XXVII FIG CONGRESS
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Warsaw, Poland

Volunteering for the future – Geospatial excellence for a better living

THE UNIVERSAL HYDROGRAPHIC DATA MODEL S-100: A REVOLUTIONARY APPROACH TO THE NAUTICAL CARTOGRAPHY AND MARITIME SERVICES

International Hydrographic Organization

IHO ASSISTANT DIRECTOR - LEONEL MANTEIGAS

ON BEHALF OF IHO DIRECTOR LUIGI SINAPI

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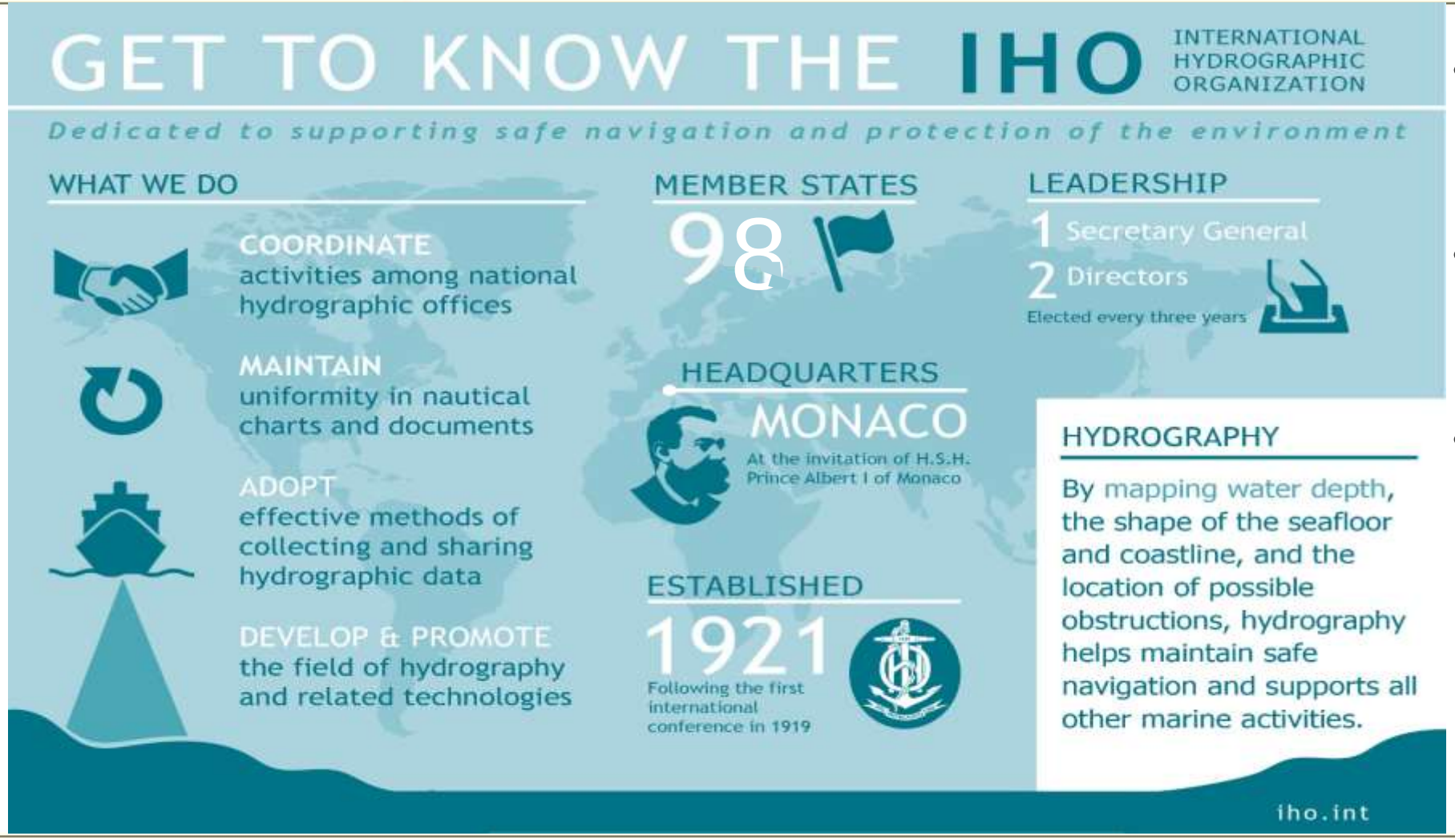
PLATINUM SPONSORS esri Trimble.

AGENDA

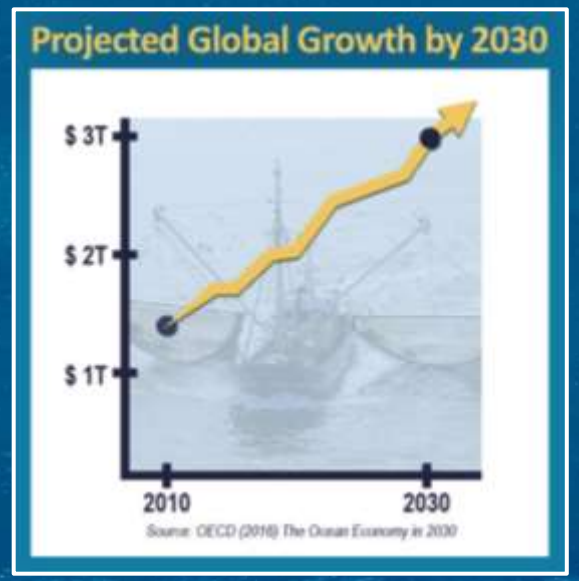
- THE INTERNATIONAL HYDROGRAPHIC ORGANIZATION (IHO)
- THE UNIVERSAL HYDROGRAPHIC DATA MODEL S-100
- S-100 BEST PRACTISES
- CONCLUSIONS



- Intergovernmental Organization in its own right
- Governance very similar to UN Bodies: Assembly/Council
- Technical consultative Organization: works with recommended standards

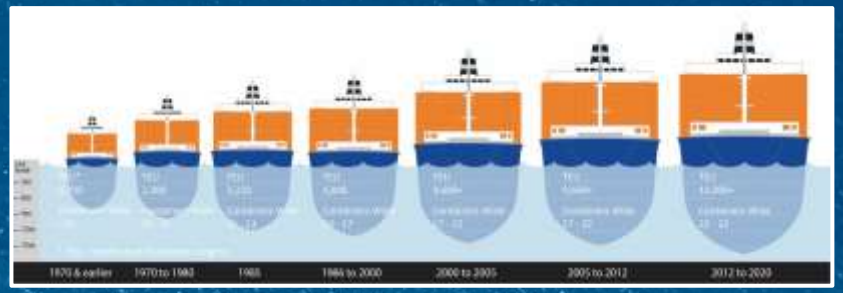
S-100: THE UNIVERSAL HYDROGRAPHIC DATA MODEL

… WHY SUCH A HUGE INTEREST?



PROJECTION OF GLOBAL GROWTH

WORLD MARITIME TRAFFIC

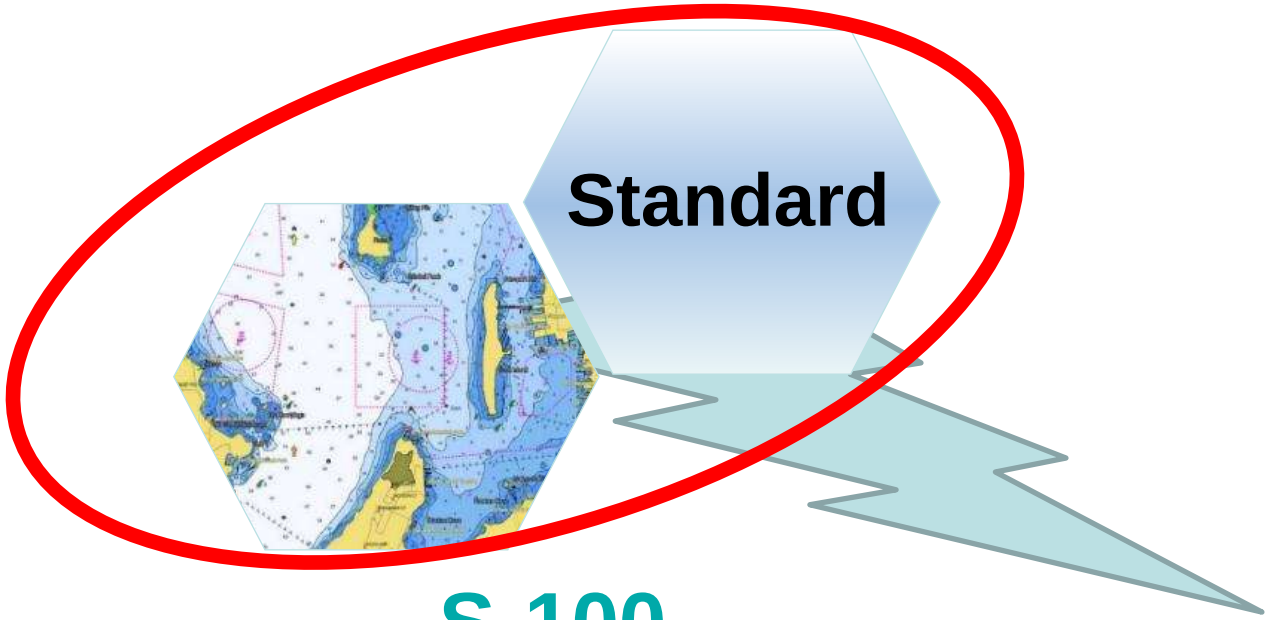


VALUE OF THE TRAFFIC VIA THE SEA IN THE U.S.A.

