



# PRIMAR S-100 development

Hans Chr. Lauritzen, Director PRIMAR

Operated by the Norwegian Mapping Authority, Hydrographic Service

**FREEDOM TO CHOOSE**



## PRIMAR's Vision

***IN ORDER TO ENHANCE SAFETY AT SEA AND PROTECT THE MARITIME ENVIRONMENT, PRIMAR'S VISION IS TO BE THE MOST EFFICIENT MODEL FOR THE PROVISION OF ENC SERVICES AND MARITIME GEOSPATIAL DATA WORLDWIDE.***

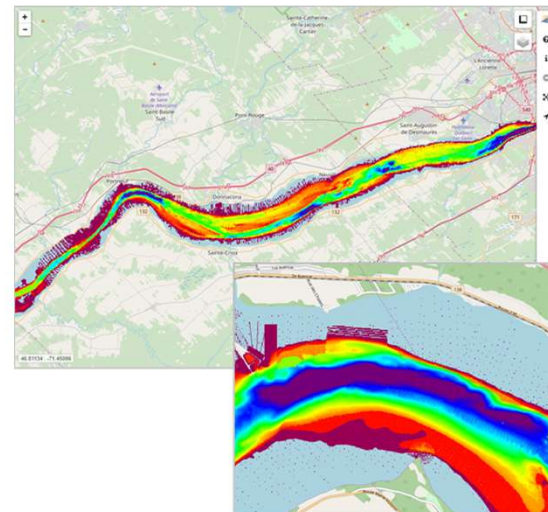
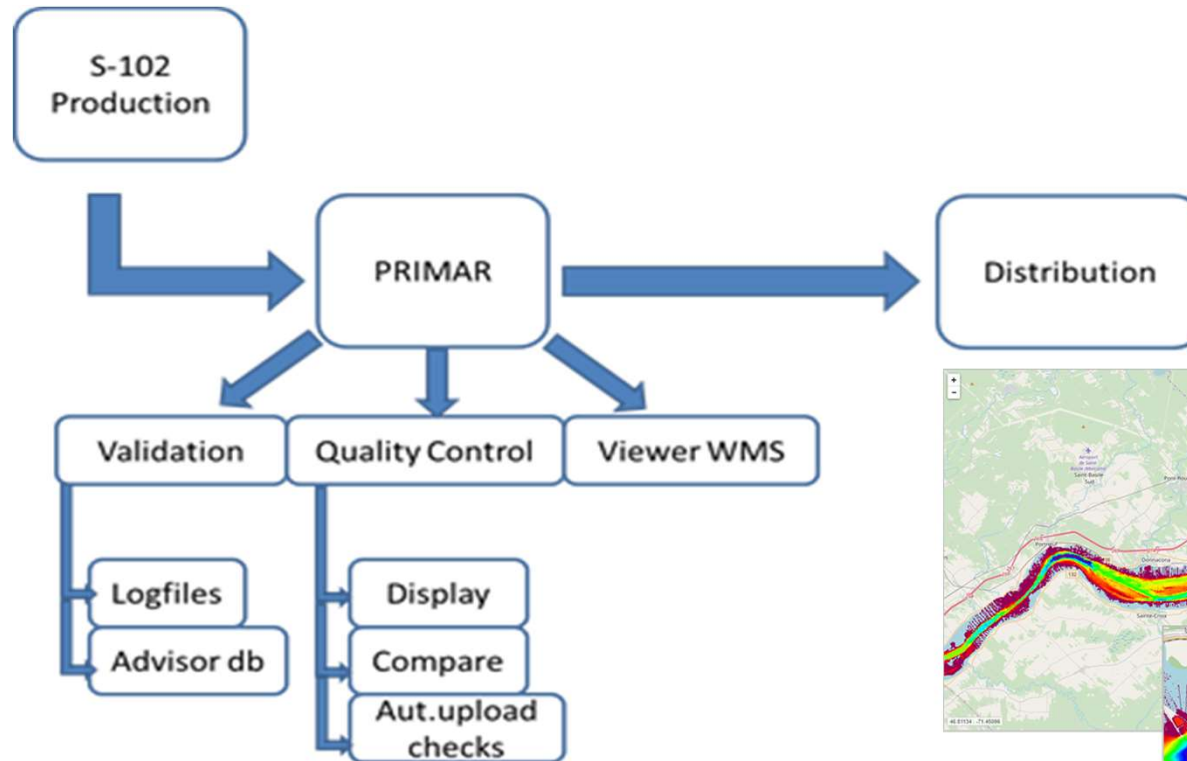
# PRIMAR S-100 Projects



- S-102 data upload, validation and distribution.
- S-102 in an operational environment.
  - Project supported by The Research Council of Norway
- S-100 Data as a Service.
  - Project in cooperation with CARIS and CHS
- S-101 data upload, validation and distribution.
- S-100 part 15 Data Protection (new S-63).
- Research project - IHO S-100 portfolio (S-101, S-102, S-104, S-111, S-129).
  - Project supported by The Research Council of Norway

# PRIMAR S-102 Project

- Expand the PRIMAR service to encompass S-102 data.
- S-102 data upload, validation, viewer and distribution.




PRIMAR S-102 viewer

# PRIMAR S-102 Project

- S-102 upload interface, validation and error reports.

### Upload Cells

+ Select file



or drop the ZIP file here

Upload Progress:

Start

#### Message Log Download Log

|   |
|---|
| Exchangeset Loaded  |
| Check autorelease status for 0 ENCs                                       |
| Load completed with remarks. See log for details.                         |
| Not loading LTTESTEST.102. See log.                                       |
| Starting load:  |
| Checking for propagated errors  |
| Checking compilation scale  |
| Checking S-57 data structure  |
| Checking order of updates   |
| Checking DSID_PRED  |
| Checking DSID_STED  |
| Checking dates  |
| Checking if the TXT/TIFF files are referred                               |
| Checking DSID_INTU  |
| Checking file size  |
| Checking if DSID.DSNM corresponds to DSID.AGEN                            |
| Checking DSID_DSNM  |
| Checking crc values   |
| Checking CATD_IMPL value  |
| Checking filenames  |
| Checking for imported cell keys   |
| Checking if the files exist   |
| Checking for previous uploaded data                                       |
| Looking for reissue.  |
| Performing access control   |
| <b>Error: BoundingBox and Coverage does not intersect. LTTESTEST.102.</b> |
| Validating S-102 file: LTTESTEST.102                                      |
| Creating exchange set   |
| Looking for catalog files   |
| Exchangeset Loader ready to load  |
| Extracting LTTESTEST.102  |
| Preparing   |

# PRIMAR S-102 Project

- S-102 upload interface, validation and error reports.

