



e-Navigation in Canada and Modern Marine Navigation Services

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Introduction

- This presentation will provide an overview of Coast Guard's ongoing efforts to modernize marine navigation service delivery in Canada, with a focus on e-Navigation as a driver to advance digital delivery of marine navigation programs.



Marine Navigation Services in Canada

Coast Guard's Marine Navigation Programs provide the foundation for safe and efficient marine navigation in Canada's oceans and waterways and include the following core programs:



Marine Communications and Traffic Services	Provides safety radio-communication services, and vessel traffic services on a 24/7/365 basis.
Aids to Navigation	Provides over 17,000 short-range marine aids, including visual aids such as fixed aids, lighthouses and buoys), audible aids such as fog horns, radar aids such as reflectors and beacons, and long-range marine aids, including electronic aids.
Waterways Management	Provides channel management and design to ensure optimization and accessibility of waterways and contribute to their safe use.
Icebreaking	Provides icebreaking and related services to facilitate the safe and timely movement of maritime traffic through and around ice-covered Canadian waters for the benefit of industry and communities.
e-Navigation	Supports fleet and programs to improve shipping through better organization and exchange of data and communications between ships and with shore.

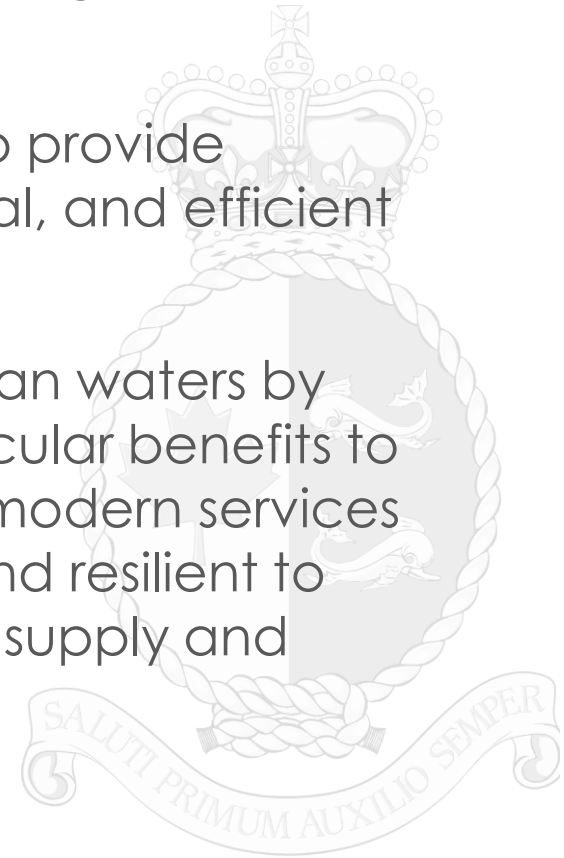
Whole-of-Government Approach to Marine Navigation

- Marine navigation is an interdepartmental effort in Canada. Coast Guard works closely with other Federal departments to deliver services to mariners in Canadian waters. Other departments include:
 - Transport Canada
 - Canadian Hydrographic Services
 - Transport Canada
 - Environment and Climate Change Canada
- Coast Guard works closely with industry through forums such as the Marine Navigation and e-Navigation sub-committees.



Modernization of Marine Navigation Services

- This is a transformative initiative, recalibrating Coast Guard's marine navigation programs to deliver navigation services in a modern and increasingly digital environment.
- Coast Guard is working to modernize its marine navigation services to provide prompt, streamlined, and integrated services for the safe, economical, and efficient movement of maritime traffic in Canadian waters.
- Modern marine navigation services will benefit all mariners in Canadian waters by supporting a robust and agile commercial shipping sector, with particular benefits to the shipping industry, fishing sector, and recreational boaters. These modern services will improve operational efficiencies to become more competitive and resilient to external shocks such as geopolitical issues, global pandemic, shifting supply and demand chains.