USA:
Maritime traffic:

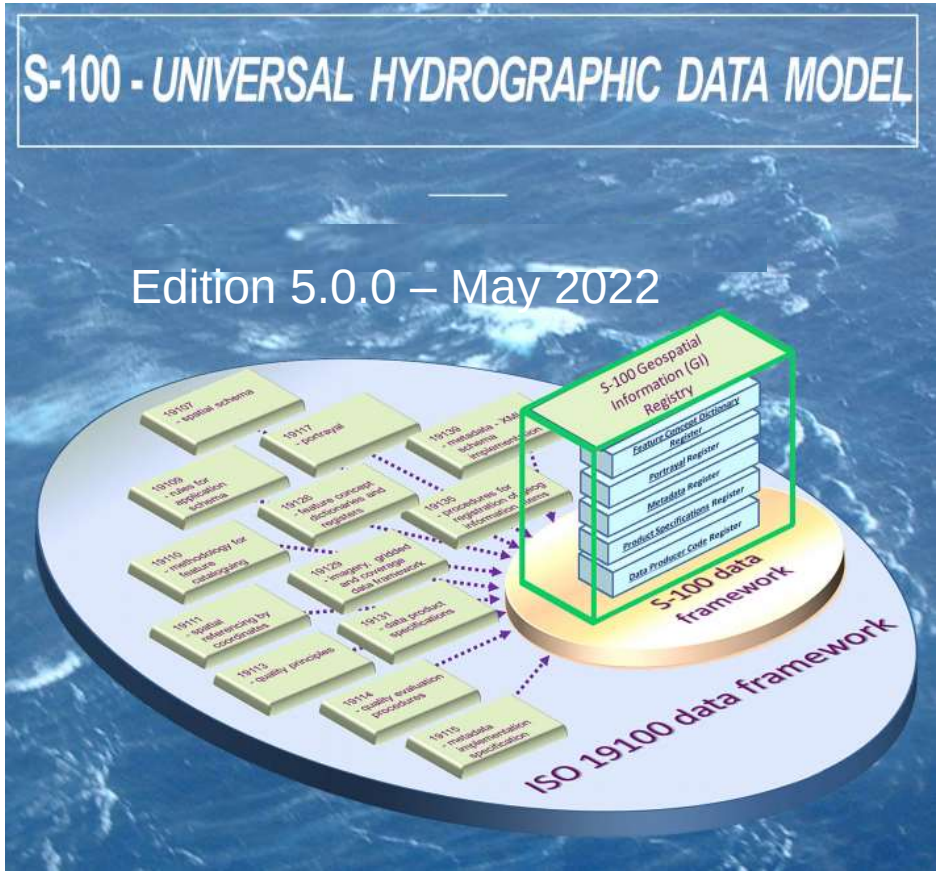
- **42%:** value of the U.S. economy transported by sea
- **71%:** weight in total U.S. international economy

S-100: THE UNIVERSAL HYDROGRAPHIC DATA MODEL



S-100

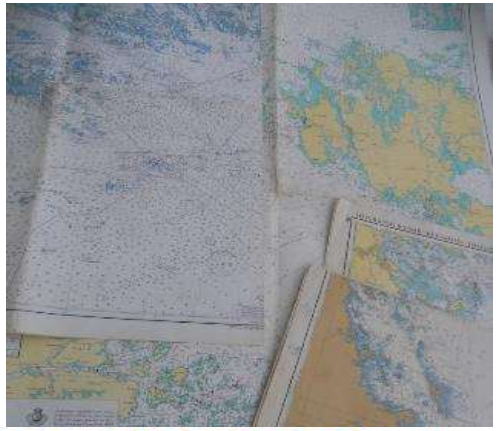
- **A universal Standard to develop digital products and services for the Hydrographic, Maritime and GIS communities**
- **It includes many parts from the geospatial standard developed by ISO/TC211**



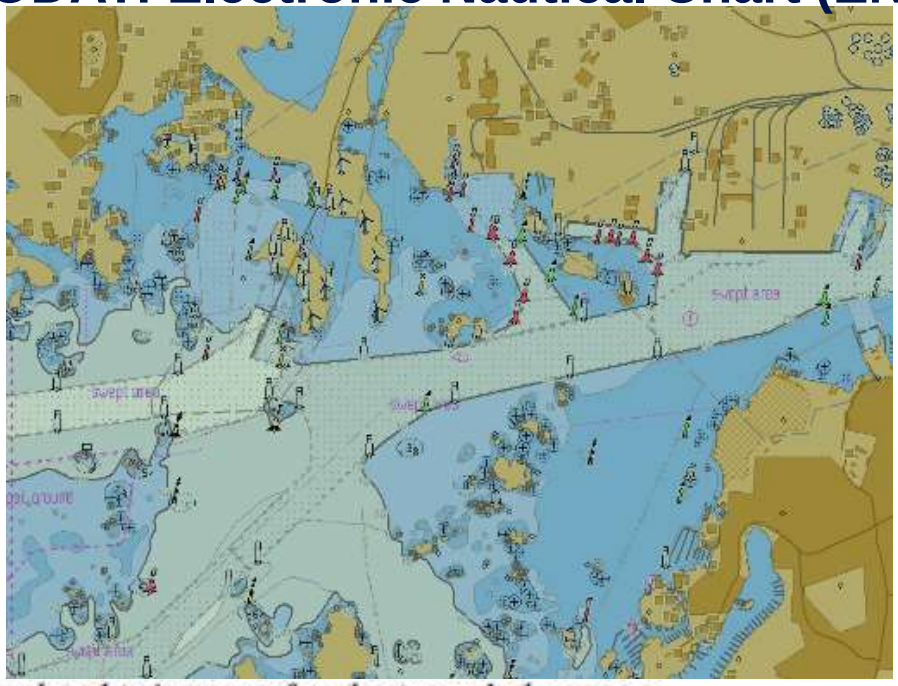
S-100: THE UNIVERSAL HYDROGRAPHIC DATA MODEL

… IMO SOLAS 1974 (PAST AND PRESENT)

YESTERDAY: Paper Chart



TODAY: Electronic Nautical Chart (ENC)



IMO SOLAS V/19 1974 (as amended):

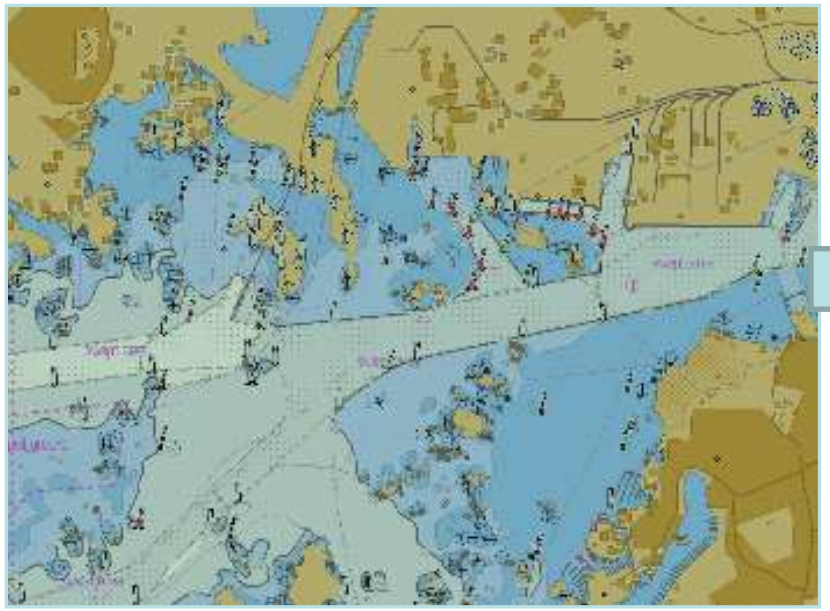
19.2.1 All ships irrespective of size shall have:

19.2.1.4 nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage. An electronic chart display and information system (ECDIS) is also accepted as meeting the chart carriage requirements of this subparagraph. Ships to which paragraph [2.10] applies shall comply with the carriage requirements for ECDIS detailed therein;