**Upload Report: 101201** ✕

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**Uploaded By:** skjeves

**Uploaded Date:** 2017-02-16T11:36:56

Loaded

| Cell ID        | Edition | Update | Reissue | Loaded | Released | Type | Prod Spec |
|----------------|---------|--------|---------|--------|----------|------|-----------|
| No data loaded |         |        |         |        |          |      |           |

Not Loaded

| Cell ID        | Edition | Update | File | Type |
|----------------|---------|--------|------|------|
| No data loaded |         |        |      |      |

Upload Messages

| Level   | Message   | Check Name    |
|---------|---|---------------|
| Error   | BoundingBox and Coverage does not intersect. NO_TEST001.102   | s102-coverage |
| Warning | Ignoring unsupported CRS WKT EXTENSION. NO_TEST001.102  | s102-crs      |
| Error   | Coordinate values does not define a proper bounding box. wlon=10.3729, elon=10.0000, slat=59.2469, nlat=59.2732. NO_TEST001.102 | s102-bbox     |

# PRIMAR S-102 Project - Validation

## Filename inconsistency:

- Error: Invalid character in filename.
- Error: Invalid filename
- Error: Missing file name
- Error: File name too short
- Error: File name too long
- Error: Unknown country code

## Coverage inconsistency:

- Error: BoundingBox and Coverage does not intersect
- Error: Could not extract BoundingBox
- Warning: BoundingBox is too large for Coverage
- Error: Could not extract Coverage
- Error: Empty Coverage

## Coordinate Reference System inconsistency:

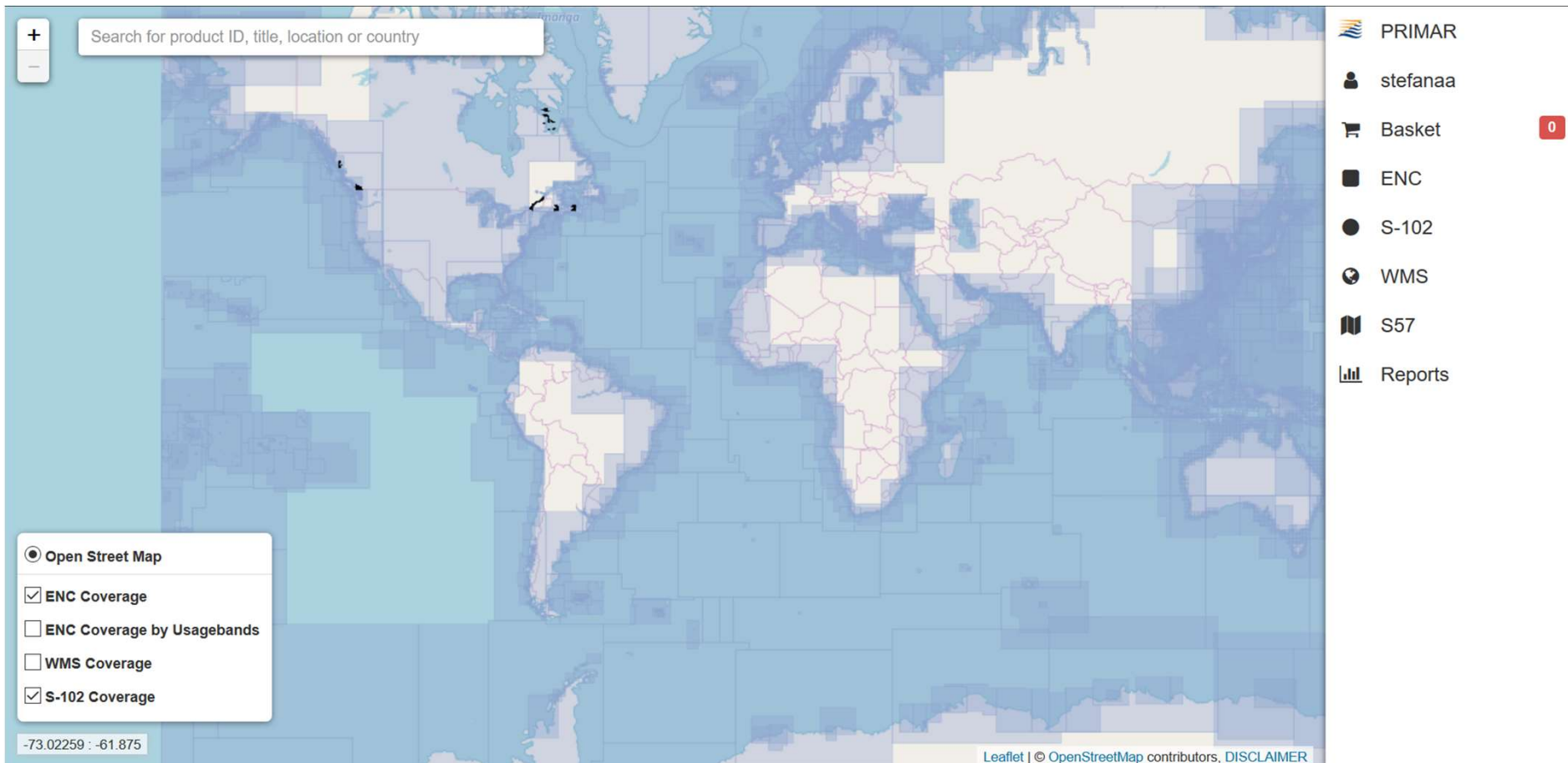
- Error: Unknown CRS
- Warning: Ignoring unsuspected CRS WKT EXTENSION

## Others:

- Warning: Dataset greater than size limit 10MB.
- Error: S-102 dataset already in database.

# PRIMAR S-102 Project

- S-102 data in the PRIMAR Chart Catalogue.