Aligning with International Standards

- The Modernization of Marine Navigation Services will allow Coast Guard to improve information sharing of its maritime data products and harmonize levels of services that meet national and international standards and requirements for the safe use and design of waterways and commercial shipping channels.
- Canadian e-Navigation priorities are key drivers of the Modernization initiative:
 - Implementing electronic aids to navigation
 - Digitalizing maritime services
 - Realizing cybersecurity requirements
 - Emergence of autonomous vessels
 - Modernizing vessel traffic management



Drivers for Modernization and e-Navigation in Canada

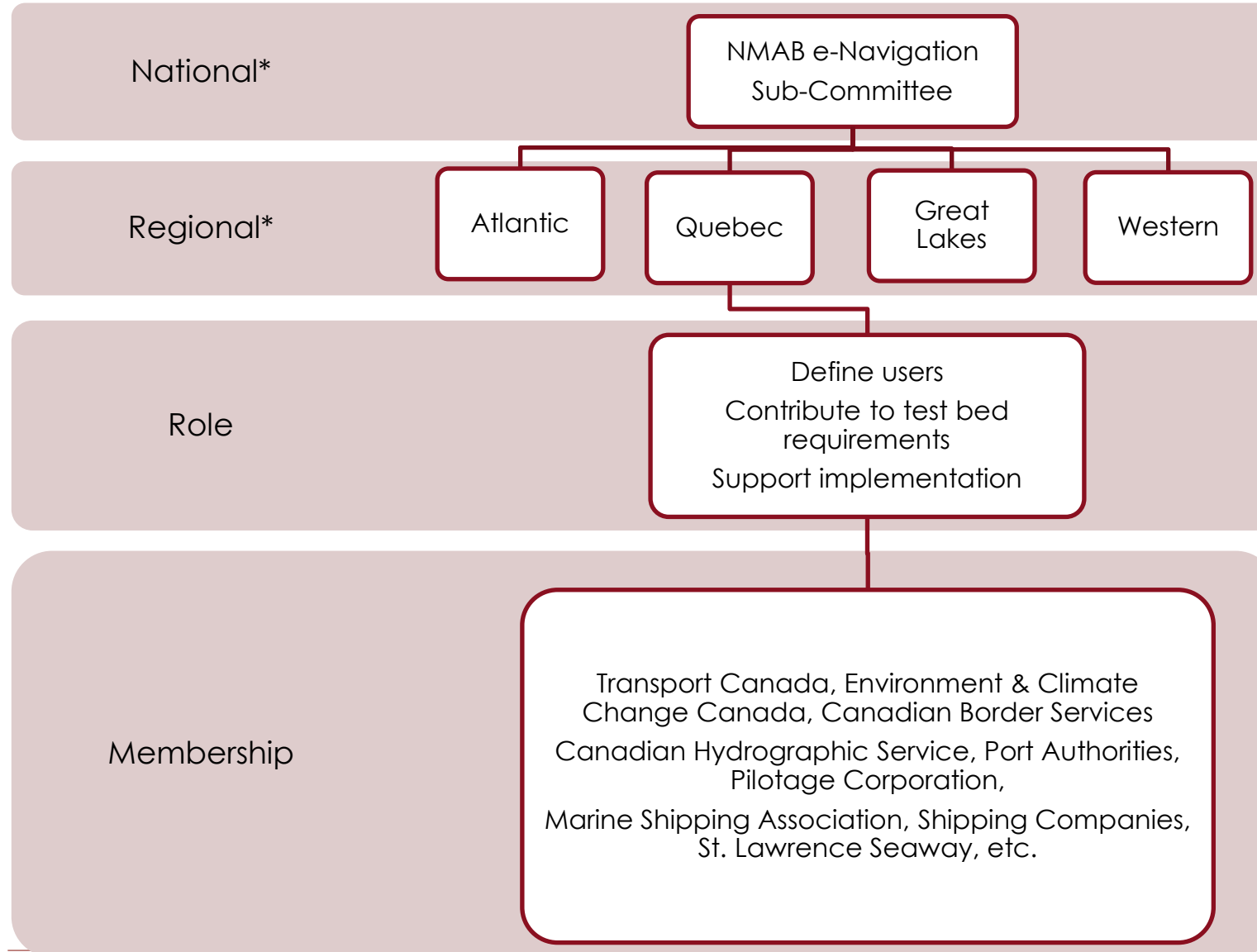
Coast Guard's marine navigation services are fundamental to navigation in Canada but currently lacking in their ability to respond to modern demands.