S-100: THE UNIVERSAL HYDROGRAPHIC DATA MODEL

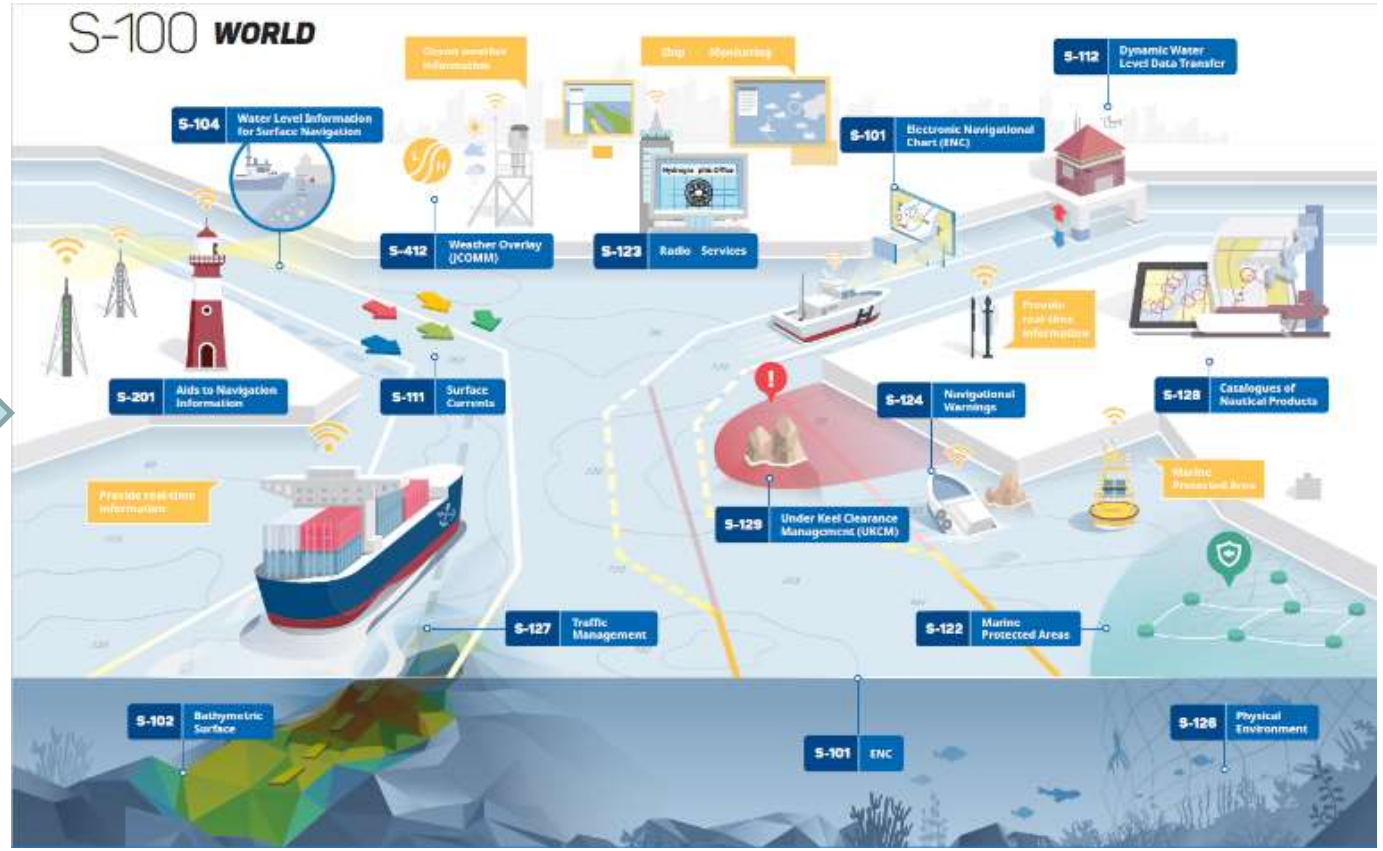
... E-NAVIGATION (THE ECDIS' FUTURE)

TODAY: ENC



***2D** ECDIS*

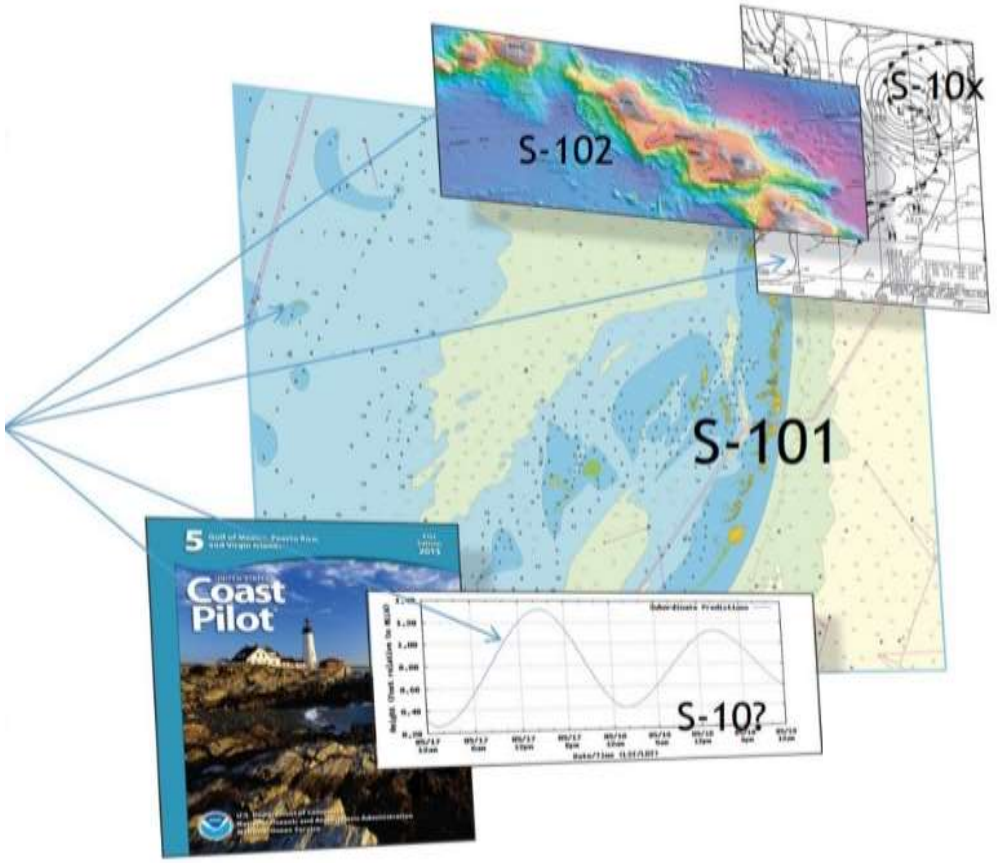
THE FUTURE: S-101 ENC as future for IMO ECDIS



***4D** ECDIS (included vertical dimension and real time information)*

S-100: THE UNIVERSAL HYDROGRAPHIC DATA MODEL

... S-100 PRODUCTS (S-1XX PRODUCT SPECIFICATIONS)