The screenshot displays the PRIMAR Chart Catalogue interface. At the top left, there is a search bar with the placeholder text "Search for product ID, title, location or country". Below the search bar are zoom in (+) and zoom out (-) buttons. The main area is a world map showing coverage for various chart types. A legend in the bottom left corner includes the following options:

- Open Street Map
- ENC Coverage
- ENC Coverage by Usagebands
- WMS Coverage
- S-102 Coverage

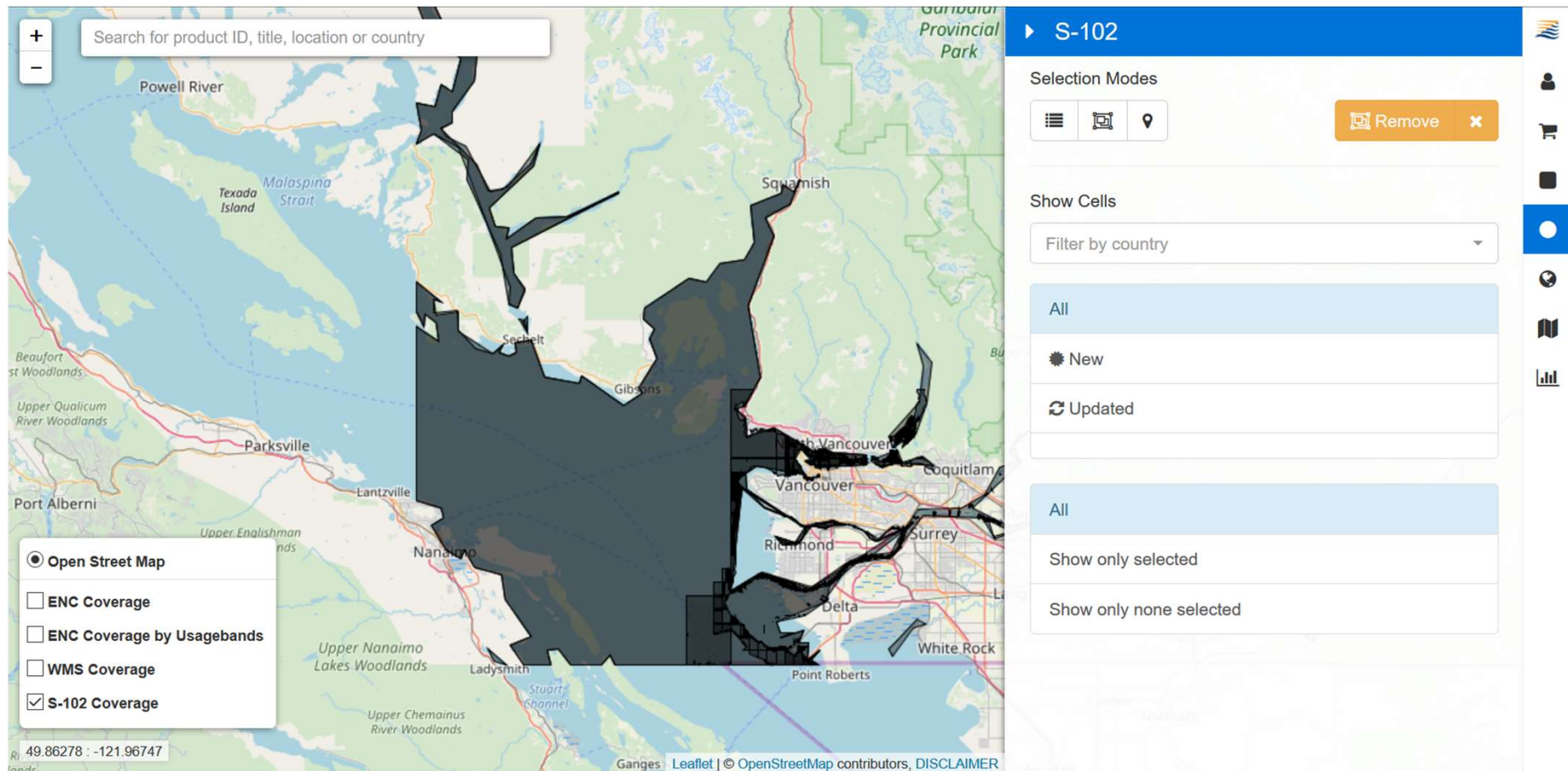
At the bottom left of the map, the coordinates "-73.02259 : -61.875" are displayed. At the bottom right, the text "Leaflet | © OpenStreetMap contributors, DISCLAIMER" is visible. On the right side of the interface, there is a navigation menu with the following items:

- PRIMAR
- stefanaa
- Basket 0
- ENC
- S-102
- WMS
- S57
- Reports



# PRIMAR S-102 Project

- S-102 data selection in the PRIMAR Chart Catalogue.



The screenshot displays the PRIMAR Chart Catalogue interface. On the left, a map shows the coastal region of British Columbia, Canada, with various geographical features and cities labeled. A search bar at the top left contains the text "Search for product ID, title, location or country". A legend in the bottom left corner shows the following options:

- Open Street Map
- ENC Coverage
- ENC Coverage by Usagebands
- WMS Coverage
- S-102 Coverage

On the right side, a blue header bar displays "S-102". Below this, the "Selection Modes" section includes icons for list, map, and location, along with a "Remove" button. The "Show Cells" section features a "Filter by country" dropdown menu and three selection options: "All", "New", and "Updated". A second set of selection options is visible below, including "All", "Show only selected", and "Show only none selected". A vertical toolbar on the far right contains icons for home, user profile, shopping cart, and other navigation functions.

# S-102 Demonstrator Project

Demonstrator for distribution and use of bathymetric data (S-102) in an operational environment.

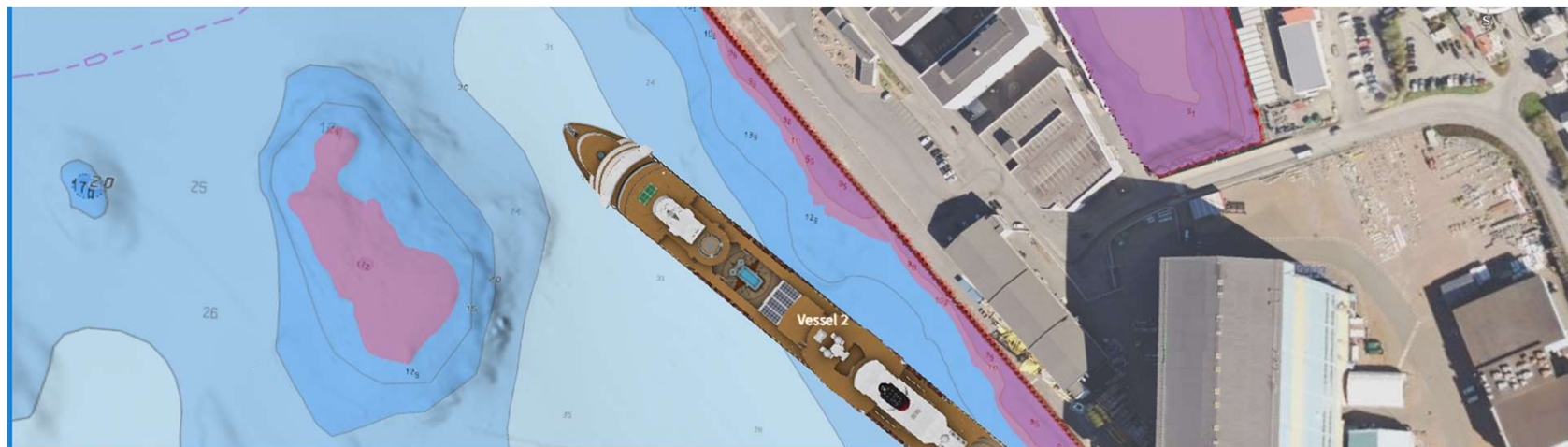
## The Project Team



## Partners & Operational Test Team



## Financial Support



# S-102 Demonstrator Project

Expected value from the project:

*To better understand how the S-102 data type can be utilized to provide a better basis for decision making regarding:*

- Resource planning
- Environmental impact
- Cost reductions
- Increased safety
- Accidents, Disasters and SAR operations
- Scientific purposes

[www.s-102.no](http://www.s-102.no)



Kvitsøy VTS watching MS Queen Victoria leaving harbor live video and via the S-102 Demonstrator



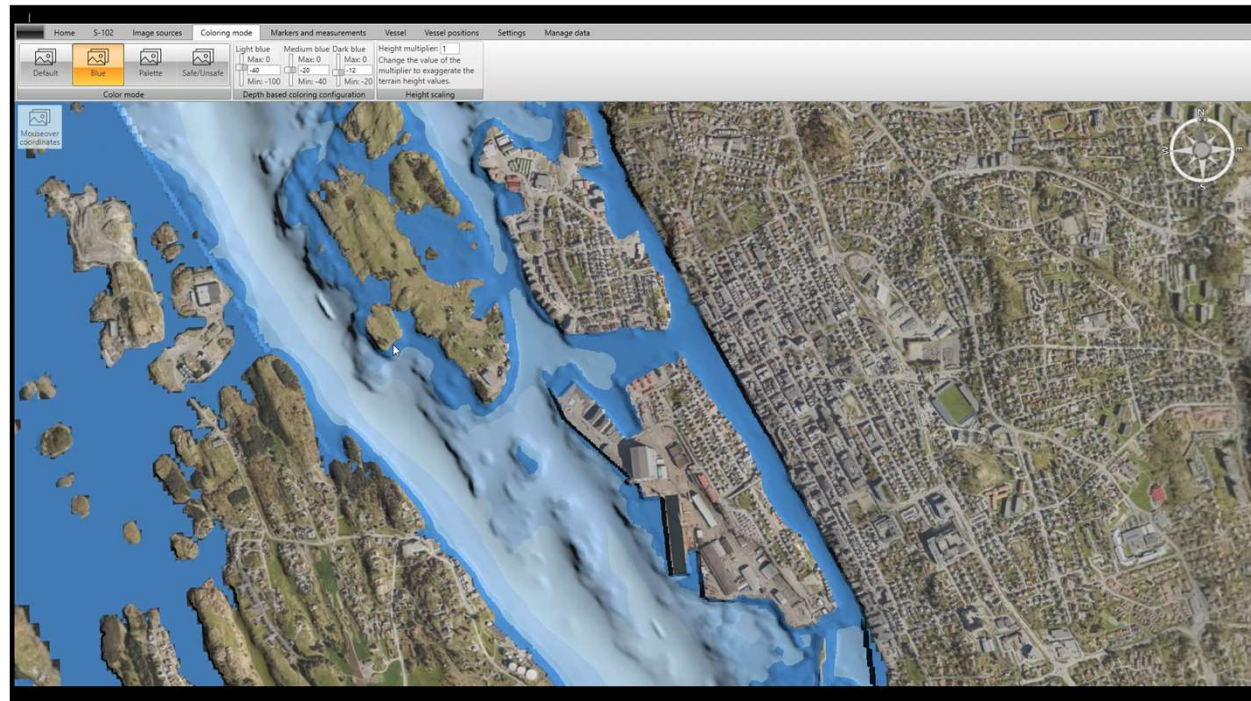
Comparing the S-102 data with ECDIS S-57 data onboard a patrol vessel from the Royal Norwegian Navy



# S-102 Demonstrator Project

Basic functionality in the Kongsberg S-102 Demonstrator:

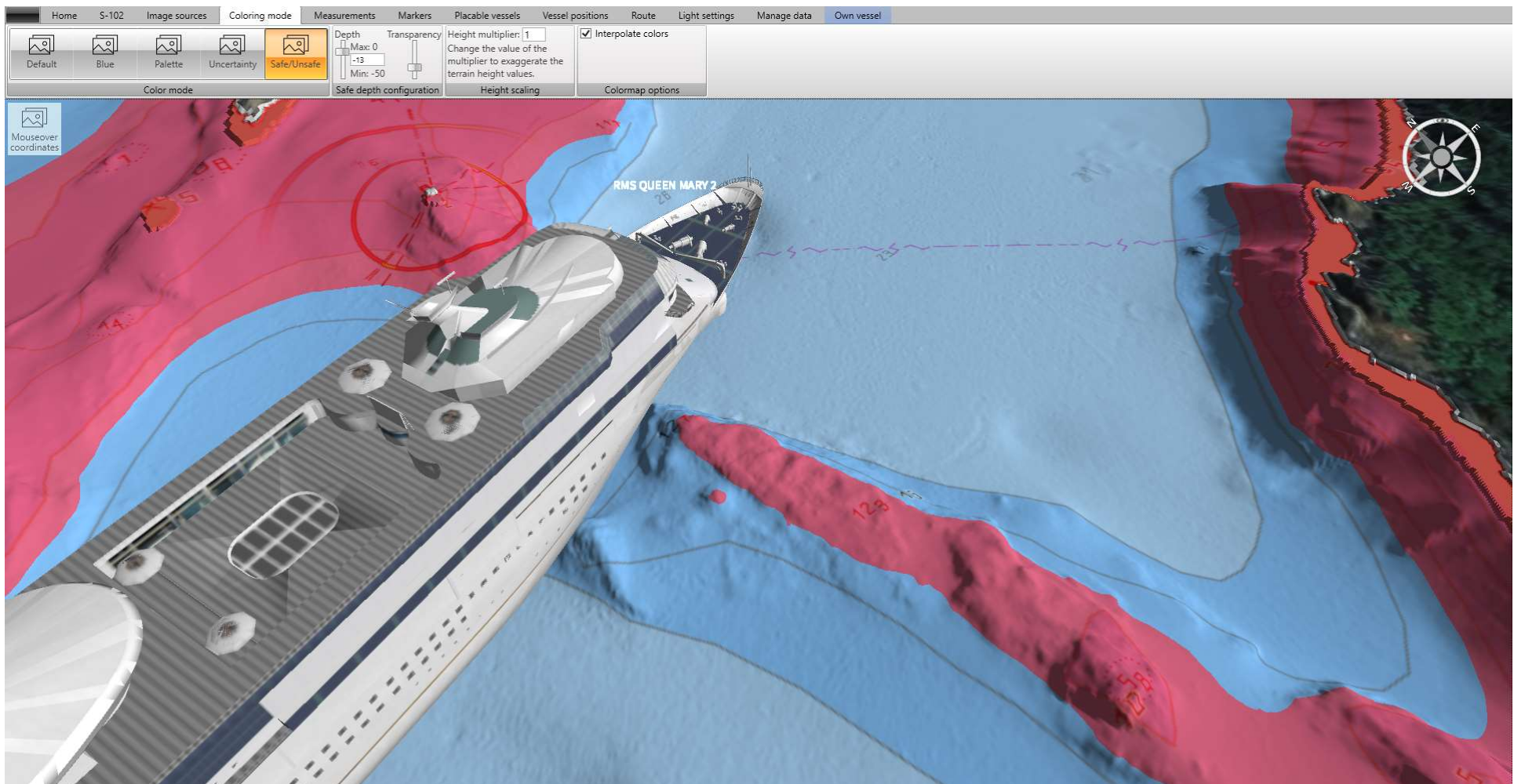
- Show various map layers in one view:
  - Bathymetry
  - Terrain
  - S-57 ENC
  - Orthophoto
- Switch between layers
- Navigation in chart
- Compass



