



Pêches et Océans  
Canada

Fisheries and Oceans  
Canada

# Canadian Hydrographic Service

Surveying and Charting Canada's  
Waters Since 1883

## Moving to Digital Operations

Dr. Geneviève Béchard

Director General

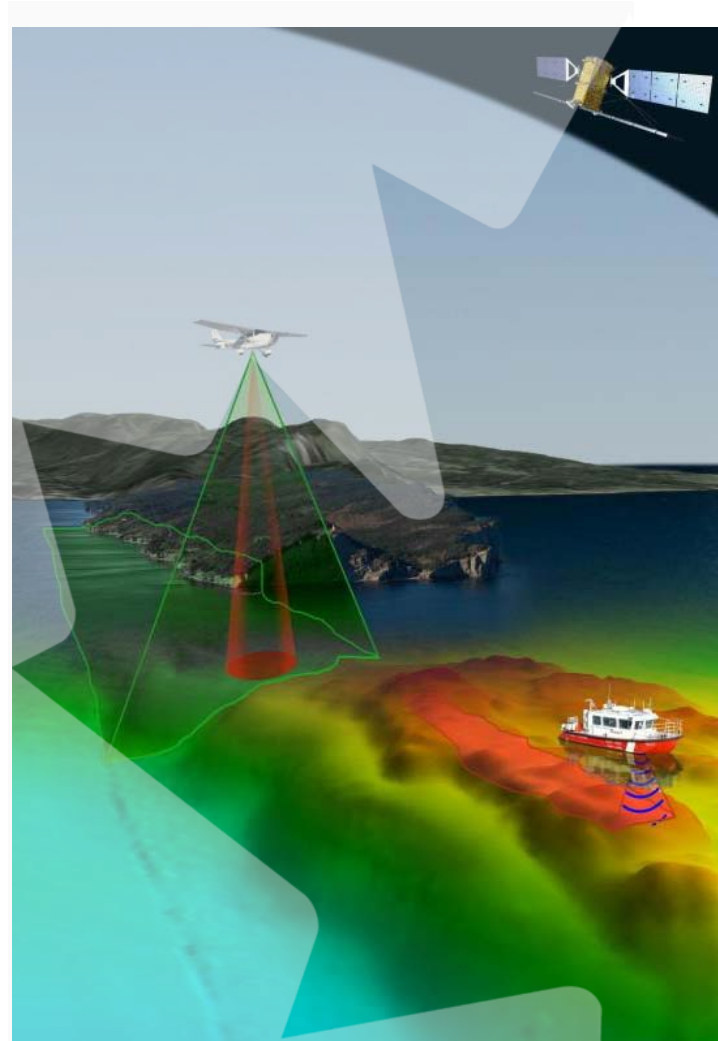
Hydrographer General of Canada

Canadian Hydrographic Service

Fisheries and Oceans Canada

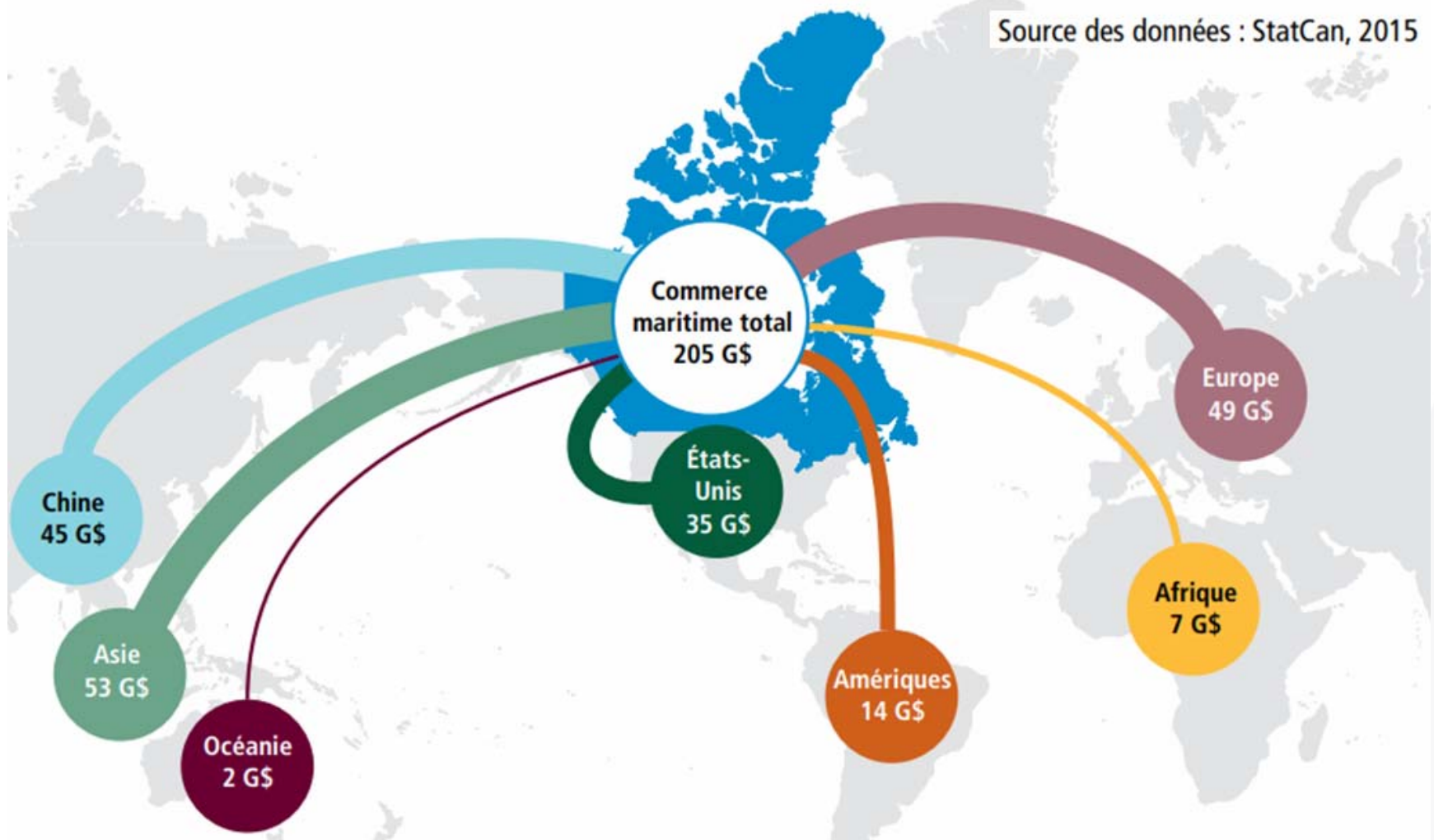


CMOS Lunch Meeting  
February 19<sup>th</sup>, 2020



# Canada is a Maritime Nation

Source des données : StatCan, 2015

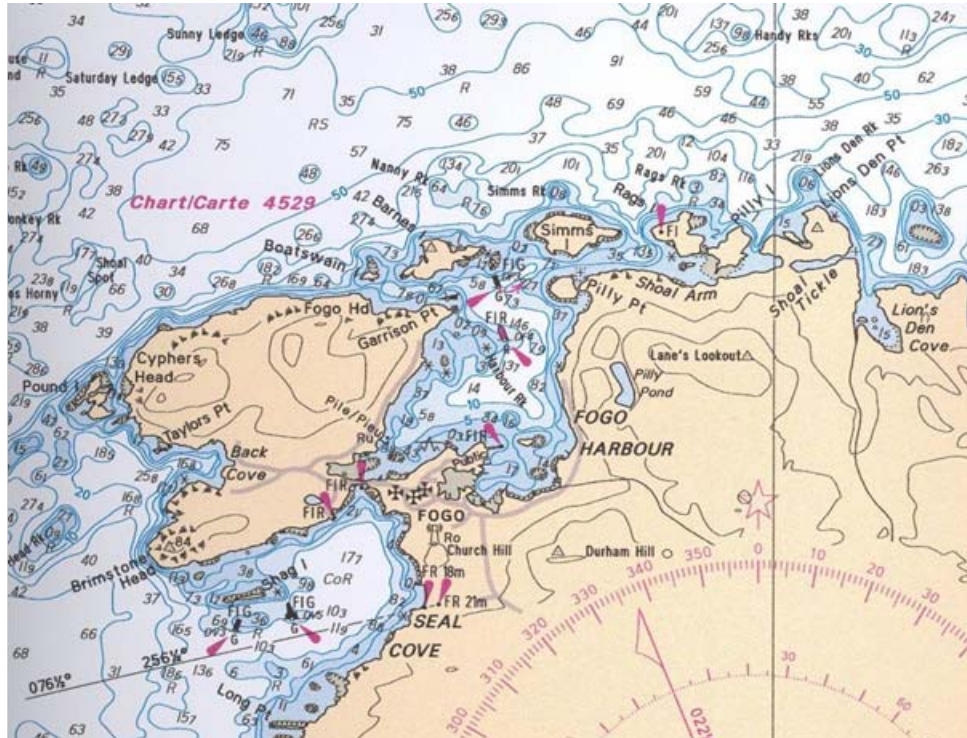


# Why Chart? Legal Requirements

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- The *Charts and Nautical Publications Regulations, 1995* (made pursuant to the *Canada Shipping Act, 2001*) requires most vessels in Canadian waters to carry and use nautical charts issued officially by, or on the authority of, the Canadian Hydrographic Service (CHS)
- CHS produces nautical charts and navigational products to support safe navigation; monitor tides and water levels to detect and predict coastal natural hazards; conduct ocean and freshwater mapping; work to determine Canada's maritime boundaries and sovereignty
- The Minister of Fisheries and Oceans is responsible for providing hydrographic services under the *Oceans Act*
- The International Convention for the Safety of Life at Sea (SOLAS) requires ships to carry and use up-to-date charts