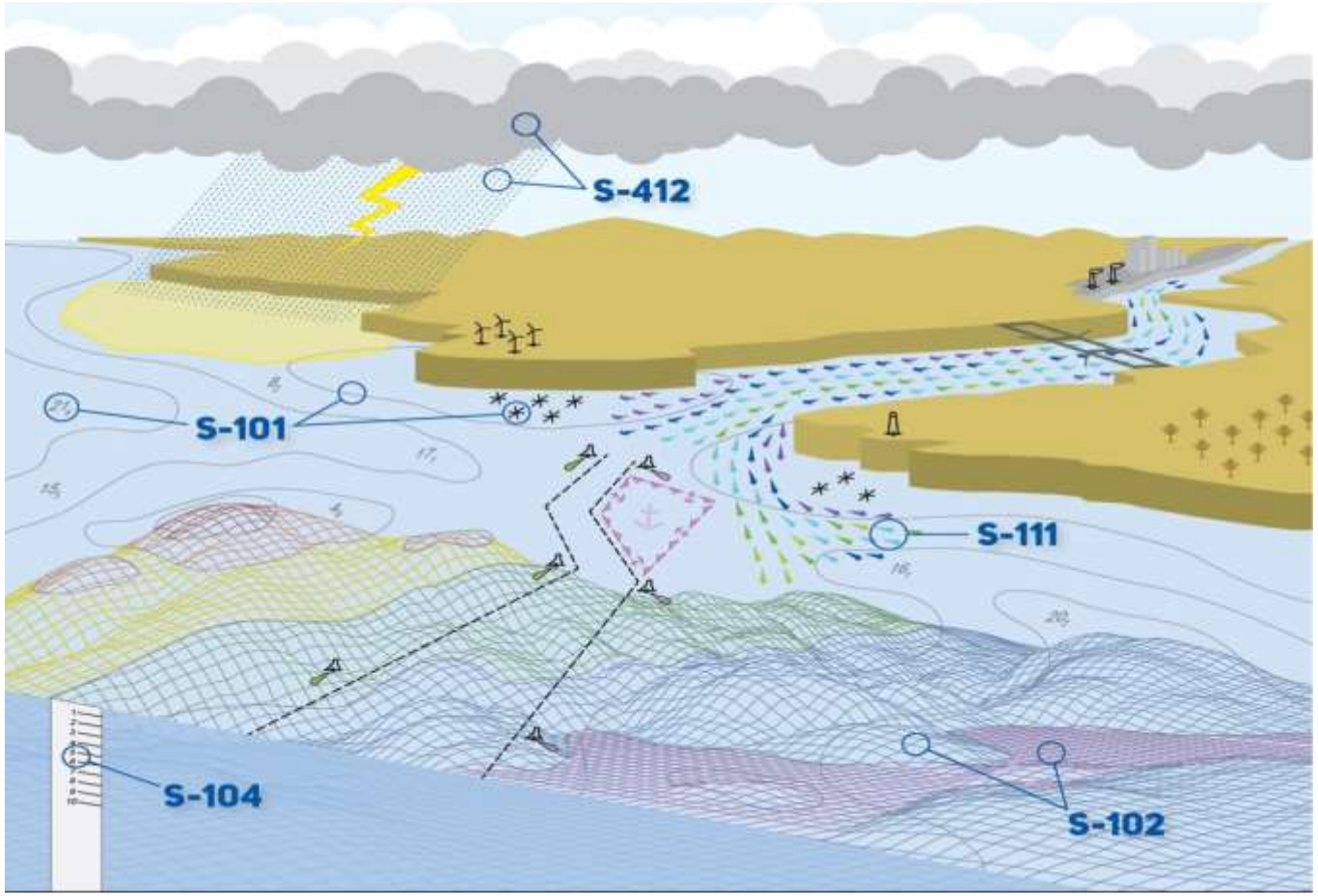


S-100: THE UNIVERSAL HYDROGRAPHIC DATA MODEL

THE PRODUCT SPECIFICATIONS TODAY

S-100 Data Products:

- **S-101: Electronic Navigational Charts**
- S-102: Bathymetric Surface
- S-104: Water Level Information for Surface Navigation
- S-111: Surface Currents
- **S-41X: Weather Overlays**



S-100: THE UNIVERSAL HYDROGRAPHIC DATA MODEL

... A ”BUILDING BLOCK” SOLUTION

- **This provides a picture of the future generation products’ development, as well as the other digital products requested by the Hydrographic, Maritime and GIS comunities**

S-100: THE UNIVERSAL HYDROGRAPHIC DATA MODEL

... WHAT'S THE MEANING FOR THE MARITIME COMMUNITY?

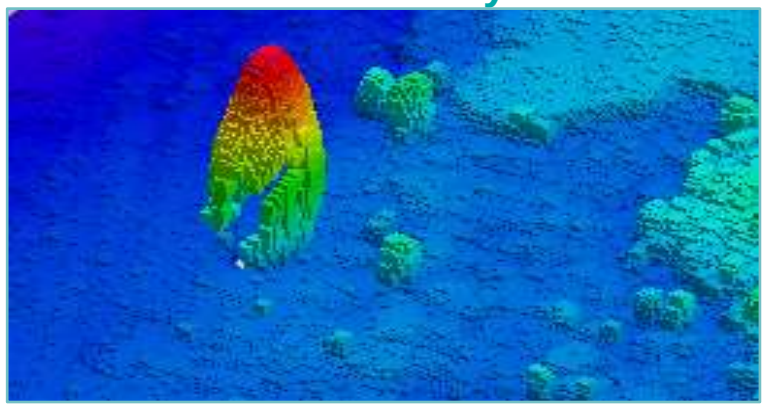
- Global coherence of the products
- S-100 is implemented directly by the producers
- Product Specifications are derived and directly linked to the different versions/editions of S-100
- The Standard uses readeable catalogues to facilitate the update of the Product Specifications
- The Standard is internationally recognized by the Hydrographic and Maritime communities

S-100: THE UNIVERSAL HYDROGRAPHIC DATA MODEL

... NEW BENEFITS DERIVING FROM S-100:

More Safety

New dangers for navigation are discovered frequently when new modern detecting methods are used

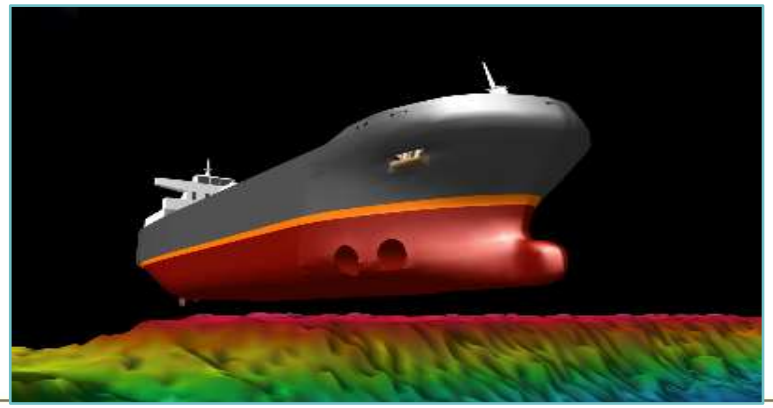


Course and time optimization

Fuel consumption reduction thanks to the use of tides, currents and meteorological information in real time

Charge optimization

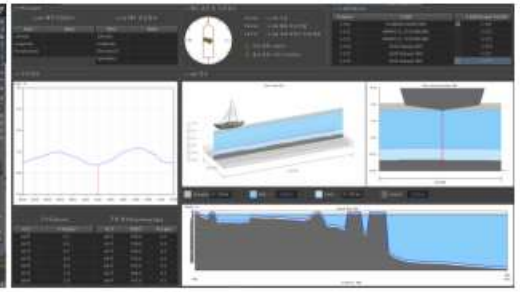
Improvement of the underkeel clearance management with the use of S-100 and GNSS vertical positioning



Autonomous navigation

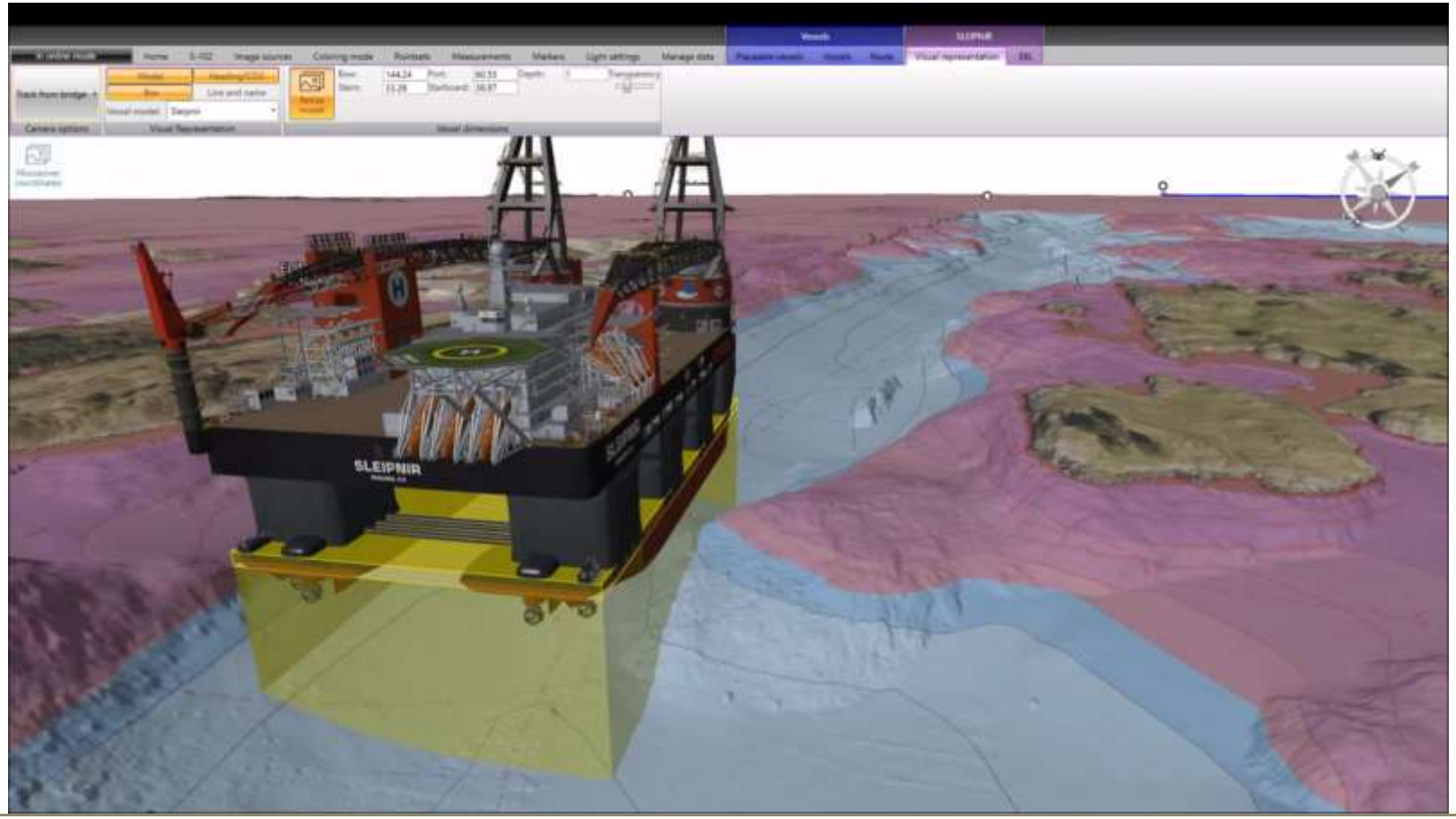
Nautical information machine readeable to facilitate all the MASS levels - Maritime Autonomous Surface Ships as defined by IMO

