S-100 and eNavigation

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S-100 Working Group Chair

What is S-100?

Provides the data framework for the development of the next generation Electronic Navigational Charting products, as well as other digital products required by the hydrographic, maritime and GIS communities

Underpins eNavigation

A brief timeline…

S-57 Ed. 2.0

S-57 Ed. 3.0

Ed. 3.1

S-57 Ed. 3.1 Supplement

1992

1996

2000

2010

2015

2017

S-100 Ed. 1.0.0

S-100 Ed. 2.0.0

S-100 Ed. 3.0.0

Who is using S-100

- International Hydrographic Organization
  - Electronic Navigational Charts
  - Nautical Publications
  - Surface Currents
  - Bathymetry
- IALA
  - AIS
  - VTS
  - ATONs
- WMO
  - Ice
  - Ocean Forecasts
- IMO
  - E-navigation

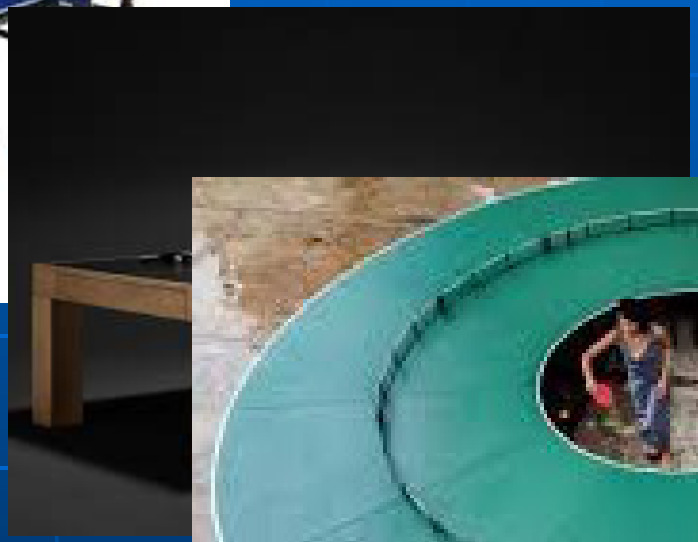
S-100 can support :

- Imagery and gridded data
- High-density bathymetry
- Dynamic ECDIS
- Underkeel Clearance Management
- Surface Currents
- Marine GIS
- Web-based services
- other maritime data applications …

What is S-100?