# S-102 Demonstrator Project



- Queen Mary 2 voyage to the Port of Oslo







# S-100 Data as a Service

*A Dream Team:*

Proponent



Progressive  
Hydrographic  
Office

Technology  
Partner



Hydrographic  
Processing and  
Production  
Software

Technology  
Partner



ENC Distribution  
Software

Channel to  
Market



RENC

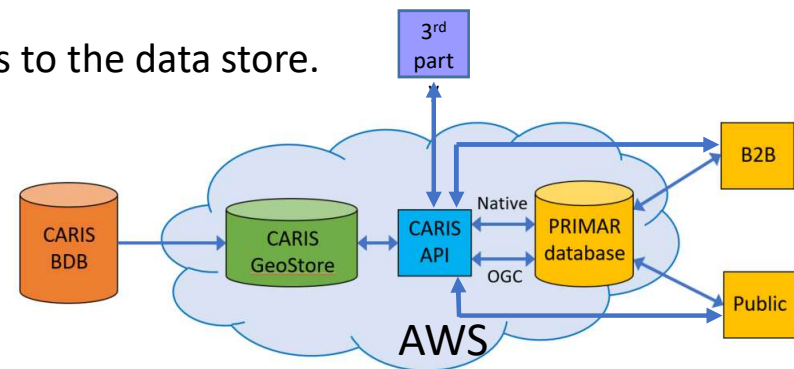
NHS

Investment Partners

# S-100 Data as a Service

## Pilot Project Overview:

- This pilot will allow CHS, Teledyne CARIS and PRIMAR to demonstrate its ability to provide a service that consumers of bathymetry data can subscribe to.
- Data will be available in pre-determined geographic areas of interest.
- By bathymetry data we mean coverages, vector features and S-102 products.
- CARIS will develop a cloud hosted datastore located outside of the CHS infrastructure.
- CARIS will develop a rich API providing 3<sup>rd</sup> party access to the data store.
- PRIMAR will expand its existing database and web applications to provide a store front to subscribe to the latest available S-102 bathymetry data and access OGC services.





# S-100 Data as a Service

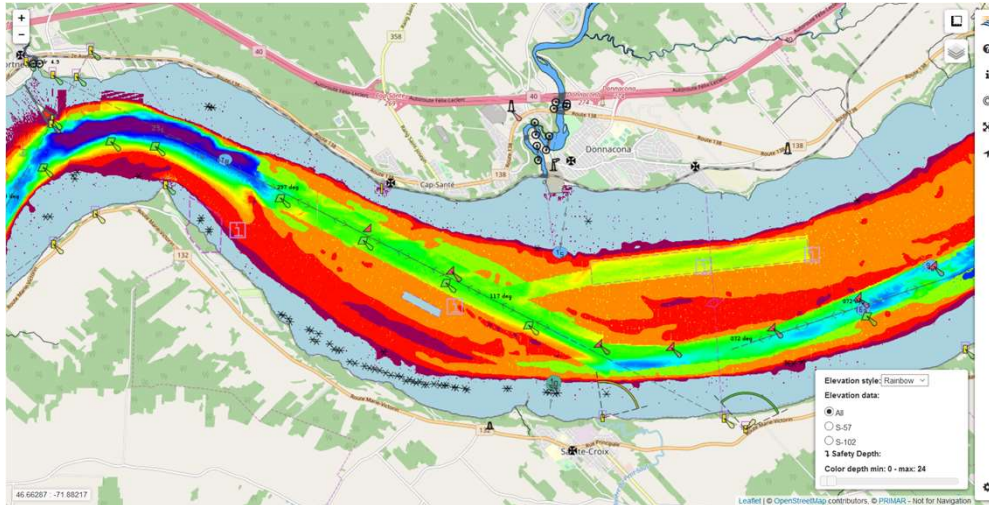


## Pilot Project Objectives:

- Garner support from potential stakeholder groups e.g. hydrographic offices, ports, pilots, other government agencies, global mapping initiatives (Seabed 2030).
- Expose the hydrographic community to these capabilities to foster support for the potential benefits of S-102 and bathymetry as a service.
- Explore potential for use of S-104 and S-111 standard for supplementary services.
- Refine the cloud and service technology to work towards a robust and commercially viable service.
- Determine the costs involved in offering cloud based storage and services.
- Develop innovative business models to ensure customer adoption by providing value added benefits for stakeholders.