S-100: Best practices - AUGUST 2019: SEA TRIALS IN ROK OF THE FIRST S-100 PRODUCT SPECIFICATIONS



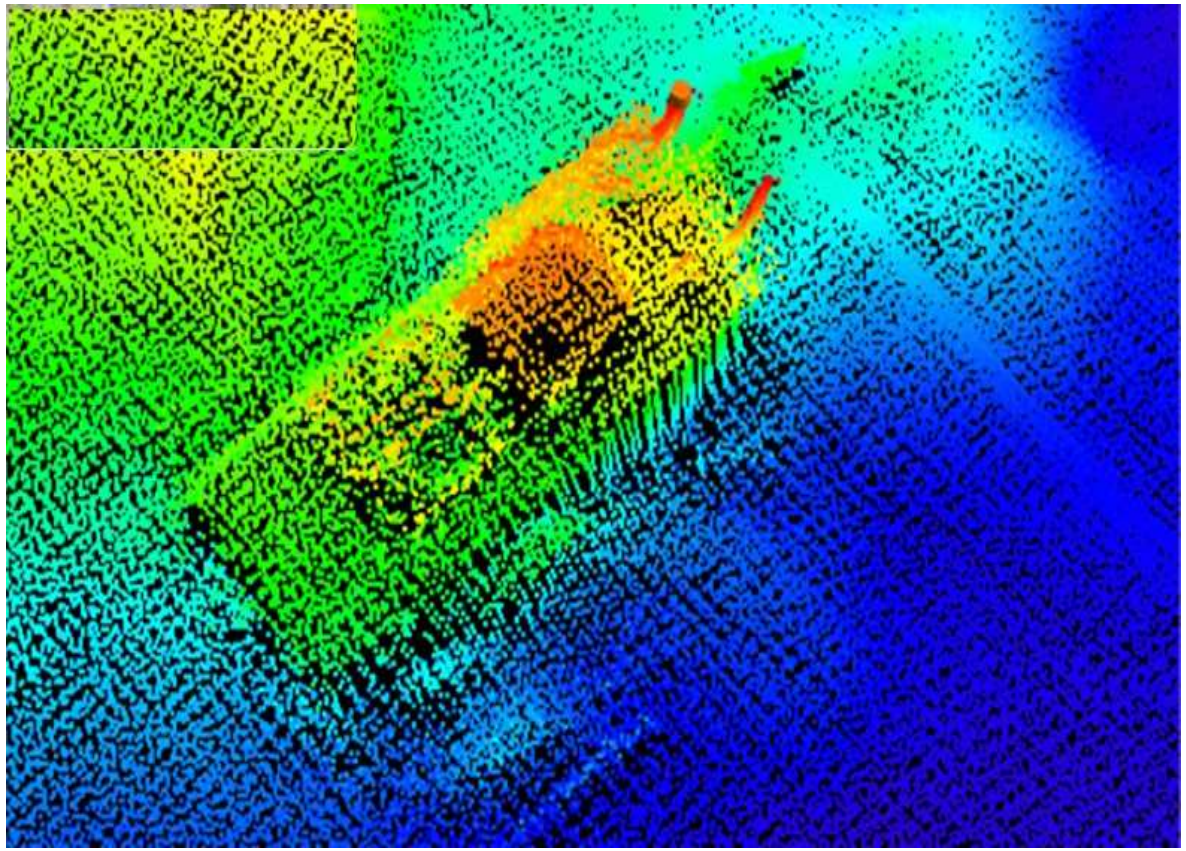
KHOA & IHO

S-100: Best practices - S-102 IN NORWAY!



Sleipnir manouvers: the biggest crane ship in the world in a narrow navigable passage using S-102

S-100: Best practices - South of Baton Rouge (USA): Use of S-102

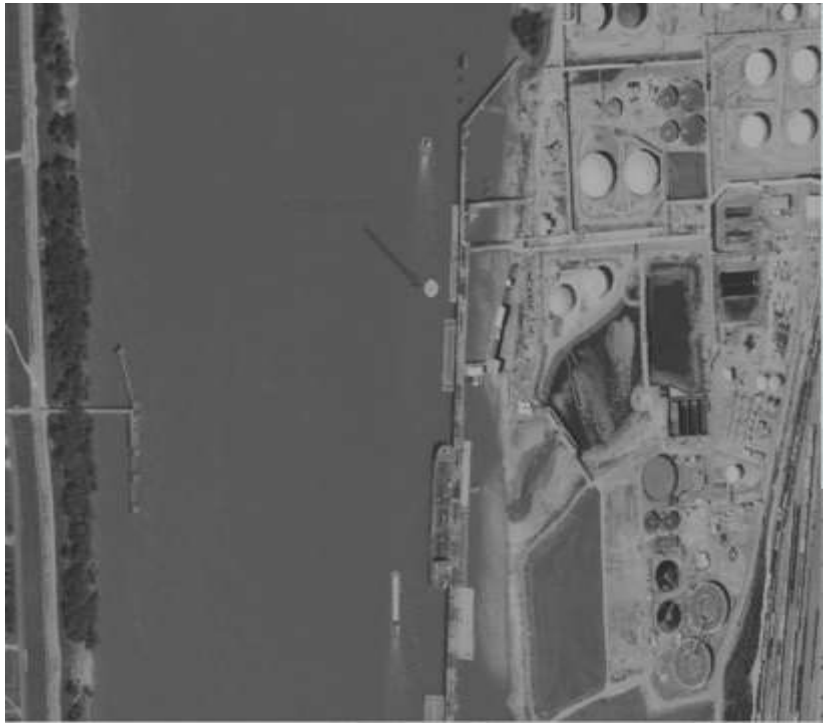


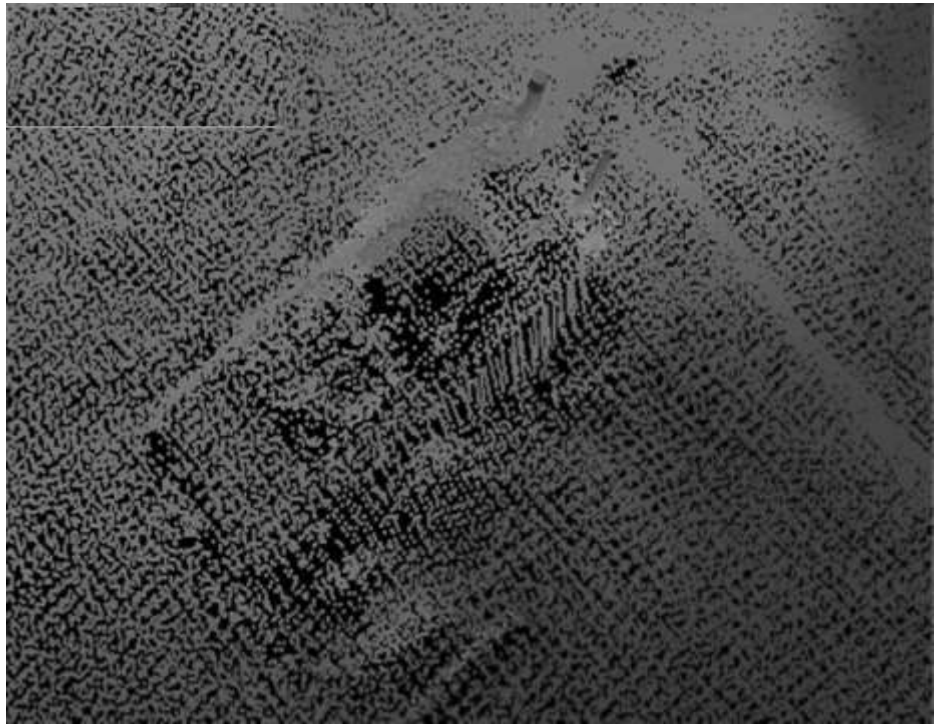
Many incidents in the Lower Mississippi are caused by underkeel shallow waters

