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ARHC
ARCTIC REGIONAL HYDROGRAPHIC COMMISSION

CANADIAN HYDROGRAPHIC SERVICE
SERVICE HYDROGRAPHIQUE DU CANADA

Collaboration in Arctic Hydrography for Maritime Safety and the Protection of the Arctic Marine Environment

Dr. Geneviève Béchard, Director General Canadian Hydrographic Service, Chair of the Arctic Regional Hydrographic Commission

November 17, 2021

IHO

Wearing Two Hats

Director General of the Canadian Hydrographic Service

- We provide up-to-date, authoritative, and standardized hydrographic information
- We help ensure the safe, sustainable, prosperous and navigable use of Canadian waters

Chair of the Arctic Regional Hydrographic Commission

- One of 16 IHO regions that coordinate hydrographic services
- Focus on improving hydrographic services in the Arctic through risk management and technological innovation

Global Context Shifting Rapidly

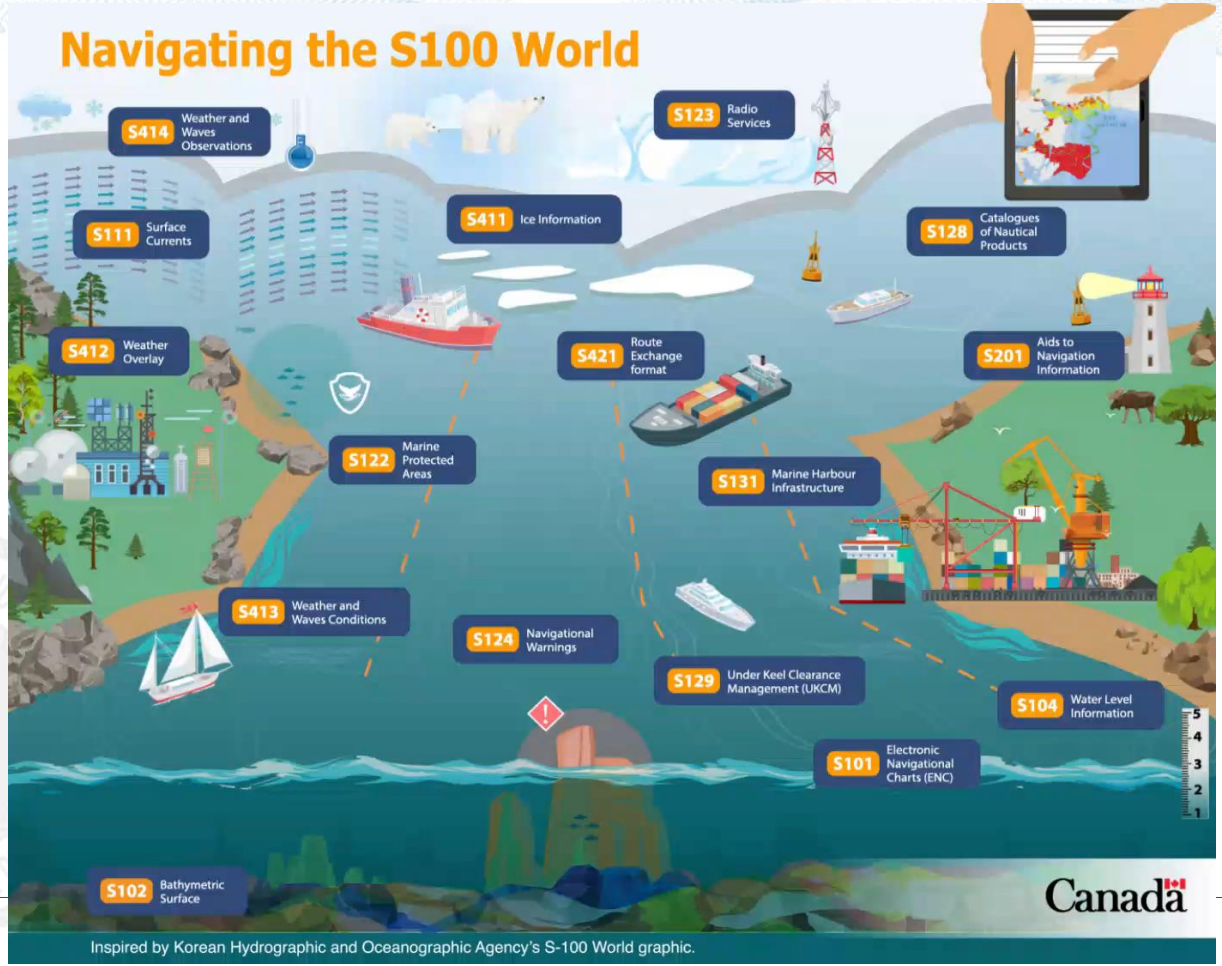
International trend is moving to digital delivery of services to support E-Navigation and autonomous shipping