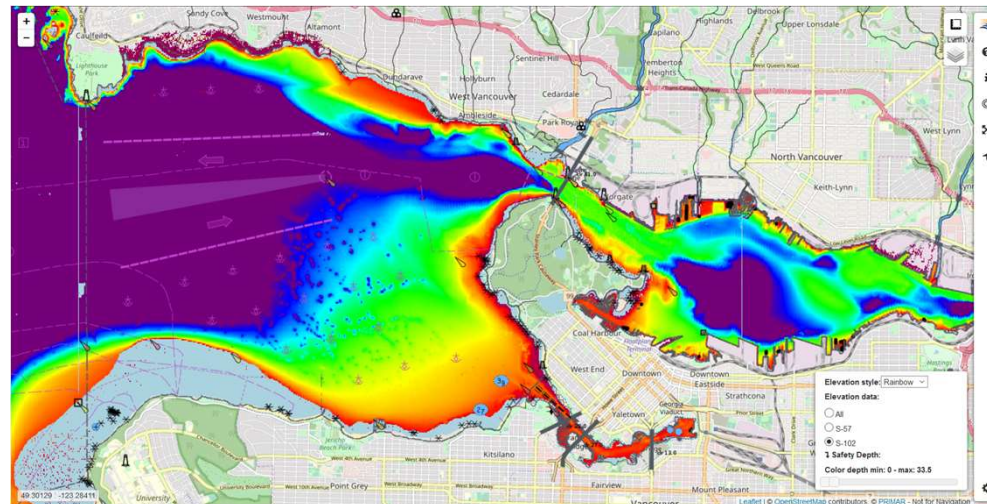
# S-100 Data as a Service

CHS S-102 data in PRIMAR Viewer:



St. Lawrence River

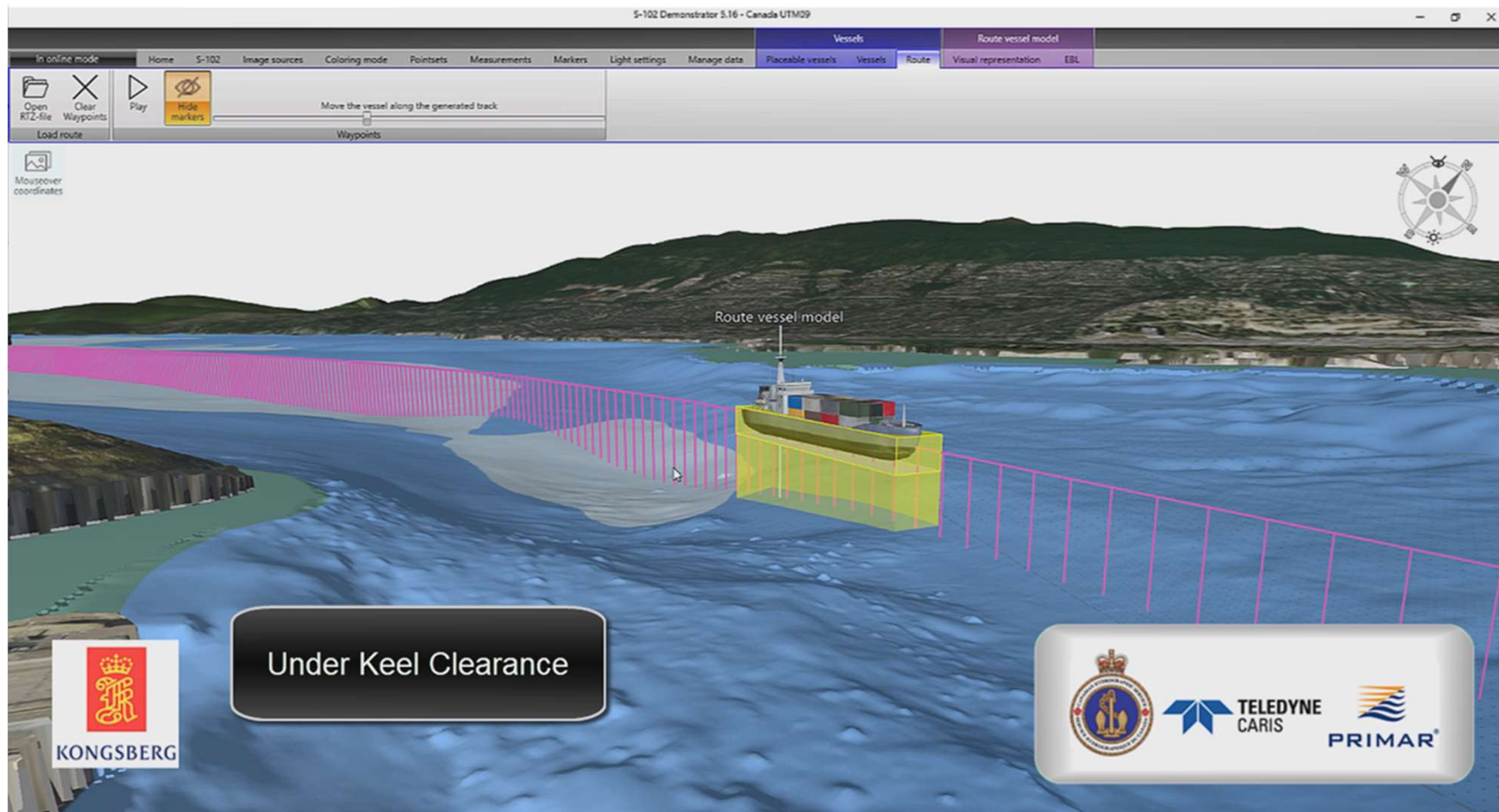
Vancouver



# S-100 Data as a Service

Vancouver

CHS S-102 data in Kongsberg S-102 demo:





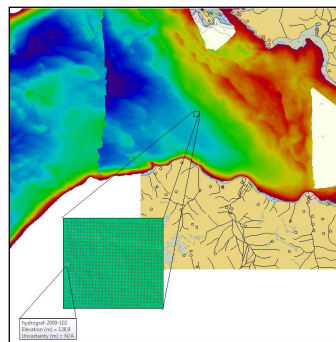
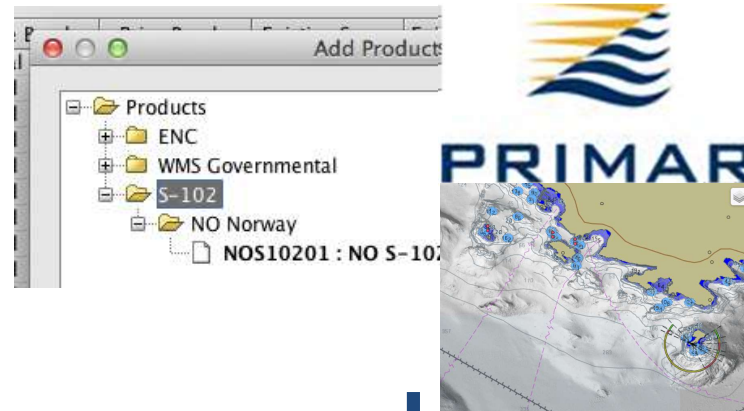
# S-100 Data as a Service – Value Chain