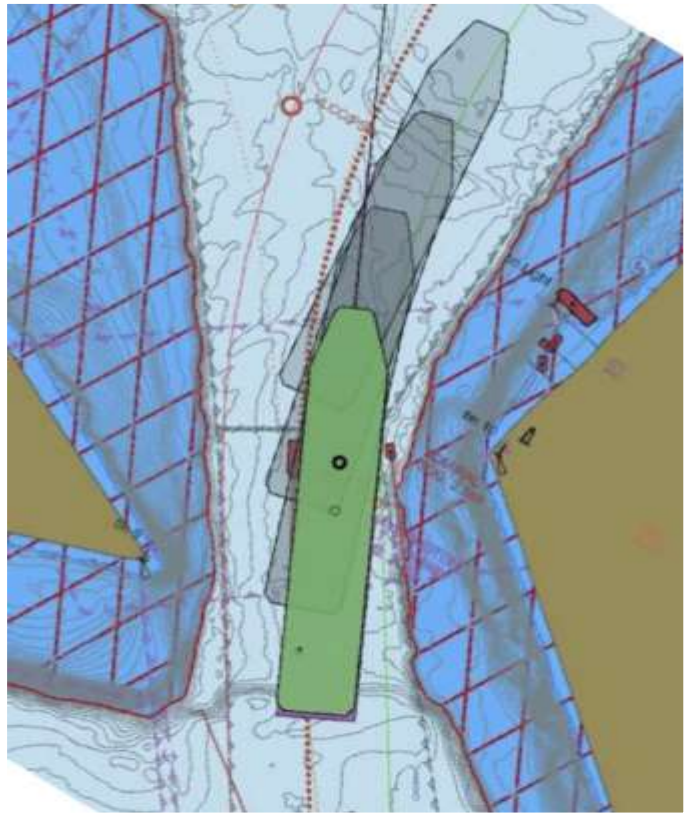
S-100: Best practices - South of Baton Rouge (USA): Use of S-102

Office of Coast Survey

National Oceanic and Atmospheric Administration





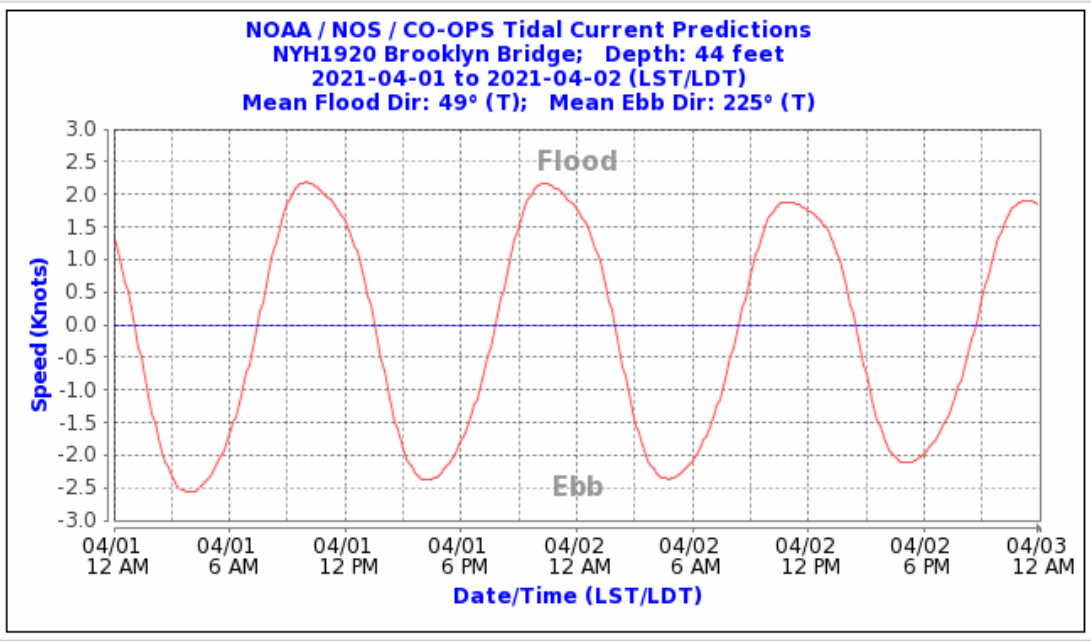


S-102 “Bathymetric information” can improve safety and allow better draft

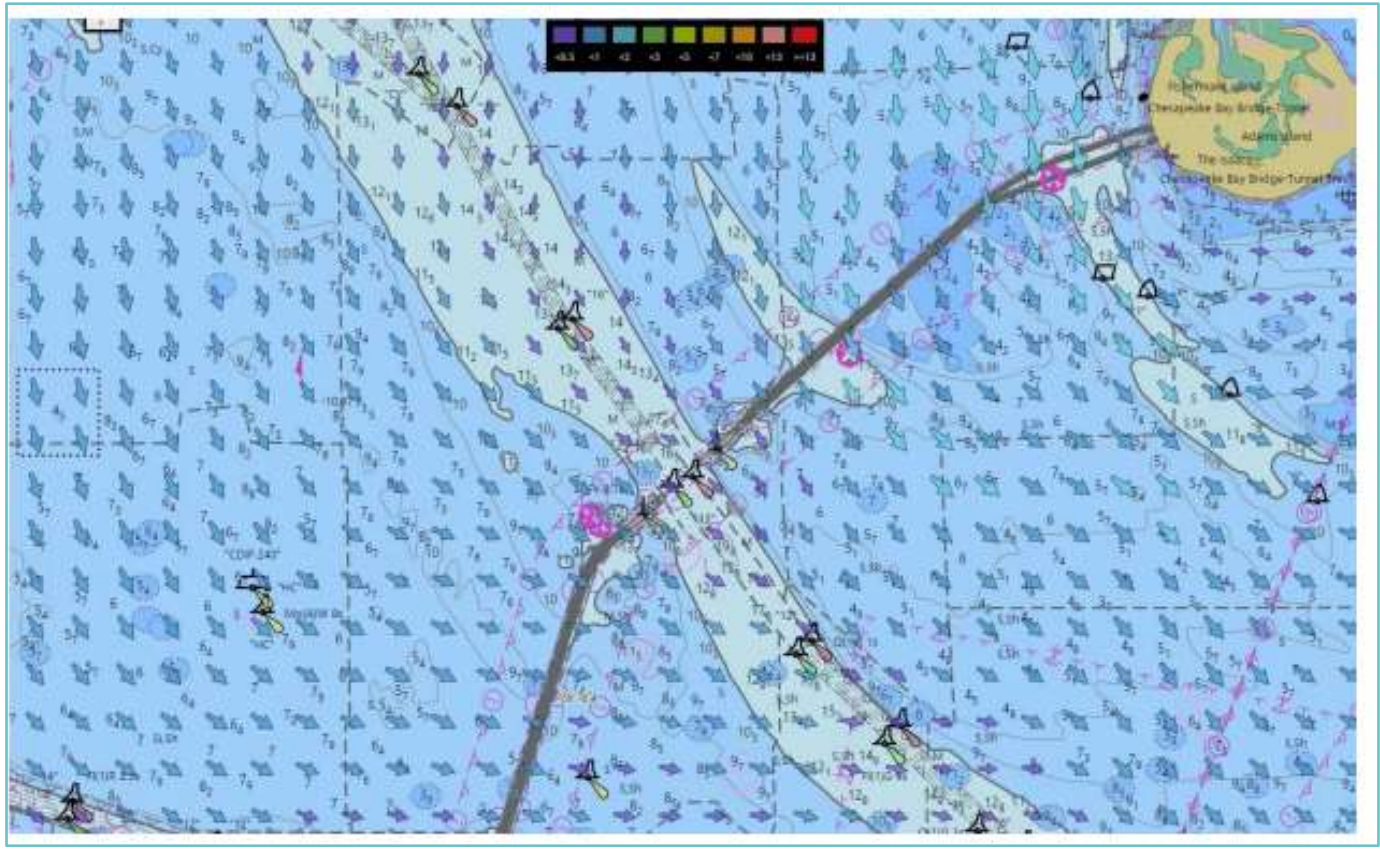
S-100: Best practices - USE OF S-104 E S-111 IN THE U.S.A.!

Brooklyn Bridge (NYH1920) Depth: 44 feet
LAT/LON: 40.7060° N 73.9977° W

Note: Depth is measured below chart datum.