International Regulatory Context

- IHO (International Hydrographic Organization): Implementing 10-year roadmap to operationalize S-100 international digital standards
- IMO (International Maritime Organization): IMO regulations continue to evolve including the application of Polar Code

Industry Needs Evolving

- Commercial vessels growing in size; operating with smaller margin of error
- Strong demand for machine-to-machine delivery of data, high resolution and real-time products and services in Canadian ports and waterways


Navigating the S100 World
S414 Weather and Waves Observations
S123 Radio Services
S111 Surface Currents
S411 Ice Information
S128 Catalogues of Nautical Products
S412 Weather Overlay
S421 Route Exchange format
S201 Aids to Navigation Information
S122 Marine Protected Areas
S131 Marine Harbour Infrastructure
S413 Weather and Waves Conditions
S124 Navigational Warnings
S129 Under Keel Clearance Management (UKCM)
S104 Water Level Information
S101 Electronic Navigational Charts (ENC)
S102 Bathymetric Surface
Canada
Inspired by Korean Hydrographic and Oceanographic Agency's S-100 World graphic.

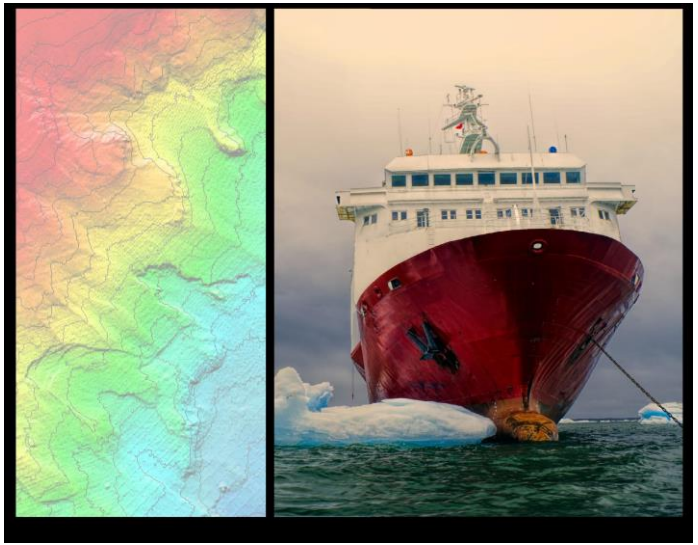
Timeline for the S-100 Ecosystem to Take Shape

Priority Products

Adapting to a Changing Arctic

Need to cooperate to adjust to changing ice conditions and increased marine traffic

- MOU signed by ARHC and PAME in 2020
- Joint policy statement approved in 2021 by Arctic Council
- Recommends Arctic States review, update, and improve existing, and collect new, bathymetric and hydrographic data in the Arctic
- Encourages these governments to find additional resources to strengthen hydrographic surveying in the Arctic



2018 Grounding of Akademik Ioffe

Canada's **Transportation Safety Board** released a report earlier this year

Key recommendations (in summary)

- Improved safety and oversight of passenger vessels travelling in Canadian Arctic
- Improved voyage planning, and knowledge of Arctic navigation
- Proactive monitoring of vessel movement, means to communication with vessels who deviate
- CHS to support risk assessment of planned routes for passenger vessels

Akademik Ioffe sailing through loose ice in Paradise Bay. (Photo: Baron Reznik/Flickr)

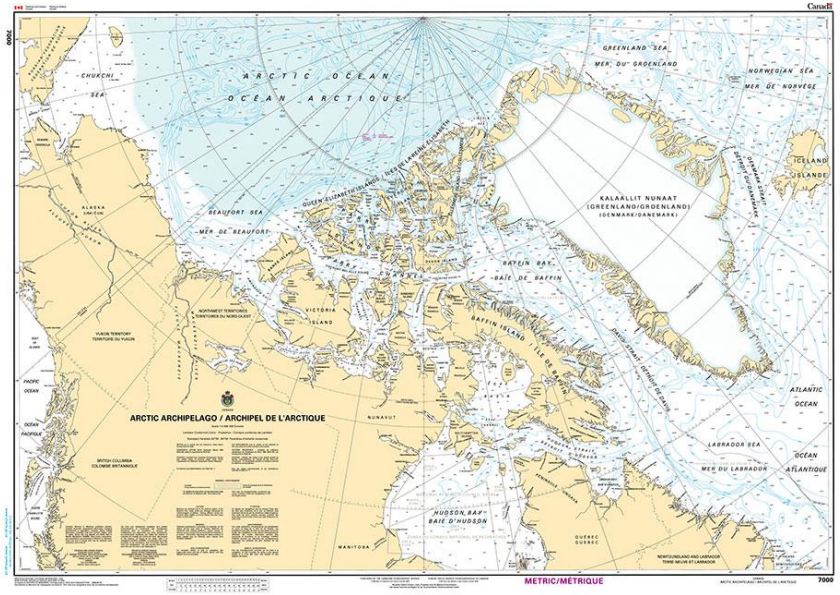
11/12/2021

Importance of Supporting Safe Shipping in the Arctic

- Region with the most data gaps
- Sensitive environment
- Important of filling the gaps
- Communicate risk
- In Canada finishing 5 year program to accelerate mapping
- Focus on proposed low impact shipping corridors

