Canadian Coast Guard

e-Navigation conception to delivery

e-Nav Underway North America, November 12-13, 2019
Goals for e-Nav underway 2019

- Conceptualization to Delivery
- Harmonization (Shared waterways)
- Referencing Waterways segments with health rating
- Next steps
Canadian structure

- **Canadian Coast Guard**
  - Marine safety information
  - Operations
  - AtoN, VTS and Ice

- **Canadian Hydrographic Services**
  - Hydro products

- **TC**
  - Regulator
  - Carriage requirements, certification & training

- **ECCC**
  - Weather and marine protected areas
e-Navigation strategy

**Inputs**
- Real-time (or near) update
- Long-lead (reference) information
- Organisational

**The e-Navigation Core**
- Shipborne e-Navigation System
- Integrated communication
- Shore-side e-navigation system

**Outputs**
- Safe navigation enhanced
- Efficiencies
- Benefits
• International trends and development of the S-100 based standard for maritime information
• Data standards
• Increasing safety and efficiency
• Service delivery
• Adapt to changing technologies
• Improving communication with stakeholders
• Decreasing risk of incidents
• Removing complexities for the mariners
Infrastructure and operation perspective

- NAVWARN
- AIS AtoN
- Modernizing AtoN database
- Water way harmonization
- Evolving data into S-100 based standards
- Data flow of marine safety information
- Paper charts 2.0
Example of a Subscription email:

Subscription parameters:

- **Subscription Title**: MyNAWVARNs
- **Schedule**: Continuous
- **Subscription filters**:
  - Status: Published

Please find a NAVWARN below that matches your subscription filters.

**Identifier**: NW-Q-0348-19

**Date**: 2019-03-28 14:01 UTC to 2019-03-29 14:01 UTC

**Status**: Published

**Title**: Aids to Navigation

**Areas**: Trois-Rivières to Donnacona

**Categories**: Buoys

**Details**: Unidentified green buoy adrift in the vicinity of Cap Lauzon.

**Position**: 46° 38.459′N 071° 55.021′W

**Charts**: 1314(NAD83)
NAVWARN Website

- [https://nis.ccg-gcc.gc.ca/](https://nis.ccg-gcc.gc.ca/)

Navigational Warnings (NAVWARNs)

**Search Terms**

**Status**
- Published

**Start Date**
- mm/dd/yyyy

**End Date**
- mm/dd/yyyy

**Areas (Series)**
- Great Lakes (C)
- St. Lawrence (Q)

**Charts**

**Categories**
- Aids to Navigation

**Sort by**
- Area
- Number of messages per page
  - 20

**Map of selected areas**

© OpenStreetMap contributors.
AIS AtoN

Ideal conditions
(AtoN radar echo clearly visible)

Winter/spring Canadian conditions
(AtoN radar masked by ice)
AIS AtoN

- **Benefits**
  - Situational awareness
  - Assistance in safe navigation
  - Existing physical infrastructure
  - Cross checking capability
  - Decision making process
  - Decrease human error

- **Limitations**
  - Reliability
  - Increased costs
  - Current mandatory requirements
Aton database modernization project

- S-100 compatible
- Data
- AtoN state
- Technologies
- Harmonize nautical information
- Streamlining processes
Waterways

- Paper charts/ENCs evolving
- Reference methodology
- Waterways expressed in segments
- Communication e-navigation information
- Removing complexity
- Unique identifiers
S-100 products – Considerations

- Impact on programs
- Impact on workforce
- New skills
- Service delivery
- One window for information
- Extensive consultations
Maritime Information portal

- [http://www.marinfo.gc.ca/e-nav](http://www.marinfo.gc.ca/e-nav)
Canadian Hydrographic Services

- CHS is moving to grid-based ENC product services that will be interoperable with S-100 services for high resolution bathymetry, surface currents, and water levels.

- Rationalizing our portfolio by moving to 3 scales of coverage for a given area.

- CHS will be canceling BSBs where ENCs exist, & will be creating ENCs from remaining BSBs where possible.

- CHS is moving to Digital Paper Chart distribution and subscription based services.

- Change how CHS does Section 2 and 4 notices.
Transformation: New generation of ENC

Large Scale grid (Pink) – $0.1^\circ \times 0.1^\circ$

Medium Scale grid (Yellow) – $1.0^\circ \times 1.0^\circ$

Small Scale grid (Green) – $4.0^\circ \times 4.0^\circ$
Moving to the grid – Medium scale example

S-102 Overlay
Transport Canada regulatory initiative to support the implementation of e-Navigation:

• Expansion of the AIS carriage requirements, including a graphical display beyond the mandatory MKD.

• Expansion of the ECDIS carriage requirements.

Transport Canada recently began consultation on the modernization of reporting requirements, which would further enable automatic reporting
AIS Application Specific Messages

• **Current situation**
  • AIS ASMs are part of Canadian Coast Guard strategy for shore to ship data dissemination
  • Canadian Coast Guard is mostly aligned with International message formats
• **Currently in use or tested:**
  – Met / Hydro (water levels, weather, visibility, wind, precipitations)
  – Environmental (Met / Hydro + Air Gap)
  – Route information (Ice recommended route, suggested route)
  – Area information (marine mammals zones, other possibilities)
  – St. Lawrence Seaway Water level message

• **Future considerations**
  • Monitoring and Reliability
  • Harmonization with USCG/NOAA/USACE
  • Better support on ships
Collaborative Voyage Management System (CVMS)

CVMS Reporting Points
- Voyage & Ship Info
- Route Plans

The e-Navigation Core
- Shipborne e-Navigation System
- Integrated Communication (including AIS, LRIT data, standard reports etc.)
- Shore-side e-Navigation System

Relevant Authorities
- Ports
- TC
- Customs
- USCG
- Seaway
- Etc.

INNAV / Modern VTS

Validation
- Conformance
- Restrictions
- Authorization
- Monitoring

Voyage Plan

TC

Customs

USCG

Seaway

Etc.

Ship Operator

Ship Master

Ship Agent

CCG

MCTSO