Data collection by HO or Contractor



PRIMAR provide channel to market



Data processing & S-102 production in CARIS software

Commercial and National Distributors Sales

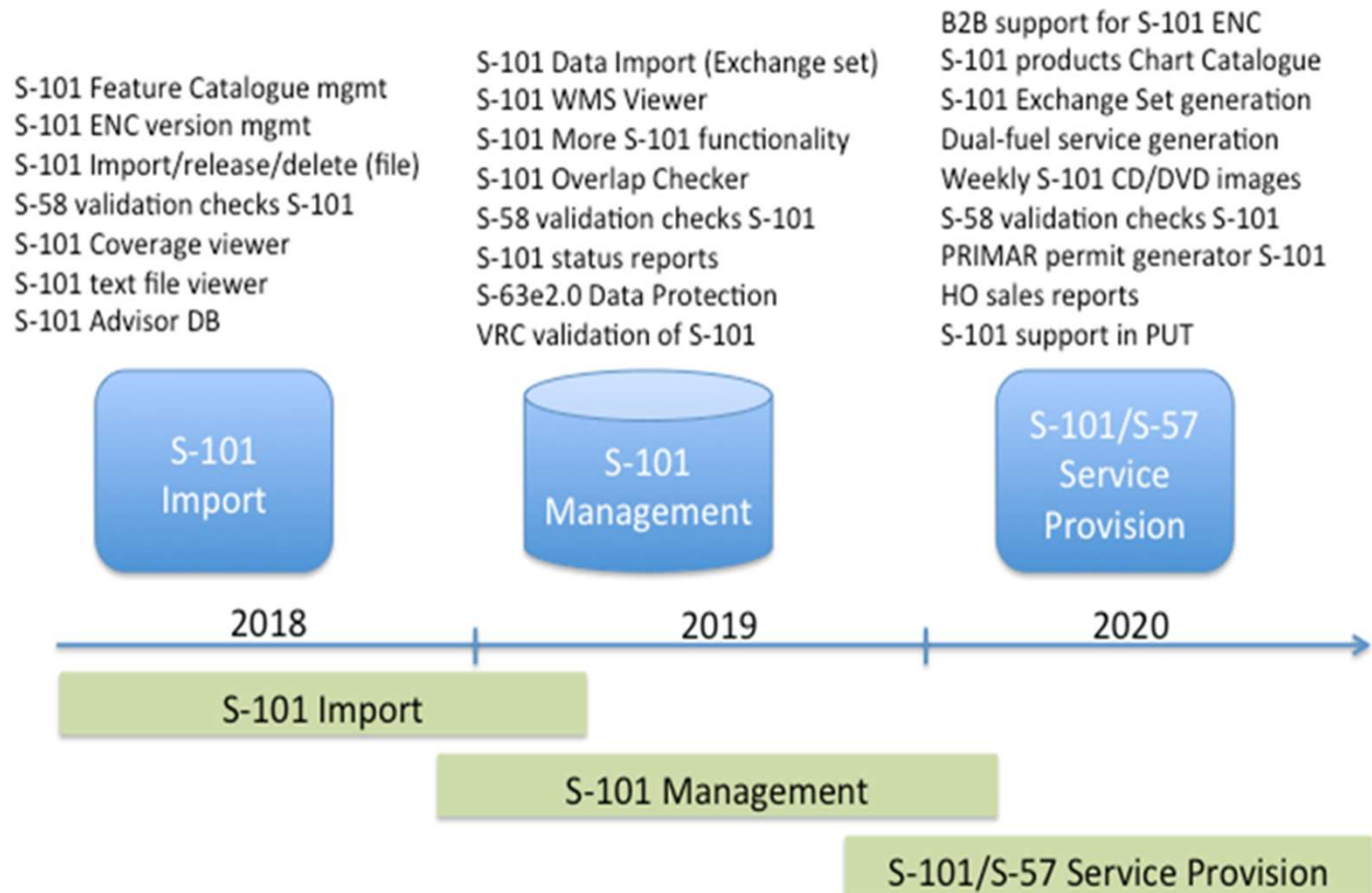


End-users

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# PRIMAR S-101 Development

- PAC 24 approved S-101 development





# PRIMAR S-101 Development 2018

- Focus for 2018 has been on implementing support for the new S-100 data model in the PRIMAR database and core technologies.
- Challenge has been to obtain complete S-101 exchange sets for testing.
  - Only converted S-101 dataset files available.
- Expanded database design to support S-101 in co-existence with existing S-57 design and services to support dual-fuel.
- Developed functionality for importing S-101 datasets.
- Populate S-101 metadata based on information available in datasets.
- Started to build automatic S-101 validation tests.
- Started to build S-101 user interface for VPN functionality for import, manage/release, export.
- Started to develop support for S-100 (part 15) data protection applied to S-101 exchange sets.