Surveying and Charting the Canadian Arctic

- Covers > 4.4 million km^2 and contains >36,000 islands
- ~ 47 % is underwater
- Intricate coastlines
- ~14% of Canadian Arctic waters have been surveyed to modern standards
- ~40% of the combined draft Primary and Secondary Low Impact Shipping Corridors in the Arctic have been surveyed to modern standards



2021 Arctic Survey Work

Multi-beam Sonar Equipped Icebreakers


CCGS Pierre Radisson


CCGS Louis S. St. Laurent


CCGS Amundsen

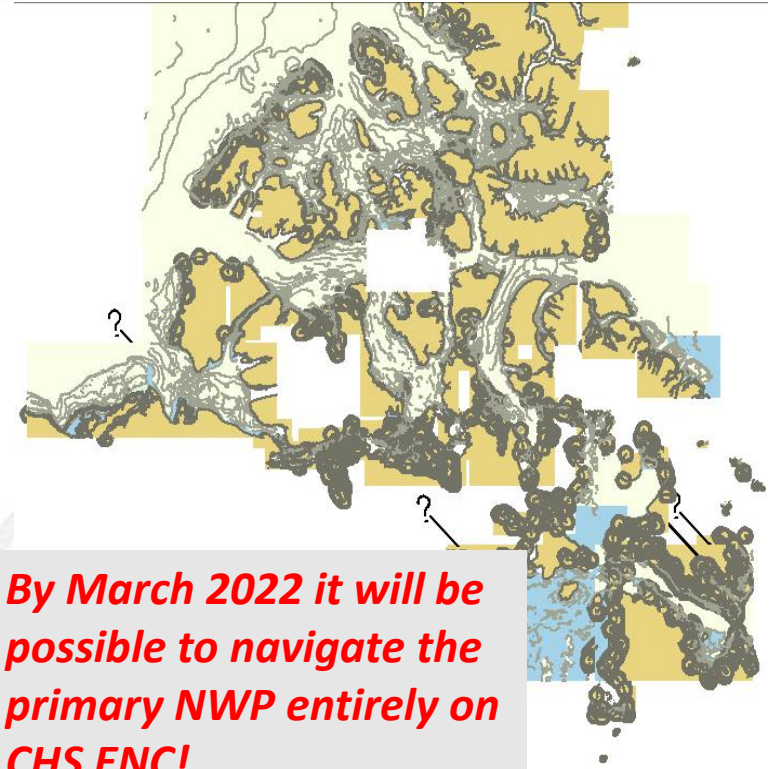
CCGS Sir Wilfrid Laurier


CCGS Des Groseilliers

Important Hydrographic and Ocean mapping **capacity** --- CCG Larson MBES recently installed

Operational Deployment of USV in the Arctic

Filling Arctic ENC Gaps



By March 2022 it will be possible to navigate the primary NWP entirely on CHS ENC!

Over the past year, 9 new ENCs produced, and 3 new editions released

- 59 NOTICE to Marines

CHS Strategy - Prioritize and focus on the Arctic Corridors

- Build up digital/vector *foundational data*

Phase 1: Create first edition ENC to match Paper Chart limits – currently ~ 90% complete.

Phase 2: prepare legacy bathymetry (load into BDB) and update ENC with new bathymetry on priority basis.

Looking ahead - CHS Arctic Strategy

<u>Within</u> the Low Impact Shipping Corridors:

- Focus survey assets on LISC (still ~60% to complete)
- Maximize use of trusted source data collection.
- Fill charting gaps – prioritize the LISC with ENC at the appropriate scale with transition to new ENC grid (under development).
- ENCs will provide “Digital Foundation” for future S100 suite of services.

<u>Outside</u> the Low Impact Shipping Corridors:

- Fully leverage remote sensing technologies (target detection and SDB)
- Work with industry, International partners (IHO) on innovative ways to communicate risk and inform planning
- Collaborate with third parties and Arctic communities on data collection (CSB).

Thank you!

Key Contacts

IHO Data Center for Digital Bathymetry (DCDB) and crowd sourced data working group Chair: Director Jennifer Jencks, Jennifer.Jencks@Noaa.gov

ARHC: Chair 2021-22 chsinfo.xncr@dfo-mpo.gc.ca

Regional Data Assembly and Coordination Center Director (Seabed 2030): arctic-pacific@seabed2030.org

Canadian Hydrographic Service: chsinfo.xncr@dfo-mpo.gc.ca