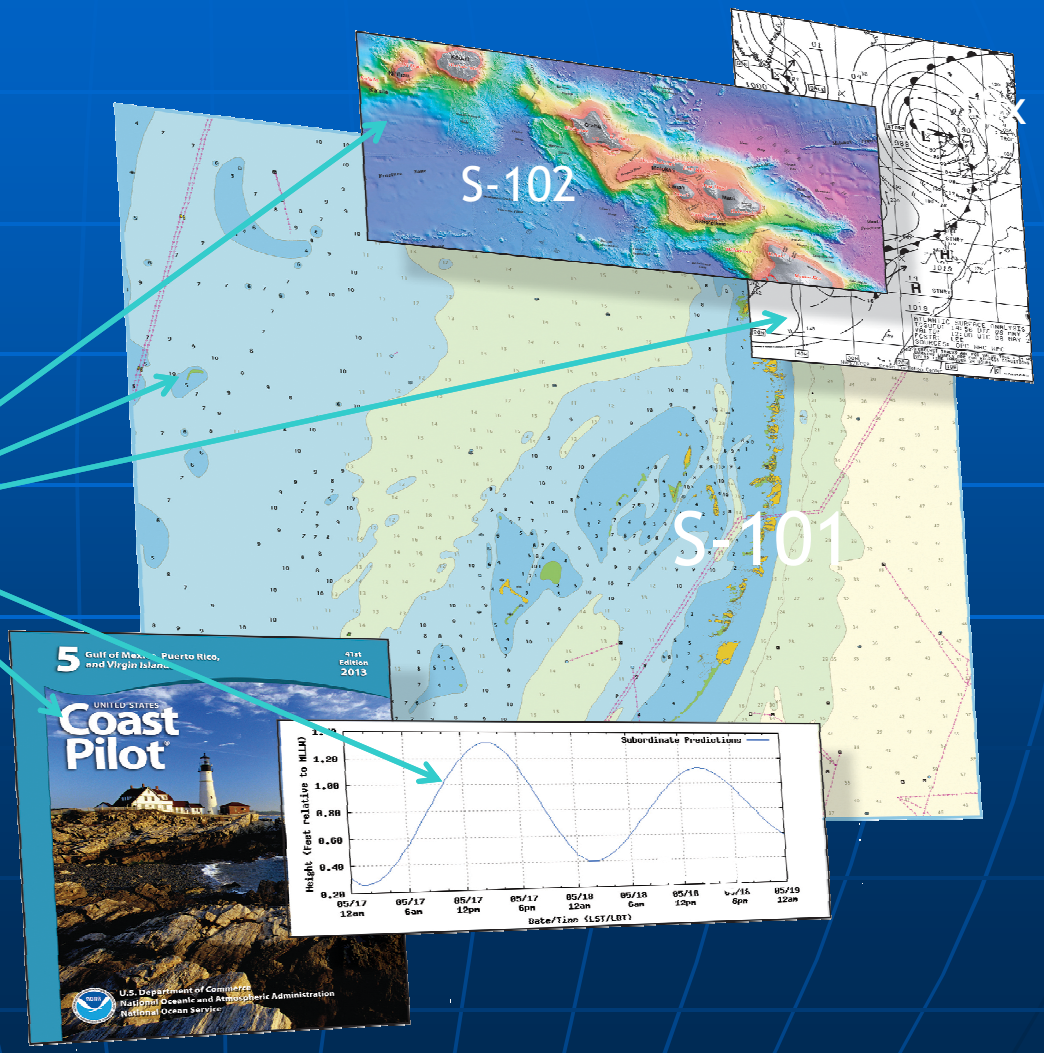
- Broad geospatial data framework
  - Based off ISO GIS standards
- Not specific to ECDIS or charting
- Create different product specifications to meet specific requirements
  - Machine Readable Catalogues
- Designed for Data Interoperability
- Harmonized Data Model

Harmonized Data Model



S-100 and Product Specifications

… contains all the components to make different product specifications for all types of hydrographic data



S-101

- S-101 represents a major step forward in product specifications for Electronic Navigational Charts
- Based on S-100 – the Universal Hydrographic Data Model
- Will eventually replace S-57 (in the future)
  - Utilize a convertor from S-57 to S-101 to allow HO's time to upgrade their production systems

S-101 New Functionality

- Revised the concept of usage bands
  - ONLY for CATALOG purposes
- ENC data tied to display scales
  - Maximum Display Scale
  - Minimum Display Scale