Coast Guard must address modern challenges including:

- Outdated systems (i.e. Coast Guard's aids to navigation database, Vessel Traffic Management and Information System)
- Reducing/removing redundant reporting requirements
- Coverage gaps across Canada, including the Arctic
- Canadian ports must remain competitive in attracting shipping companies
- Mariners need more near real-time information and added-value information



e-Navigation Governance in Canada

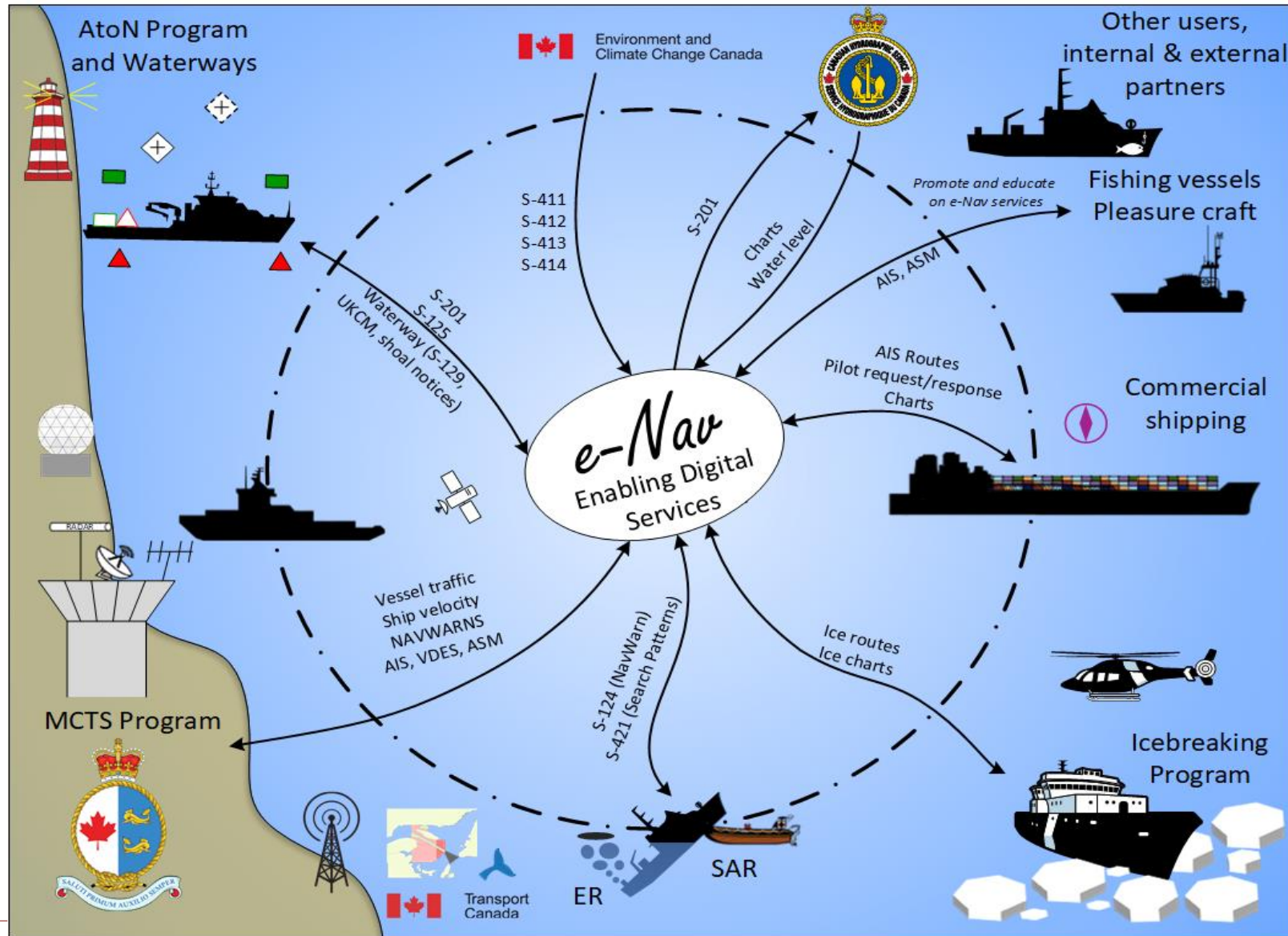


NMAB e-Navigation Subcommittee:

- Advisory council to facilitate the development, orientation and prioritization of all matters pertaining to the implementation of the e-Navigation concept within Canada, and feeds into international implementation of e-navigation
- Members work in partnership to harmonize the e-navigation objectives of the federal government and marine industry
- Regional e-navigation sub-committees oversee regional implementation, in line with national direction and objectives and provide regular reports on regional aspects

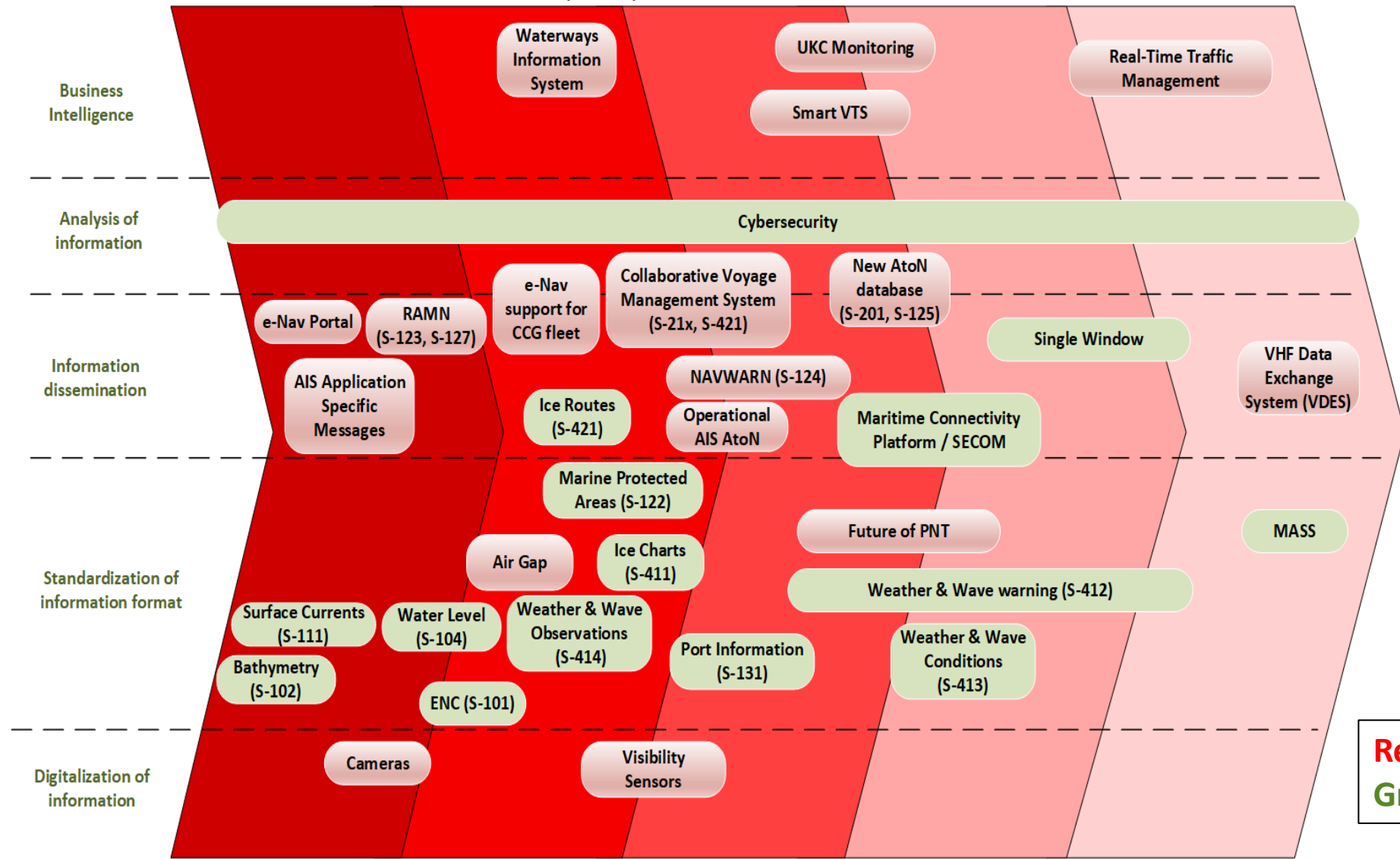
**All Subcommittees are co-chaired by CCG and Industry*