# What Are Charts?



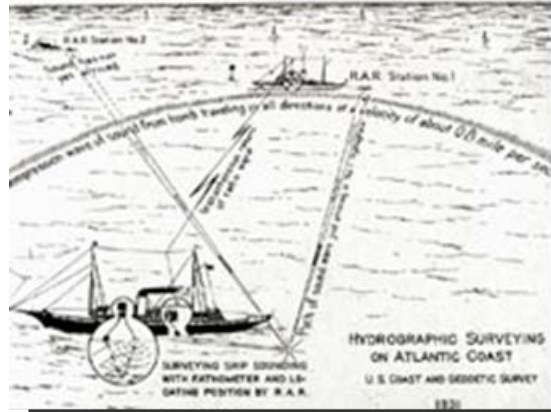
- Nautical charts are essential tools specifically made to allow mariners to plot a safe course to be followed.
- Charts portray water depths, dangerous shoals, conspicuous features, tides, currents, detailed shoreline, aids to navigation, place names and many other types of information that are *critical to safe marine navigation* and other marine activities and industries.



# Evolving Technologies



Lead line



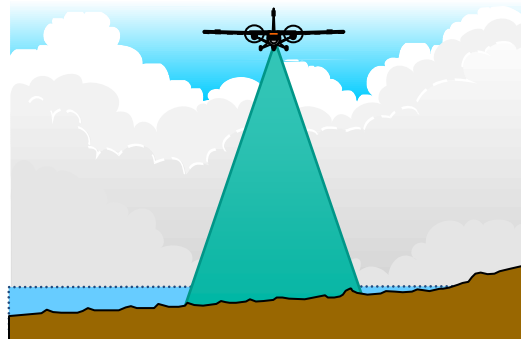
wiredrag navigation survey



radio acoustic ranging



Multibeam

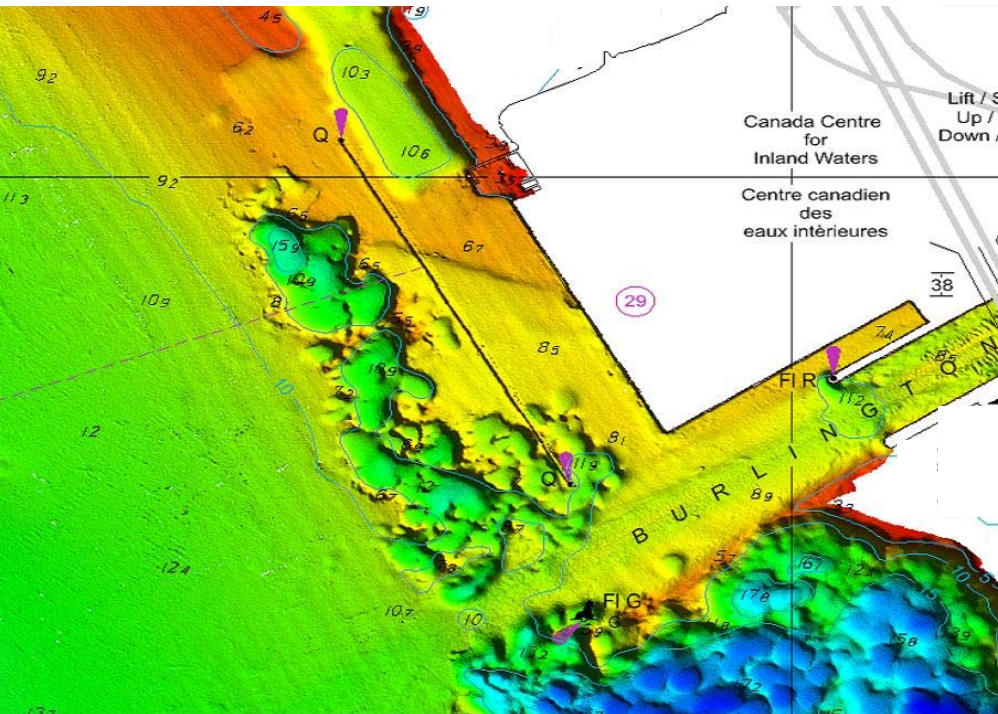


LIDAR

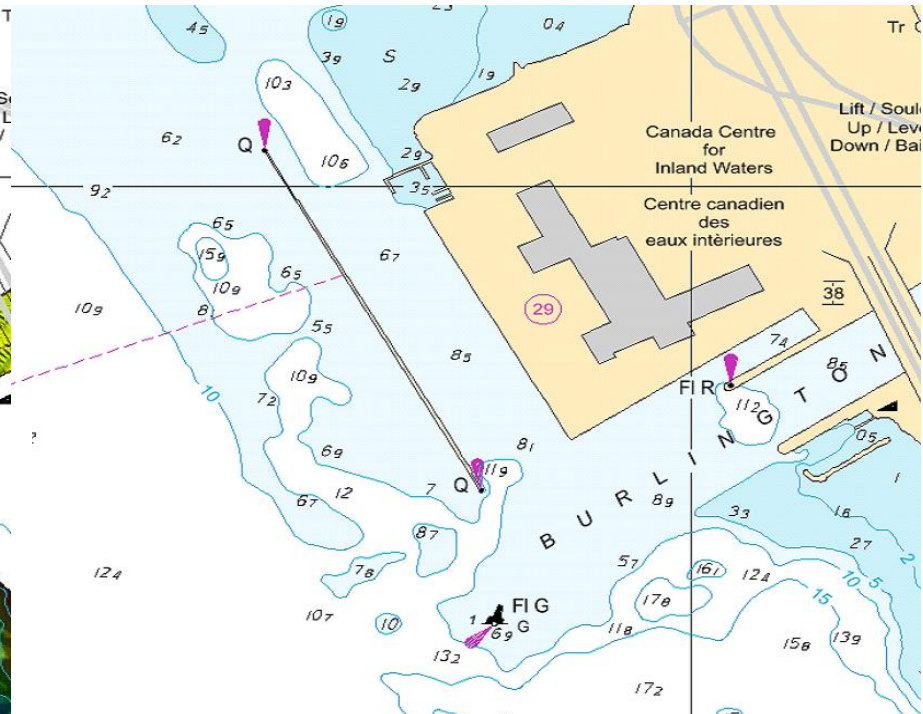


satellite

# About Charting and Mapping...



Seabed Map



Chart

# S-100 **WORLD**

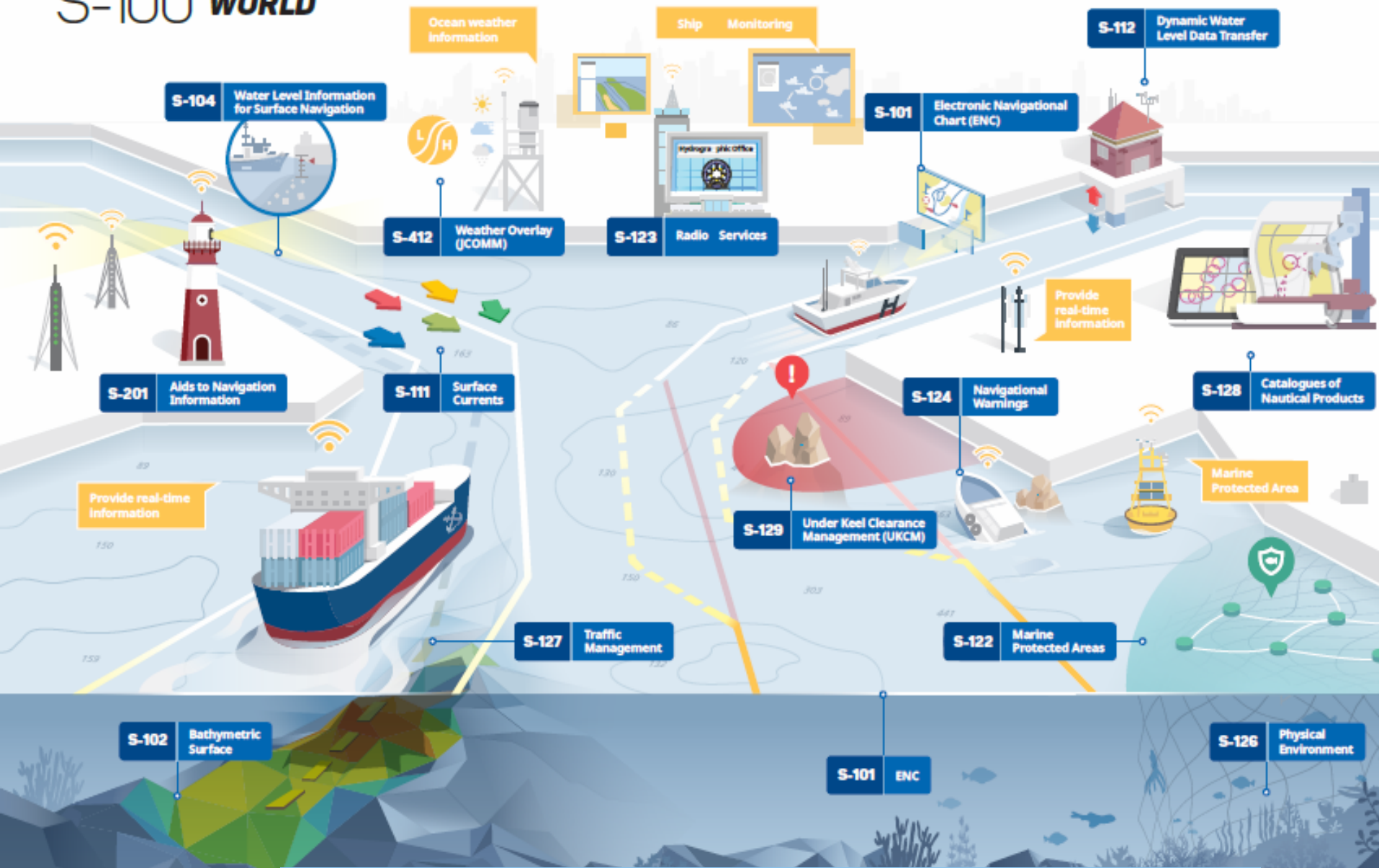


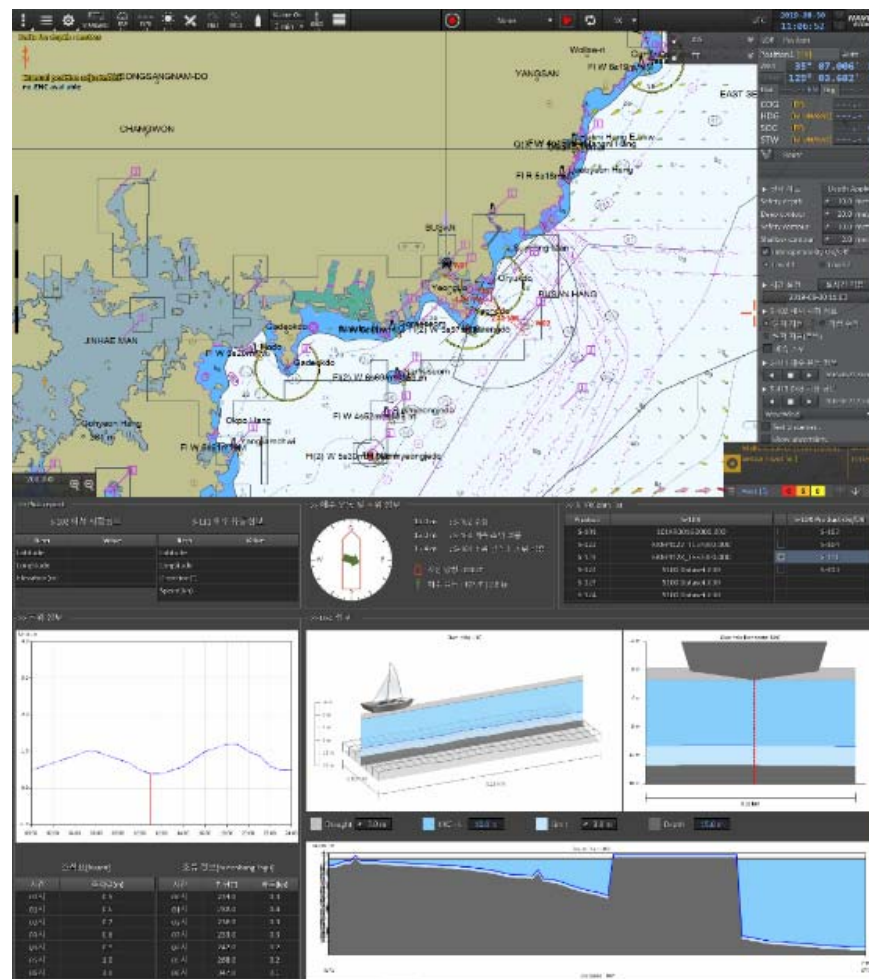
Image credit: Korea Hydrographic and Oceanographic Agency



