus product specialization
- Improved product for the mariner
 - Multiple products from single database provides consistency
 - Product synchronization
 - More up-to-date product
- Integrated end-to-end COTS solution



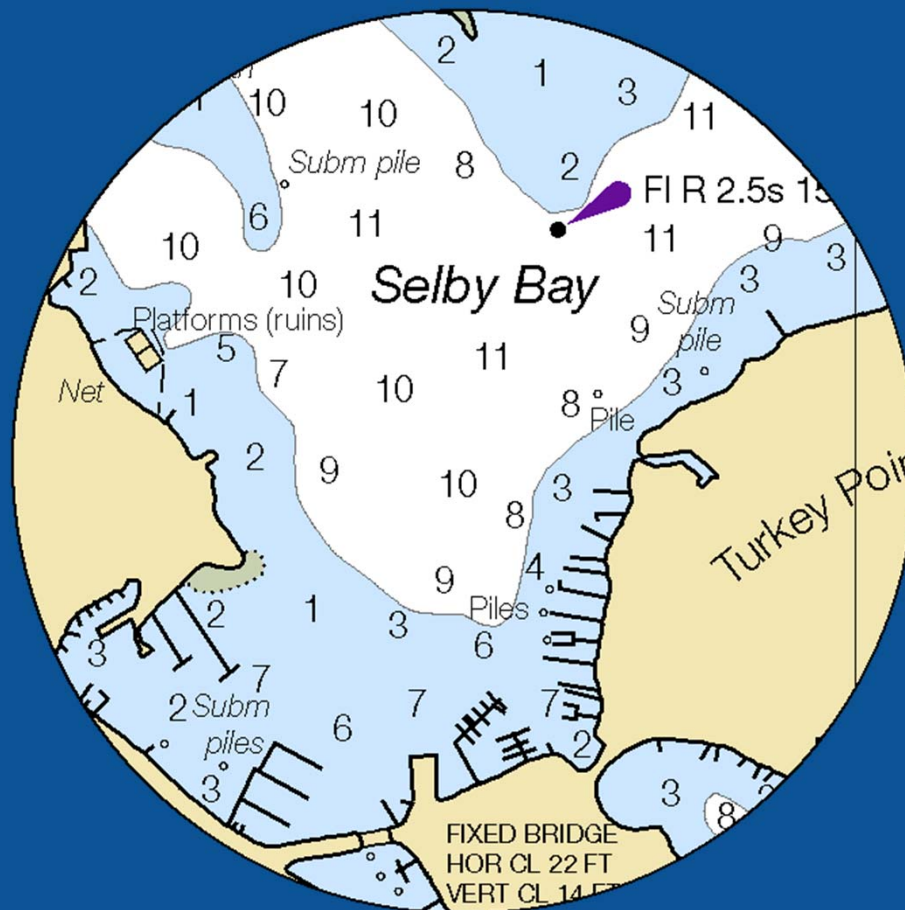
Product Finishing



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Product Finishing



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Improving ENC Standards

- Currently based on IHO S-57
 - While good it can be better
 - Not flexible
 - Takes Years to make a change
- IHO introduced S-100 – Universal Hydrographic Model
 - Leverages the ISO Geographic Information System Standards
 - Flexible Catalogue Structure



S-101

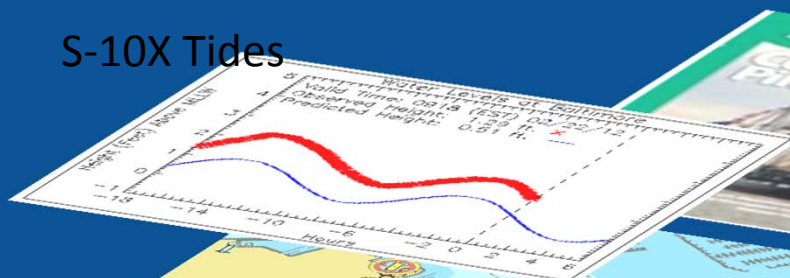
- S-101 represents a major step forward in product specifications for ENC's
- Dynamic content
 - Exchangeable and Machine Readable Catalogues
 - New content will NOT take years to implement
 - Or require new type approval for ECDIS
 - Will allow for real-time tidal information
 - Interoperability with other S-100 product specifications
 - Sailing Directions
 - High Resolution Bathymetry



S-100 Enabled ECDIS

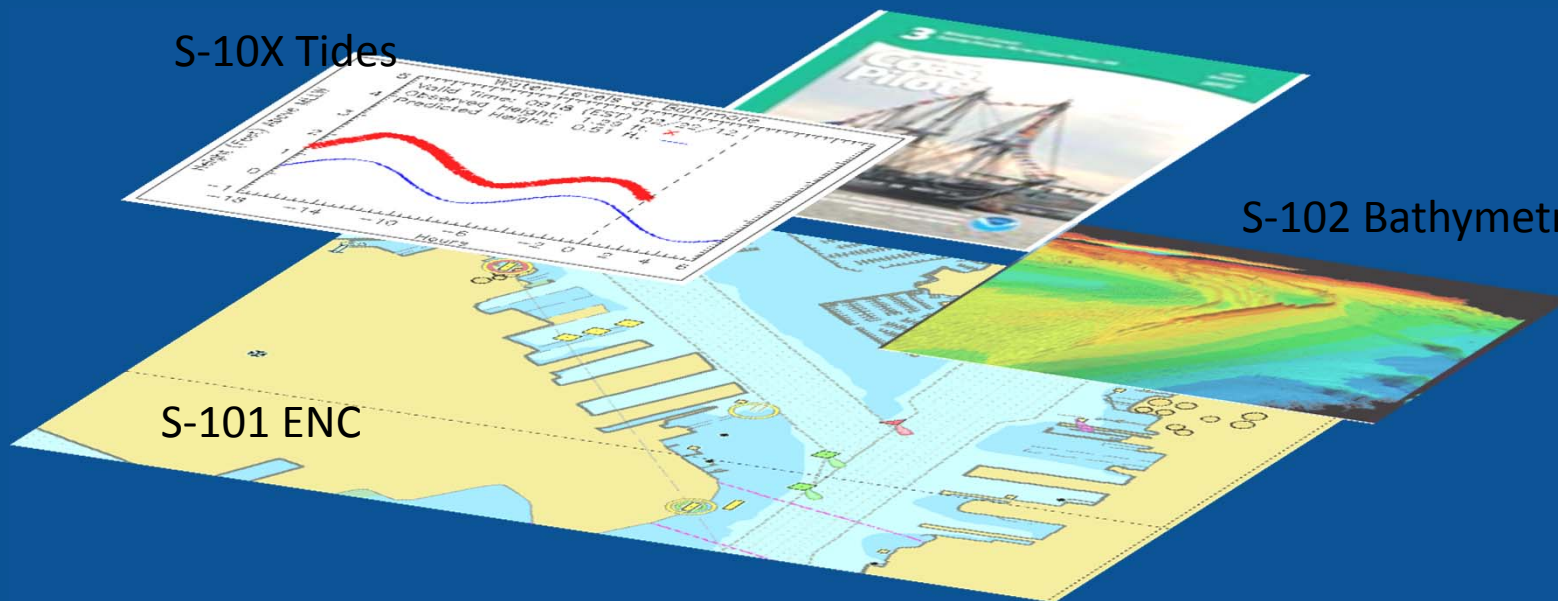
S-10X Nautical Publications

S-10X Tides



S-102 Bathymetry

S-101 ENC



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