Display Scale
1:10,000,000
1:3,500,000
1:1,500,000
1:700,000
1:350,000
1:180,000
1:90,000
1:45,000
1:22,000
1:12,000
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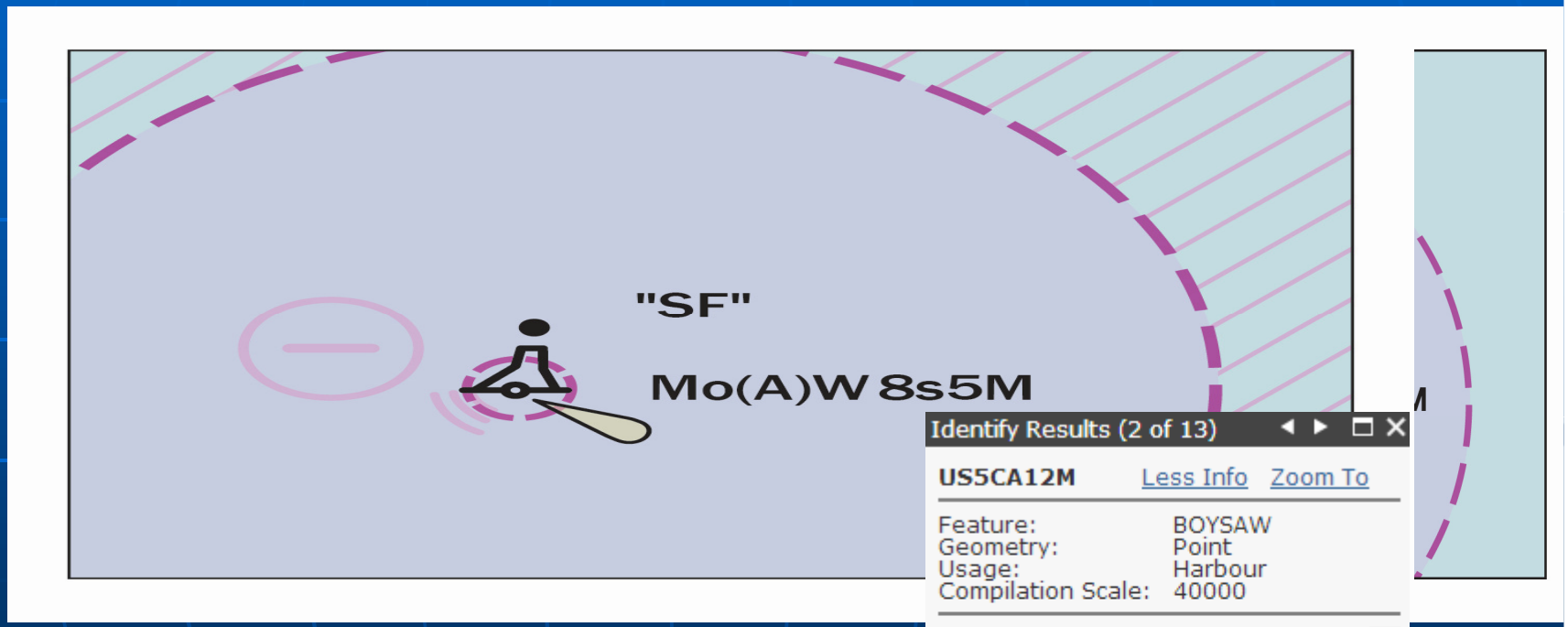
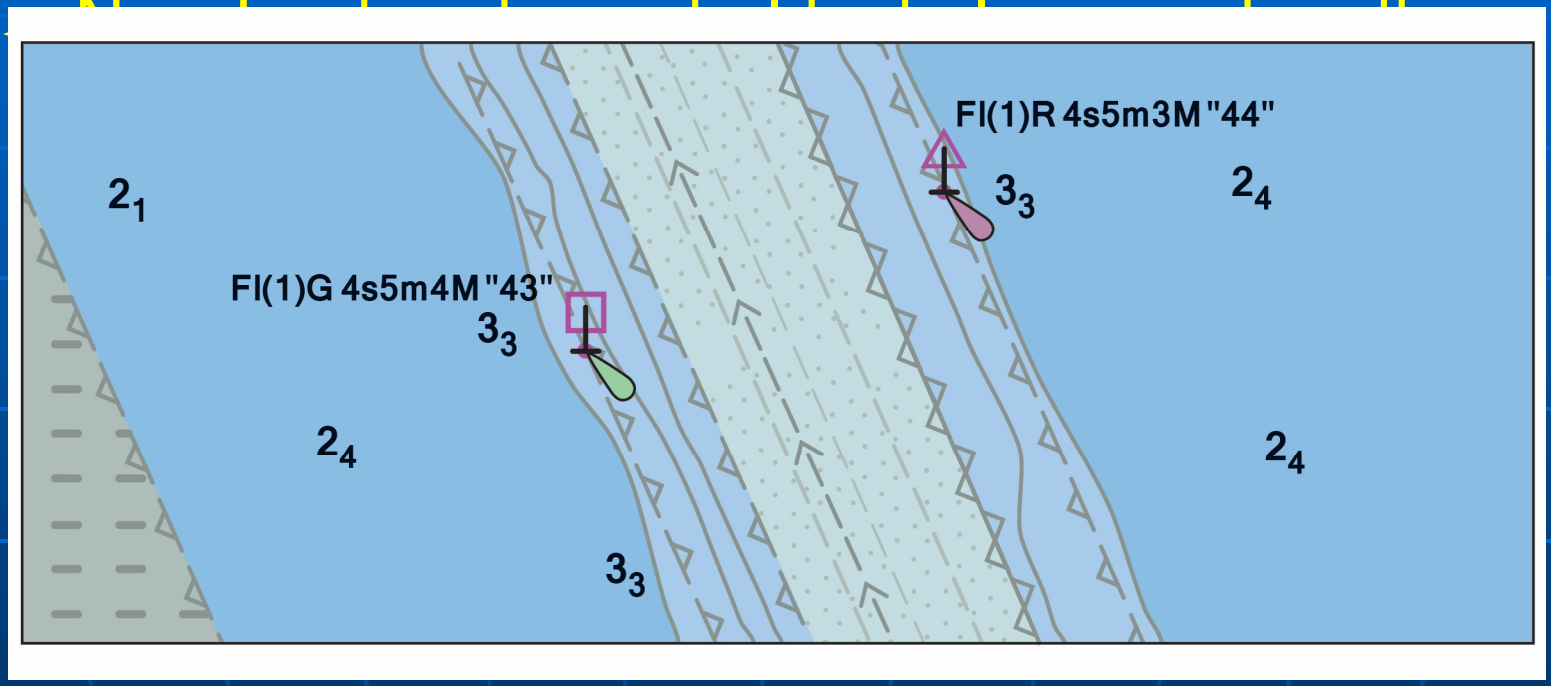
1:4,000
1:3,000
1:2,000
1:1,000