# What's Happening at the IHO

## New International Hydrographic Organization Strategic Direction

- IHO Assembly (April 2020) will be asked to endorse a 6-year Strategic Plan and a 10-year Implementation Strategy for S-100
- Plan to be synchronized with the International Maritime Organization
- World Hydrography Day 2020 theme: "*Hydrography – enabling autonomous technologies*"





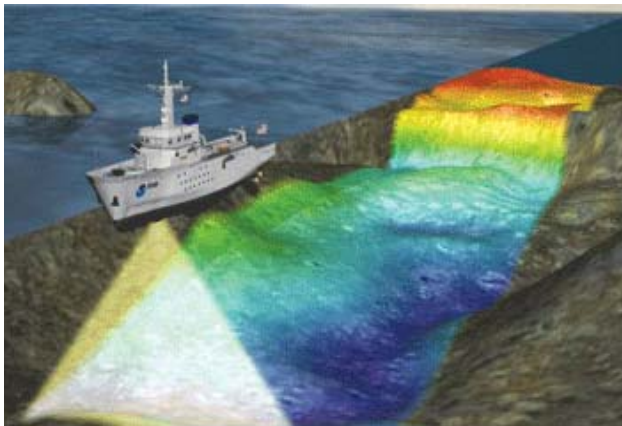
# Transformation throughout the Hydrography Chain