e-Navigation: Enabling Coast Guard's Digital Services



Canadian e-Navigation Implementation Roadmap

Short term (2024/25) Medium term (2028/29) Long term (2030+)



Red - CCG
Green – Federal partners

MASS – Maritime Autonomous Surface Ship VTS – Vessel Traffic Service RAMN – Radio Aids to Marine Navigation ENC – Electronic Navigational Chart
UKC – Under Keel Clearance NAVWARN – Navigational Warning SECOM – Secure Communication PNT – Positioning, Navigation, and Timing
AIS – Automatic Identification System VHF – Very high Frequency

CCG S-100 Services

The two sides of digitalizing Radio Aids to Marine Navigation are S-123 (Marine Radio Services) and S-127 (Vessel Traffic Management)

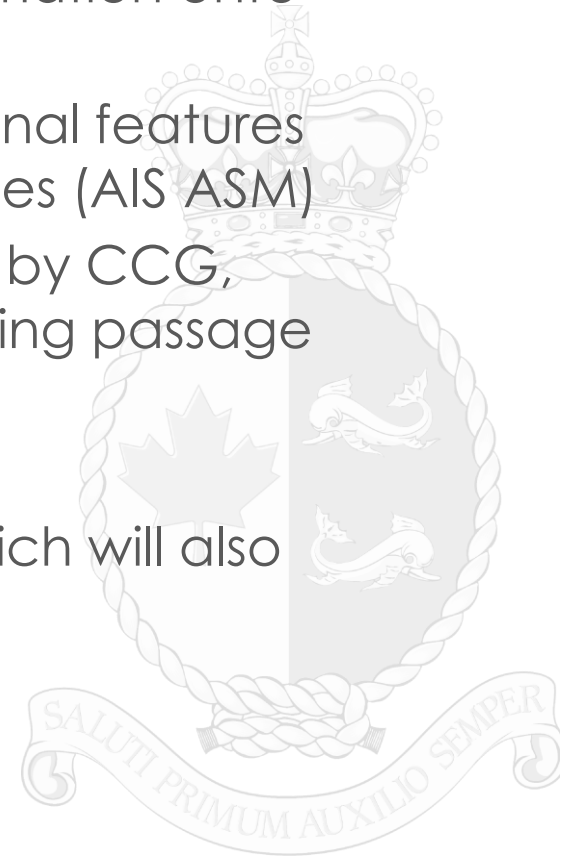
S-123 will allow for information related to CCG radio services to be integrated into shipborne equipment, to facilitate route planning, and will allow for near real-time updates

S-127 will provide a means of geolocating traffic related regulatory information such as reporting points, traffic zones, pilotage services, places of refuge, etc.