S-101 Display Name



S-101 Text Placement

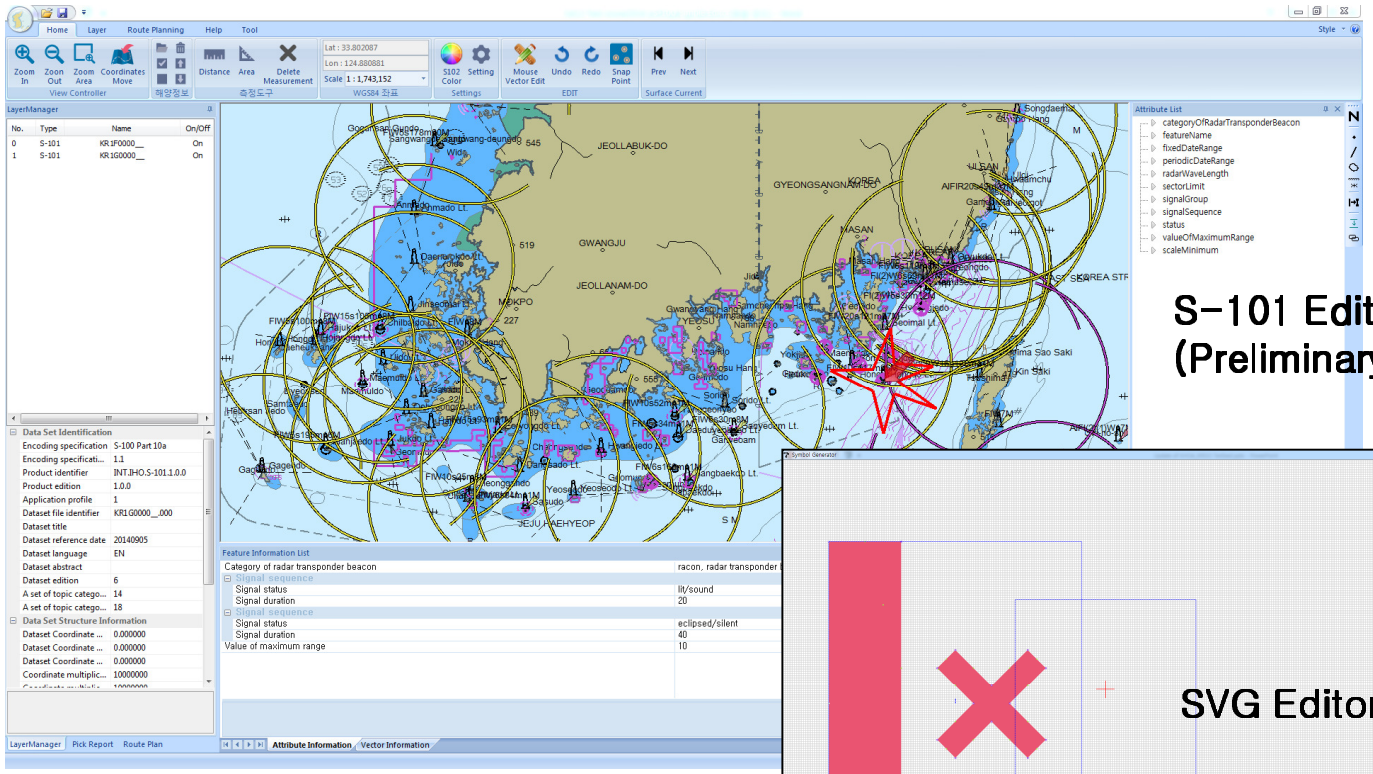


S-100/S-101 Test bed

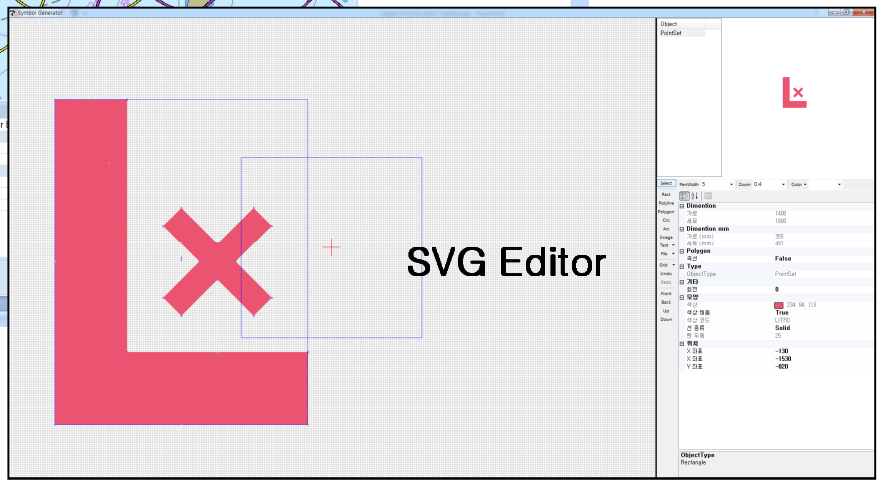
- IHO is establishing an S-100 test bed
  - Test the functionality of S-100 Product Specifications
- Phased approach
  - Multiple sub-systems
  - Iterative Development
  - Nine Distinct Phases

03 S-100/S-101 Test bed

S-100 Editor(Preliminary production tool) / SVG Editor



S-101 Editor
(Preliminary production tool)