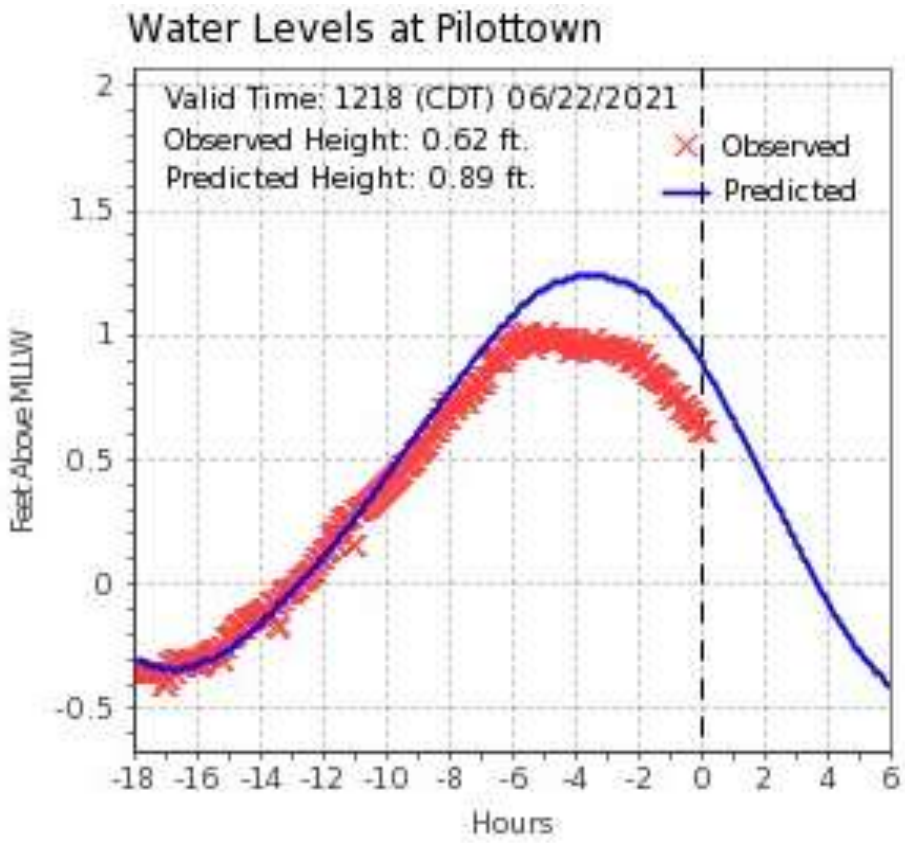


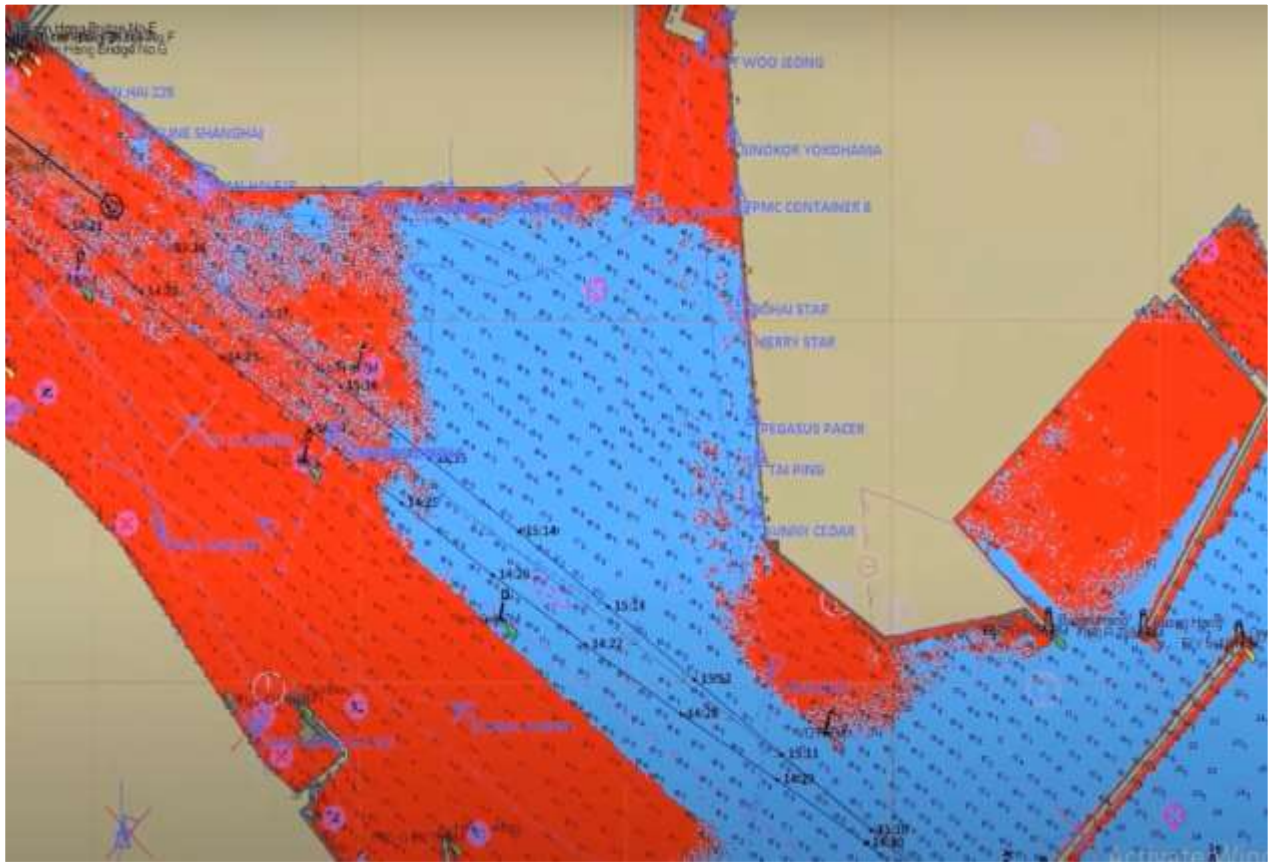
S-104 Tide levels



S-111 Surface currents

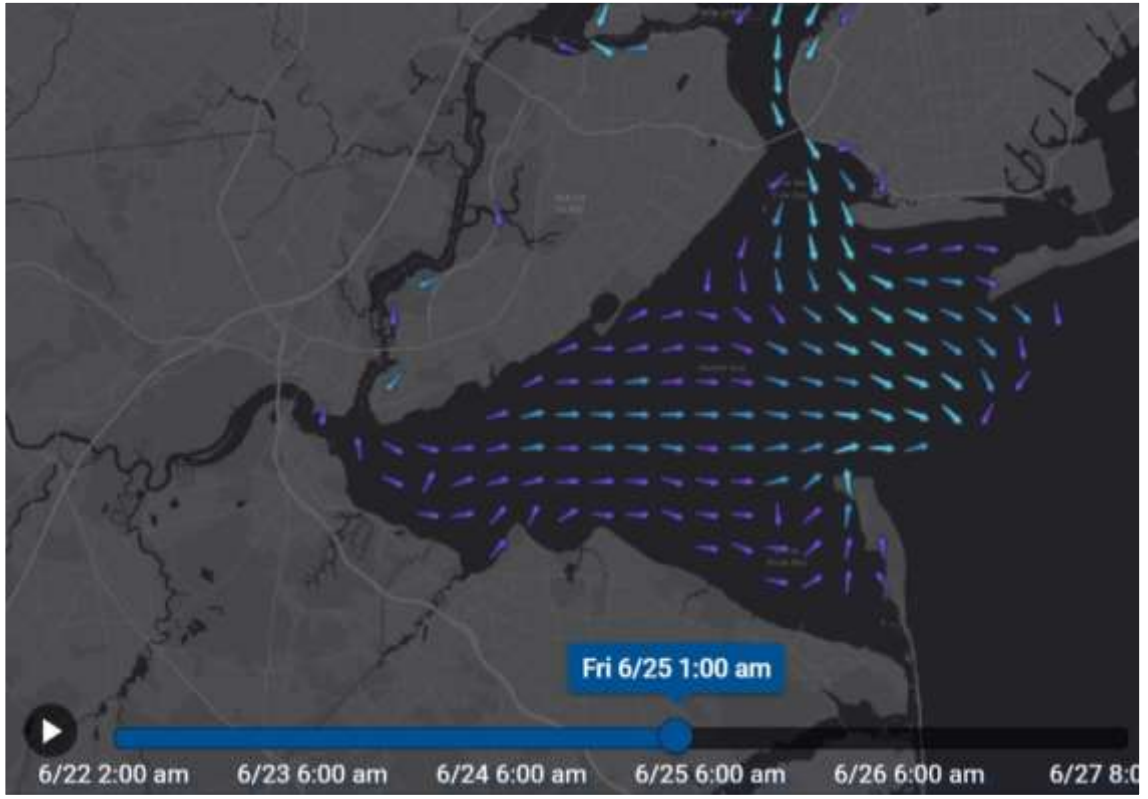
S-100: Best practices - USE OF S-104 IN NEW ORLEANS (USA)!