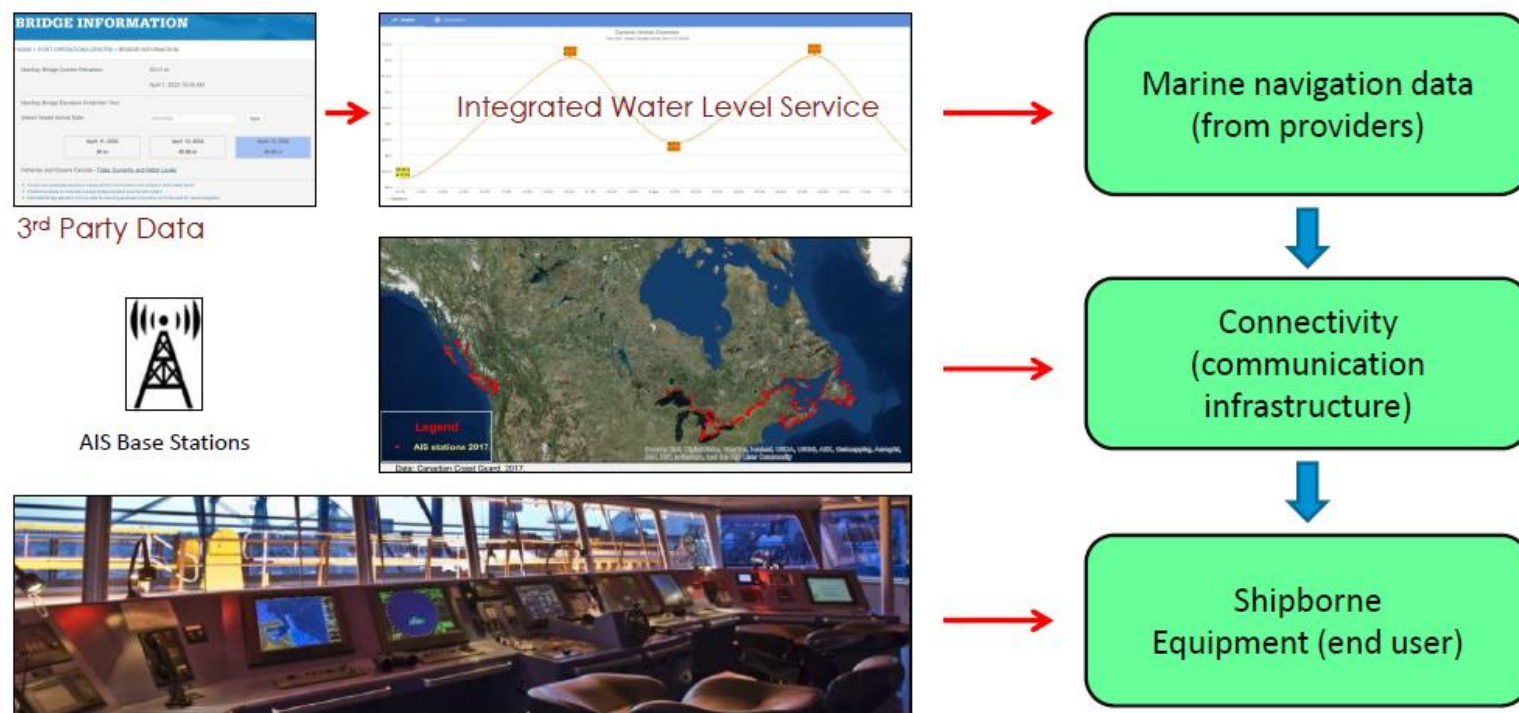
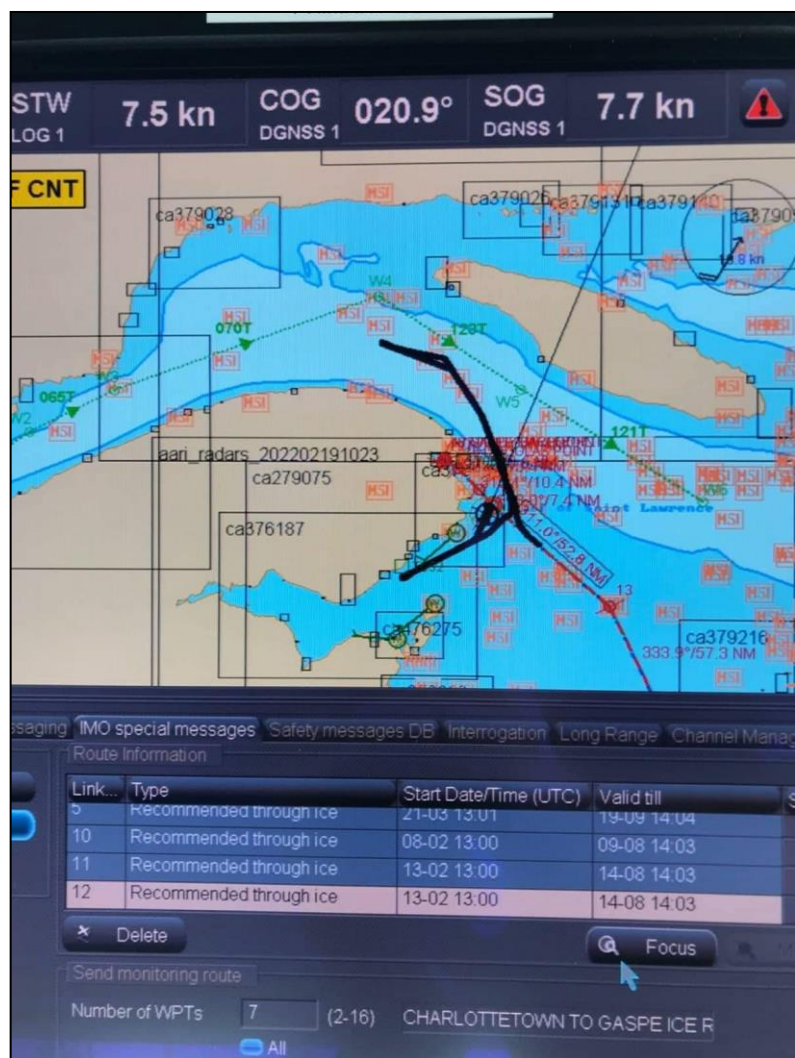
CCG S-100 Services