Data Acquisition

Data Integration

Data Dissemination

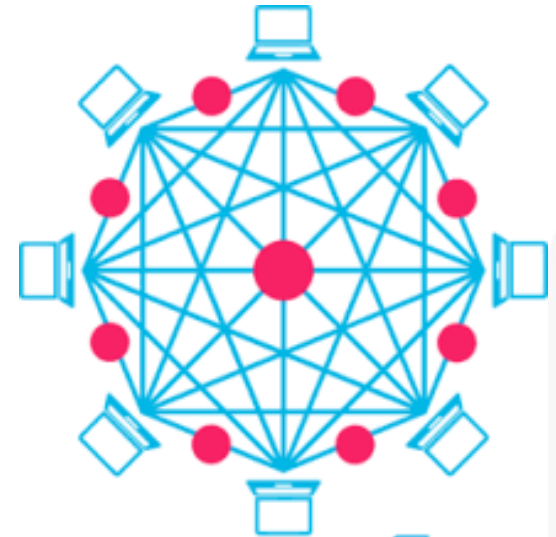


Production BDB Server

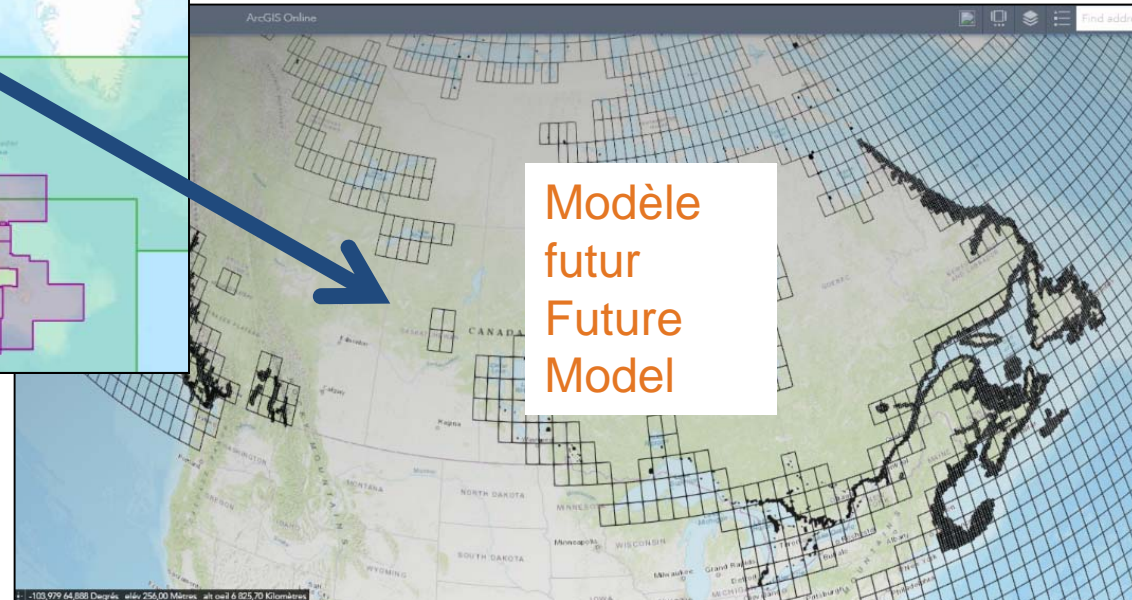
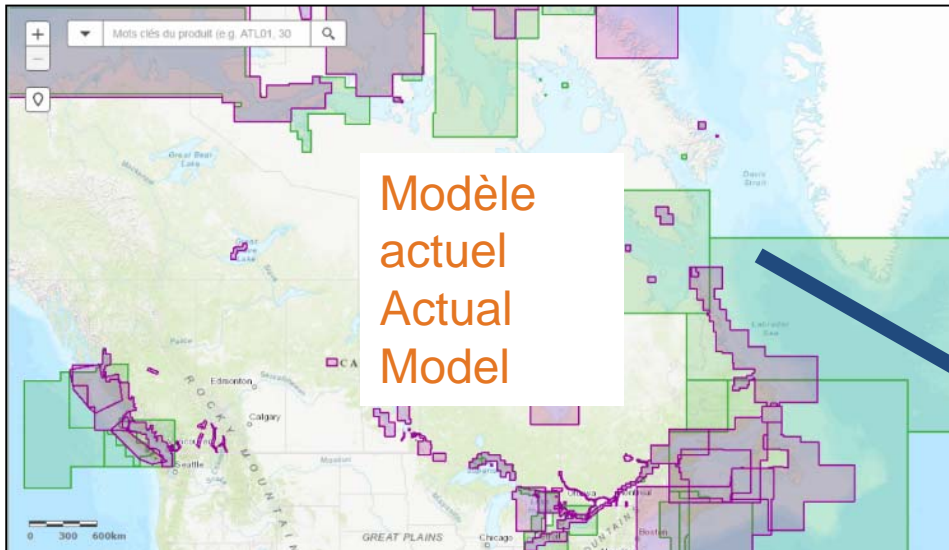
Outdated Cells