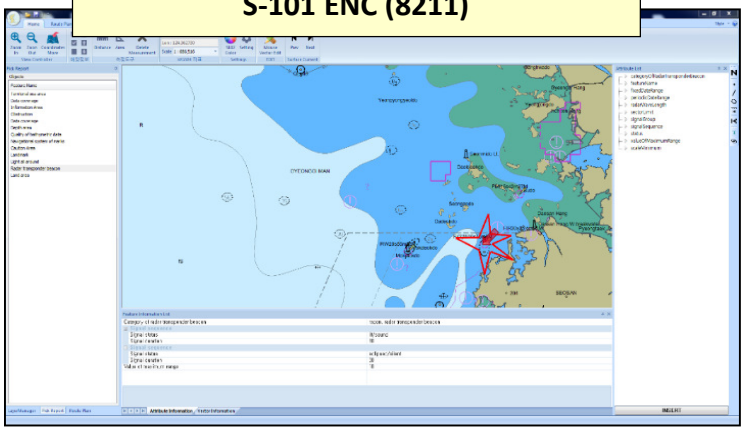


SVG Editor

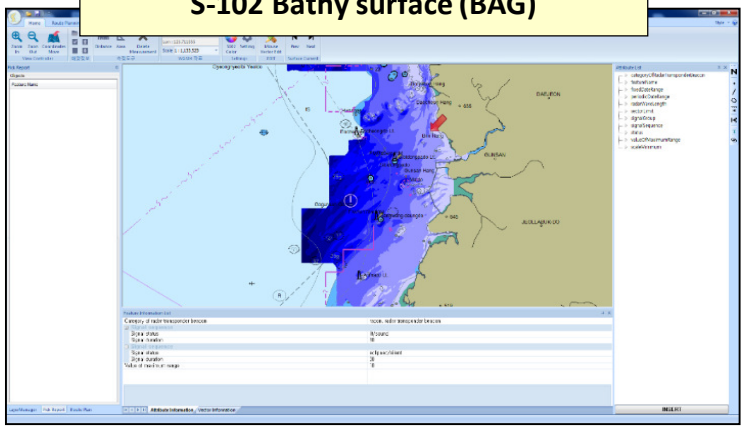
03 S-100/S-101 Test bed

KHOA S-100 Test bed (S-100 Viewer)

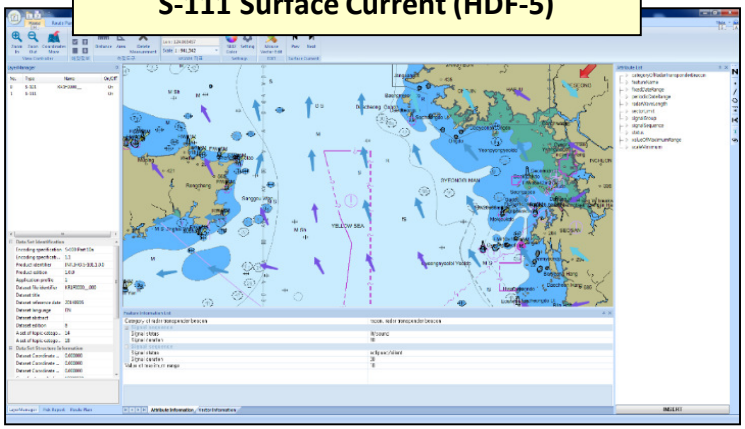
S-101 ENC (8211)



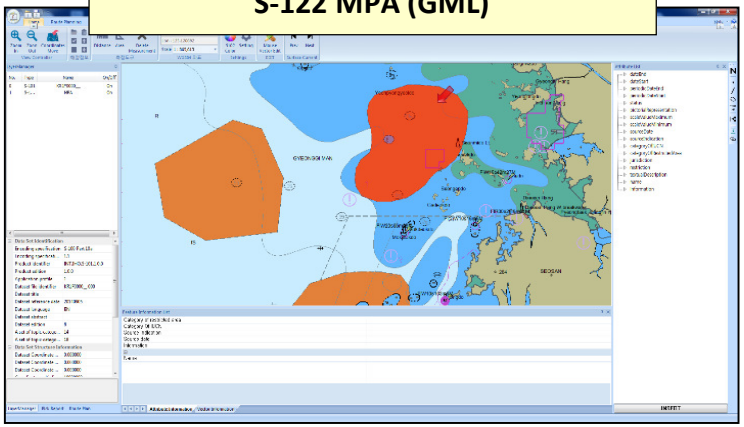
S-102 Bathy surface (BAG)



S-111 Surface Current (HDF-5)