- Other CCG S-100 Services include:
 - **S-124 (Navigational Warnings)** – trials are ongoing to get this information onto CCG Fleet vessels, it is currently being tested in a lab environment
 - **S-125 (Marine Navigation Services)** – aimed at digitizing navigational features related to aids to navigation and AIS Application Specific Messages (AIS ASM)
 - **S-129 (Under Keel Clearance Management)** – under investigation by CCG, including how S-129 can be used to improve the service of providing passage windows for vessels
- CCG is working on preparing the organization for these products, which will also mean training our people and implementing new systems.



ALS Application Specific Messages

AIS ASM Broadcast Provision Process



e-Navigation Portal

- The website for the e-Navigation Portal has been moved to Canada.ca and updated with a new look.
- All the information that was previously on the portal is still here. New information has been added on Ice Conditions, with a new link added to access information related to Daily Ice Briefings.
- AIS AtoN and AIS ASM layers are also now available on the portal.
- There are two new addresses that will bring you to the portal, depending on the language of your choice:

<https://e-navigation.canada.ca/>
<https://navigation-electronique.canada.ca/>

NAVWARNs

Hydrography

Weather

Aids to Navigation

AIS AtoNs

Cameras

Waterway Information

Infrastructure

Marine Charts

Base layers

NAVWARN details

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Search CCG

MENU

Canada.ca Canadian Coast Guard e-Navigation Portal Navigational Warnings Search for NAVWARNs

NAVWARN details

Navigational Warnings (NAVWARNs) replace Notices to Shipping (NOTSHIPS) and shall be construed as Notices to Shipping

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Title Waterway Information - North Atlantic Right Whale

Cancels NW-Q-1699-21

Areas Maritimes Newfoundland St. Lawrence

VTS Offshore Systems - Advance Reporting Requirements

Coming soon

Advance reporting forms and information for ships entering Canadian waters.

- Eastern Canada Vessel Traffic Services Zone (ECAREG)
- Western Canada (VTS Offshore)
- Northern Canada Vessel Traffic Services Zone (NORDREG)

Final Thoughts

- Despite operational challenges introduced by COVID-19, modernization efforts and e-navigation initiatives have continued to progress.
- The modernization initiative will continue to be advanced based on engagement and collaboration with partners, and marine stakeholders to identify priority areas for improvements in service delivery.
- Coast Guard will continue to engage with the international community to ensure harmonized adaptation of e-navigation and influence international standards to better fit the Canadian context.





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