Combine & Export

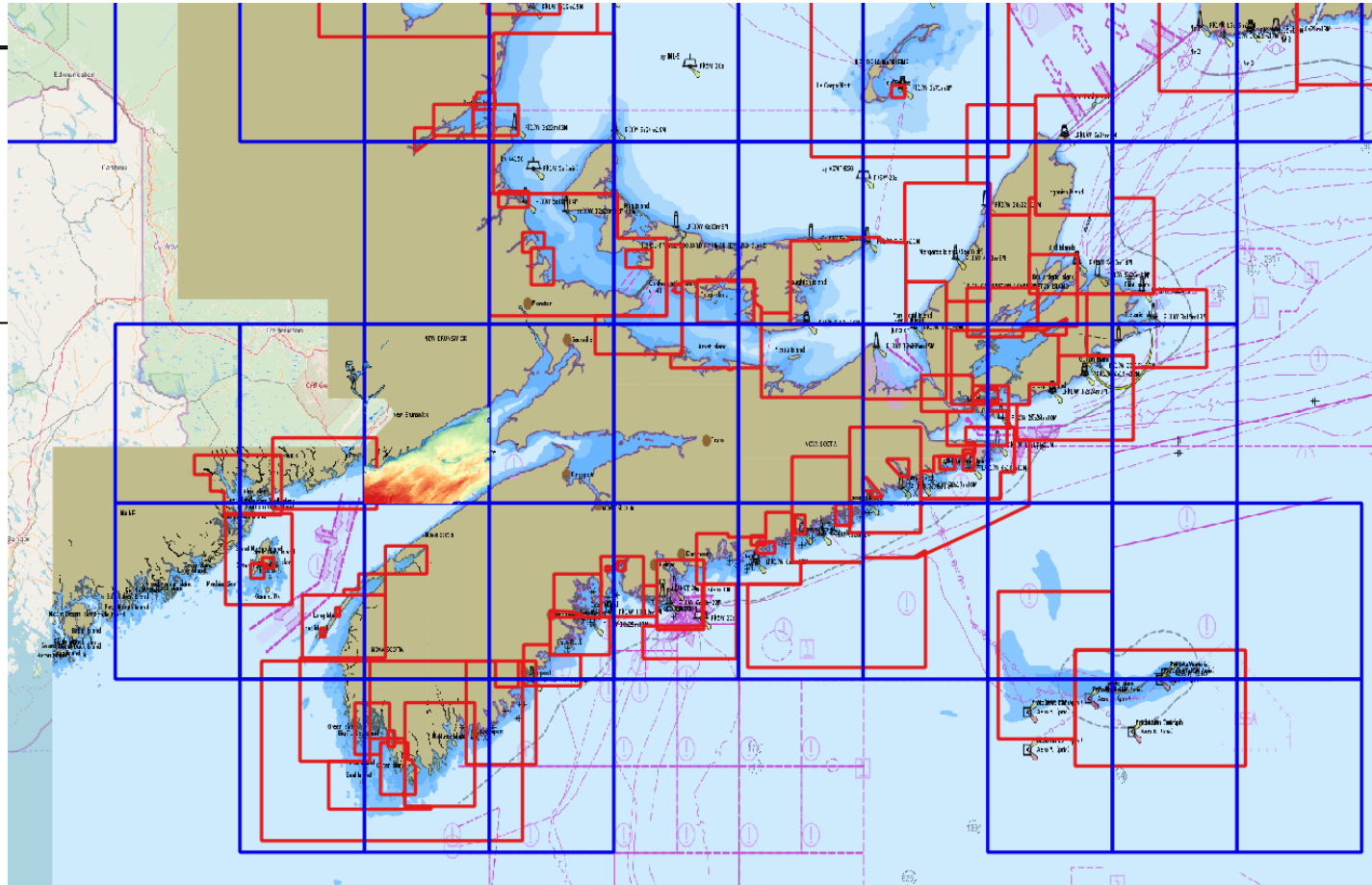


# Infrastructure of Gridded Cell Scheme Enables e-Navigation



# What would gridded ENC cells look like?

S-102 Overlay





## CHS Bathymetry in CARIS Bathy DataBASE



TELEDYNE  
CARIS



*Click for video*





# CHS Bathymetry in CARIS Cloud in Kongsberg S-102 Demonstrator



*Click for video*

# High-definition bathymetry (S-102) User Trials

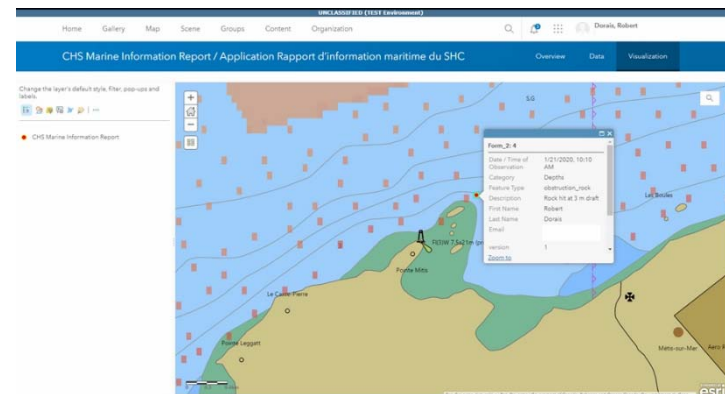
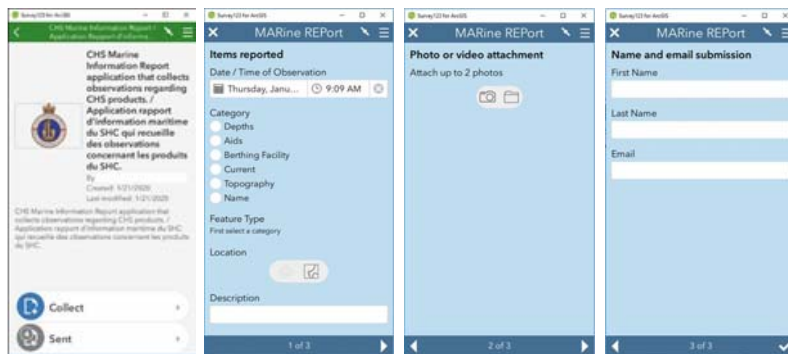
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- High-definition bathymetry (S-102) User Trials on the St. Lawrence River began December 2<sup>nd</sup> and will go on until March 2020
- For the purposes of testing delivery of data to ships, this User Trials project involves CHS working with Norway and industry (Teledyne CARIS) to test the dissemination of S-102 Bathymetry data to pilots and other users including Port of Montreal, Canadian Coast Guard, National Defense and Original Equipment Manufacturers
- Korea coordinating S-100 based Sea trials:

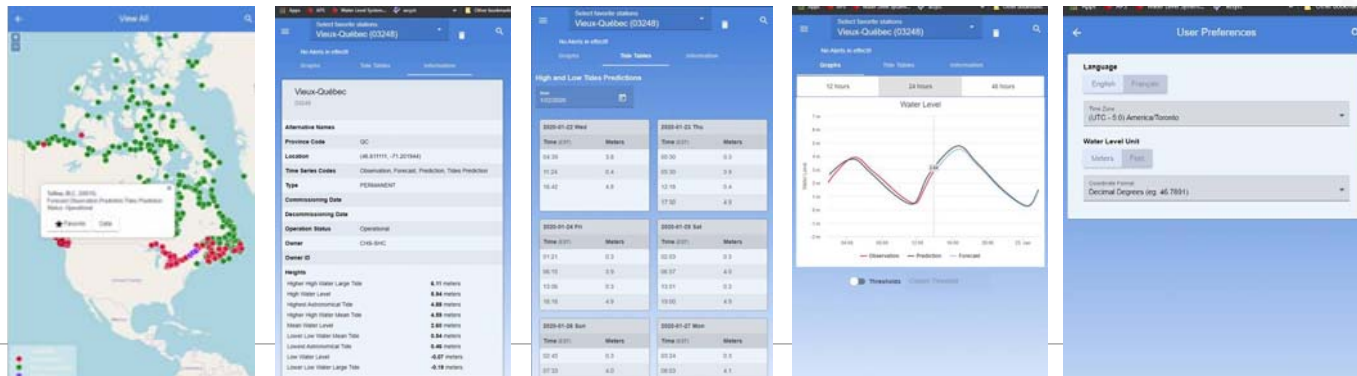
[Korean S-100 Sea Trials](#)

# Developing Digital Services

- MAREP – Marine Information Report – *under development*



- TIDES – V1 is web based, V2 will be a standalone and downloadable



# Moving to Digital Publications

- Sailing directions – Digital  
(<http://www.charts.gc.ca/publications/sailingdirections-instructionsnautiques-eng.html>)
- Tide Table books – Digital  
(<http://www.charts.gc.ca/publications/tables-eng.html>)
- Chart Catalogues – *In progress*  
(8.5"x11" printable format)







# IHO S-121 Standard Pilot Project

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- CHS contracted the Open Geospatial Consortium (OGC) to lead a pilot project on Maritime Limits and Boundaries (MLBs), which aims to operationalise the IHO S-121 standard for MLBs in software for use by the Government of Canada
- DFO – CHS is partnering with Natural Resources Canada / GeoConnections, Geoscience Australia and the United Kingdom Hydrographic Office on this pilot project
- By updating the IHO S-121 Feature Catalogue / Registry and developing tools to support data interoperability in different formats from Canada, United Kingdom and Australia, the project aims to fulfill the deposit of MLBs with the Secretary General of the United Nations and an expansion of the standard to better support the Marine Spatial Data Infrastructure, the Marine cadastre, international land boundaries, fishing zones and maritime regulations.

# Vision for the Future



Port of Rotterdam, the Netherlands