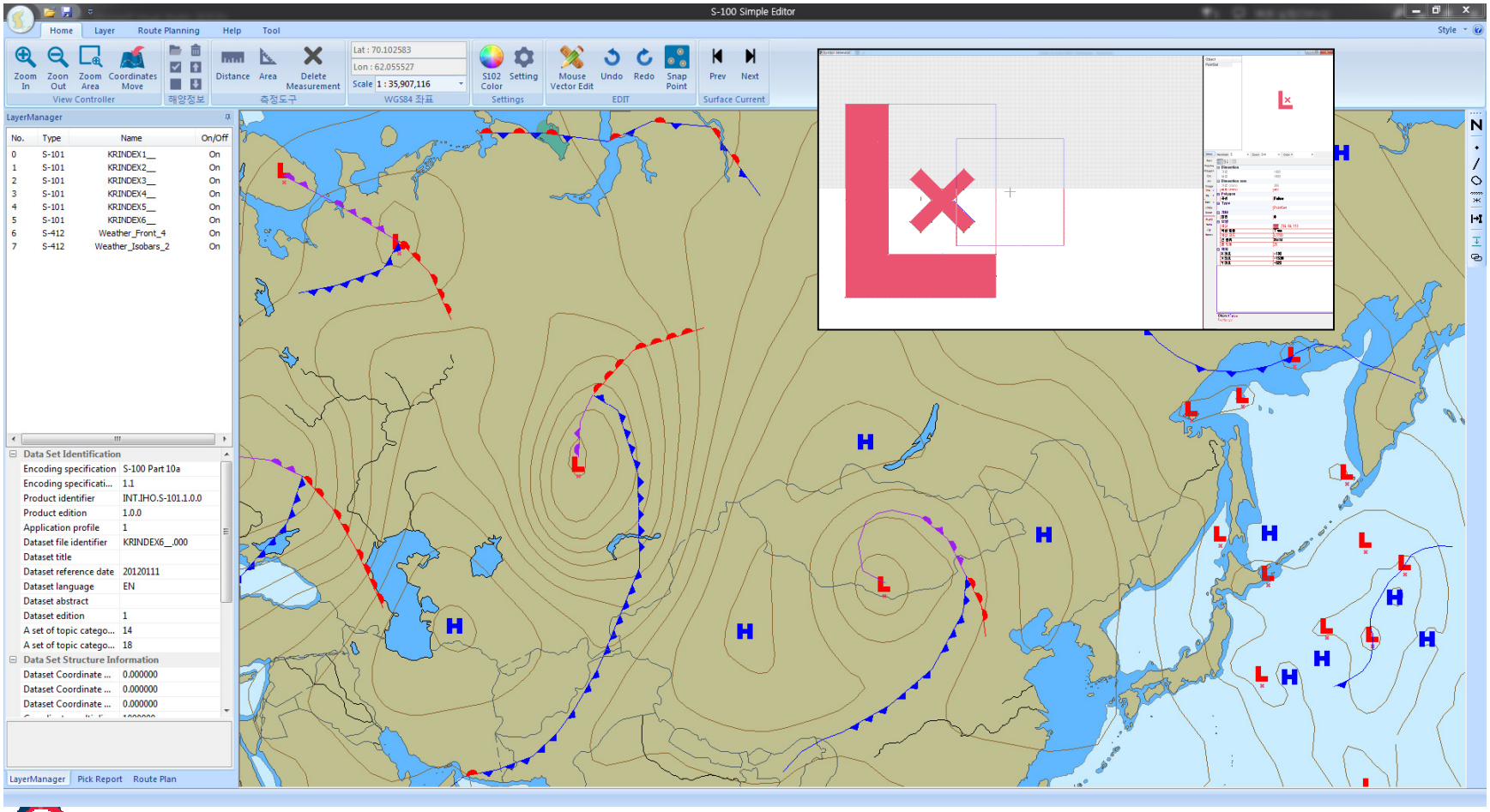


S-122 MPA (GML)