# PRIMAR S-101 Development 2019

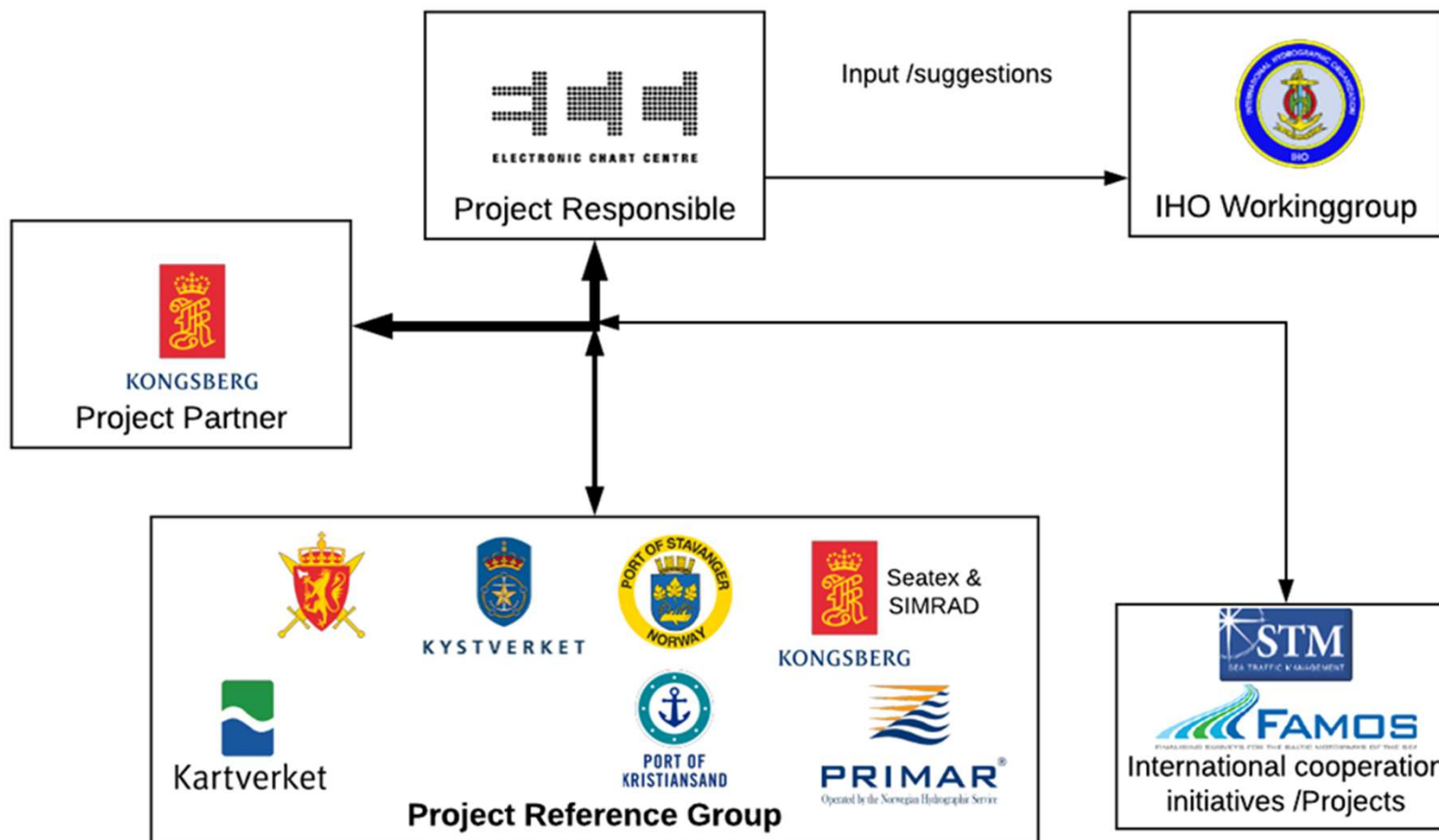
- Empower IHO to operate as protection scheme administrator for S-10x products.
- Complete VPN User Interface to import, manage and release S-101 datasets.
- Develop support for IHO Feature and Portrayal Catalogues.
- Develop S-101 Viewer.
- Develop S-101 Overlap Checker.
- Develop S-57/S-101 Comparison Viewer.
- Additional S-101 validation tests.
- Start development on Chart Catalogue with functionality to support S-101.
- Approach OEMs with PRIMAR plans and interfaces for providing S-57/S-101 dual fuel services.



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# Research project - IHO S-100 portfolio

Feasibility study for the IHO S-100 portfolio.

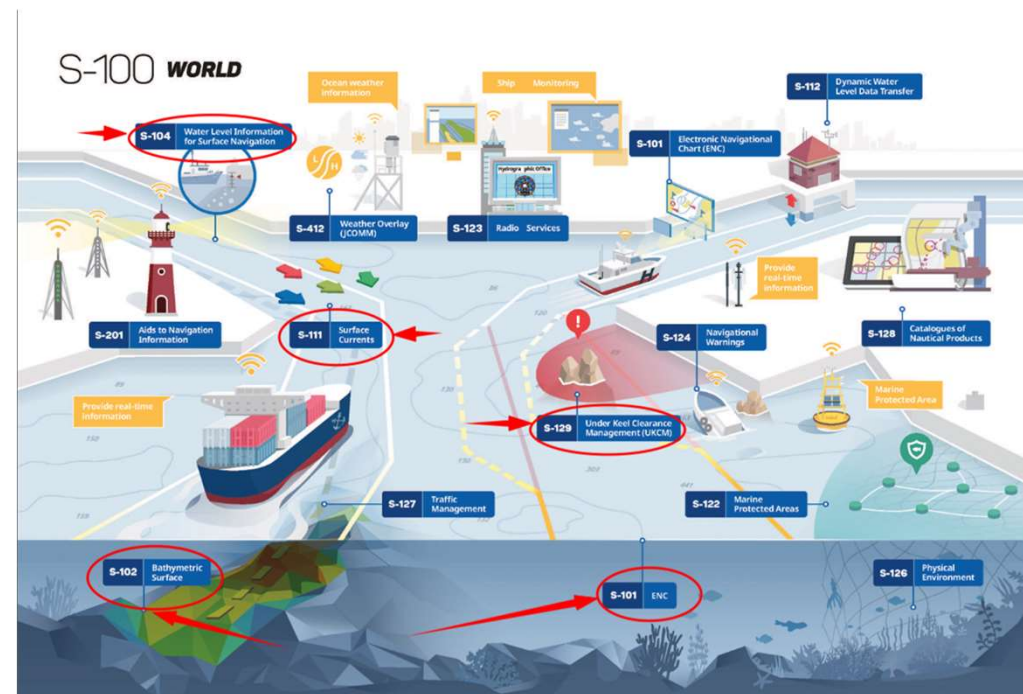




# Research project - IHO S-100 portfolio

The S-100 standards scope for the project:

- S-101 (ENC)
- S-102 (Bathymetri)
- S-104 (Water Level information)
- S-111 (Surface Currents)
- S-129 (Under Keel Clearance)



Project timeline: 3 years  
 Project startup: April 2019



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## **Research project - IHO S-100 portfolio**

### Project objectives:

- To define how the new standards, combined, can create value for the maritime industry and how new & improved products and business opportunities can be designed & developed based on the new standards.

### Expected outcome:

- In-depth knowledge on ownership, accessibility, quality and challenges related to the selected data types.
- Increased knowledge related to the value of combining data types.
- Competitive advantage.
- Valuable input and ability to impact final IHO S-100 standards.
- Contribute to product improvement and new products.



**Thank you for your attention**  
**Questions?**

**[www.primar.org](http://www.primar.org)**