The data provided by the S-104 product provides clear information on where it is safe for the ship to maneuver

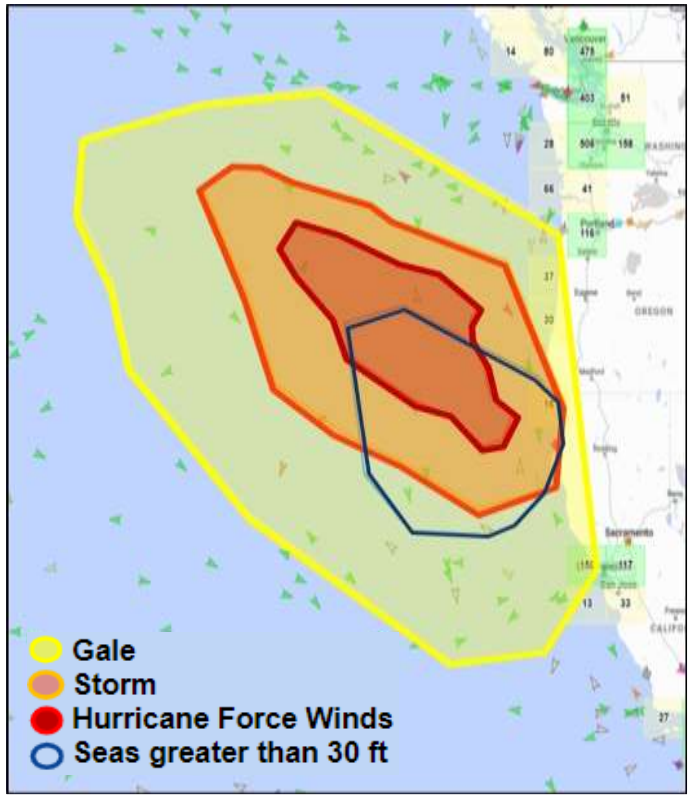
S-100: Best practices - S-111 ROUTE PLANNING



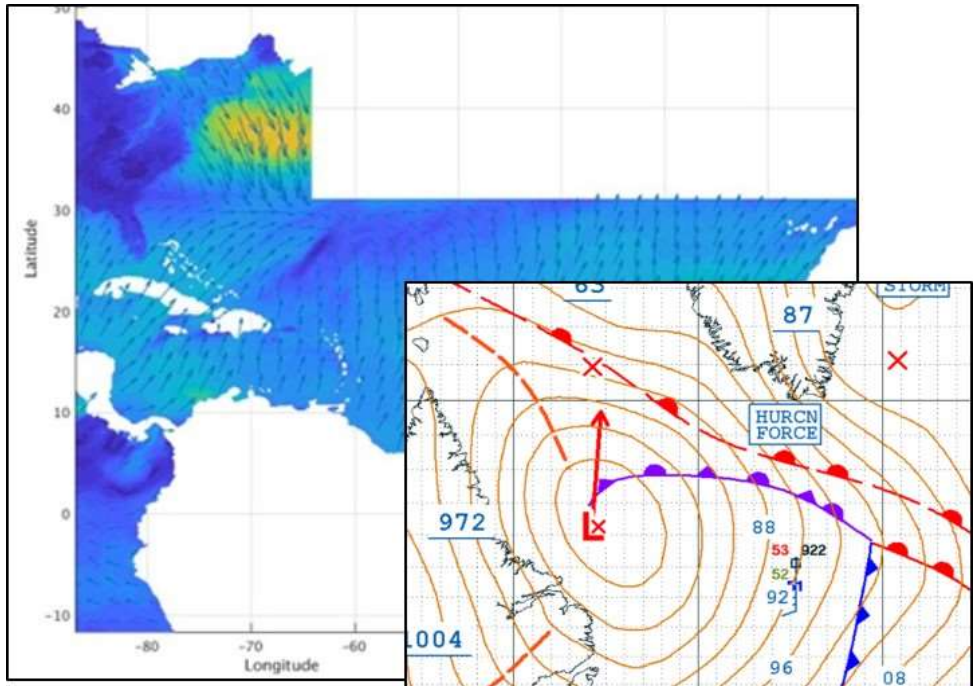
The surface current data provided by the S-111 product helps optimize the ship's route, in terms of less fuel used, reduced CO2 emissions and cost

S-100: Best practices - S-41X: WAVES AND WEATHER CONDITIONS AT SEA

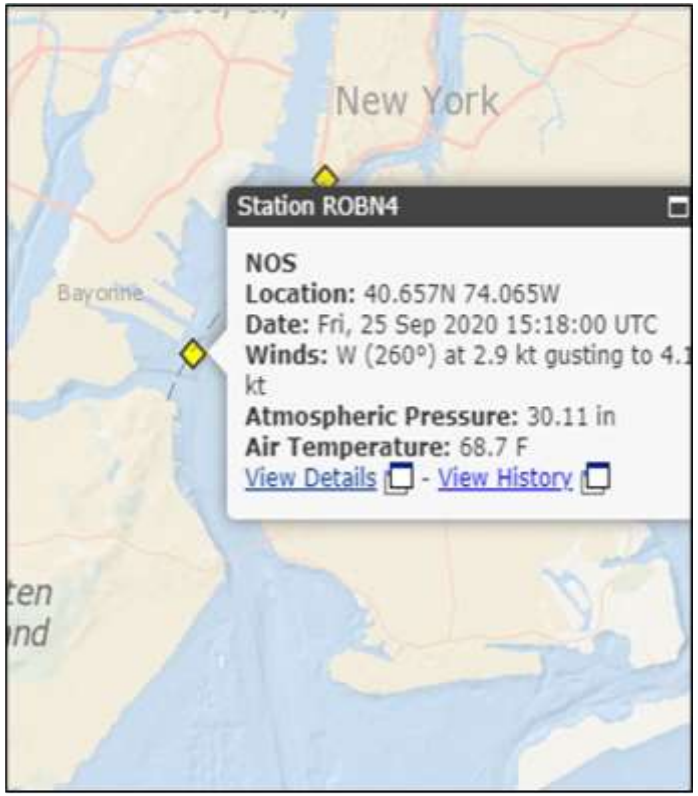
S-412: Weather Overlay



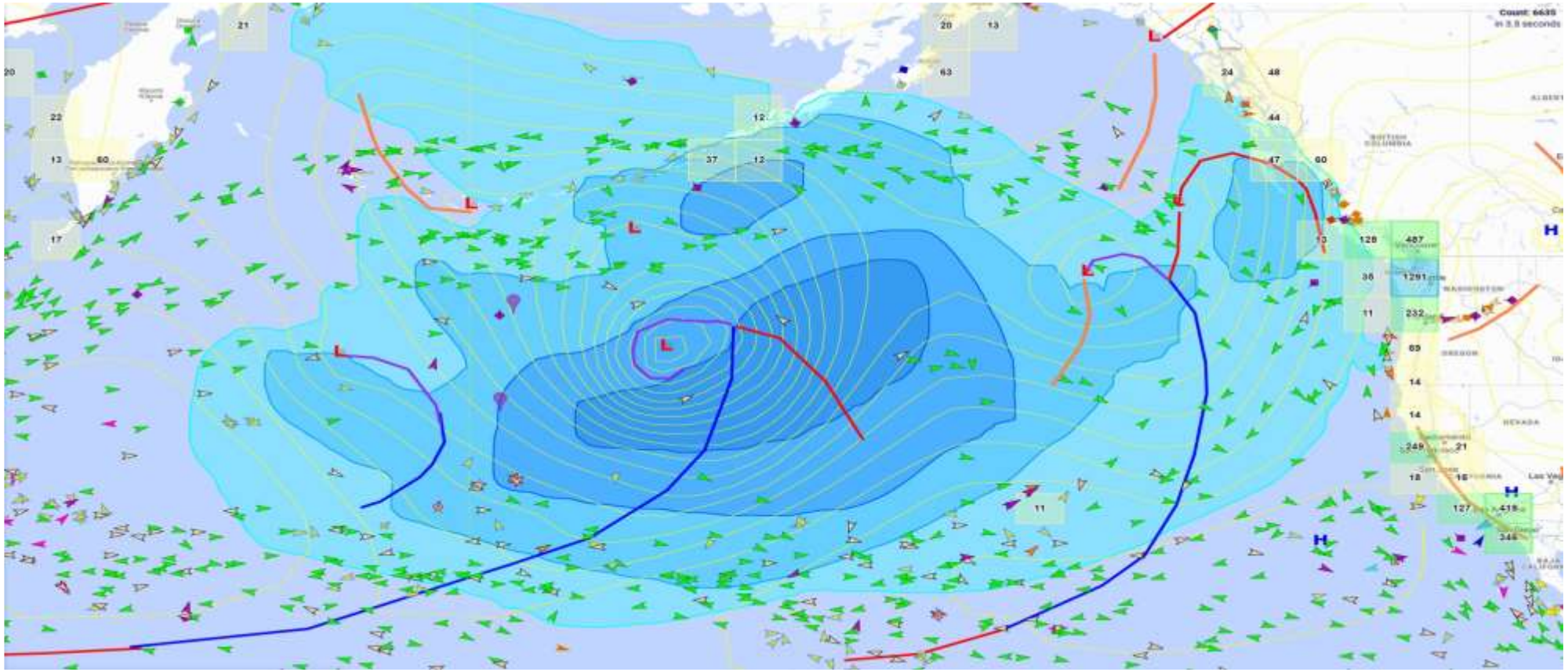
S-413: Weather and Wave Conditions



S-414: Wave and Weather Observations



S-100: Best practices - S-41X: DEPARTING FROM NEW ORLEANS (USA)



S-41X product provides weather-marine information critical to navigational safety

CONCLUSIONS:

- S-100 IS A REVOLUTION FOR THE MARITIME INTERNATIONAL COMMUNITY
- S-100 PROVIDES A COMPLETE 4D PICTURE OF THE MARINE ENVIRONMENT, USING DATA AND INFORMATION USEFUL FOR THE MARINERS
- THE S-100 DEVELOPMENT IS HAPPENING WITH ALL THE INTERNATIONAL MARITIME STAKEHOLDERS
- THE USE OF S-100 WILL IMPROVE THE RESPECT FOR THE MARINE ENVIRONMENT

IHO International Hydrographic Organization

Thank you for your attention

1921–2021

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