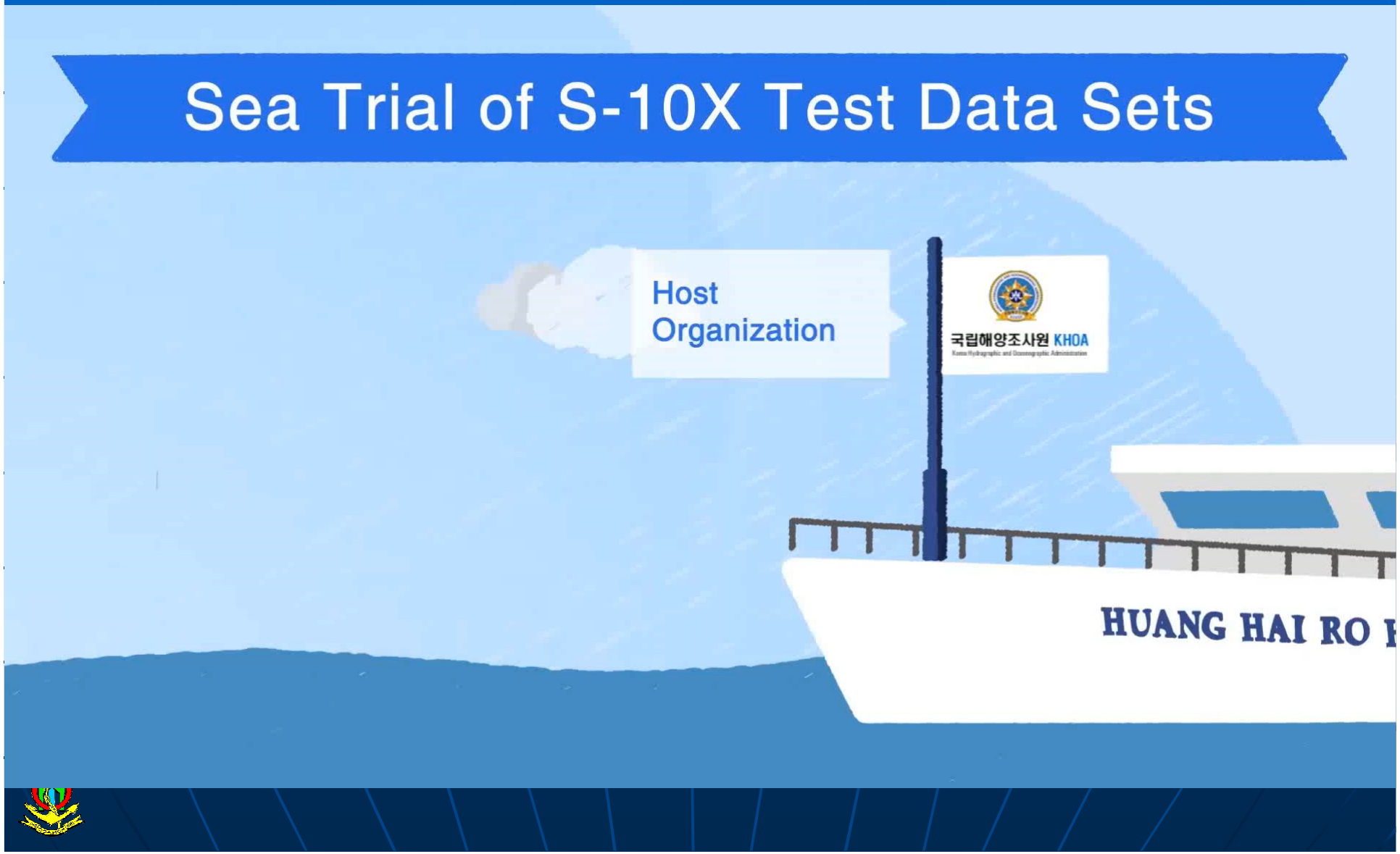
03 S-100/S-101 Test bed

KHOA S-100 Viewer (Test bed) – S-412 Weather Overlay



S-100 Sea Trial

Sea Trial of S-10X Test Data Sets



S-100 Interoperability Specification

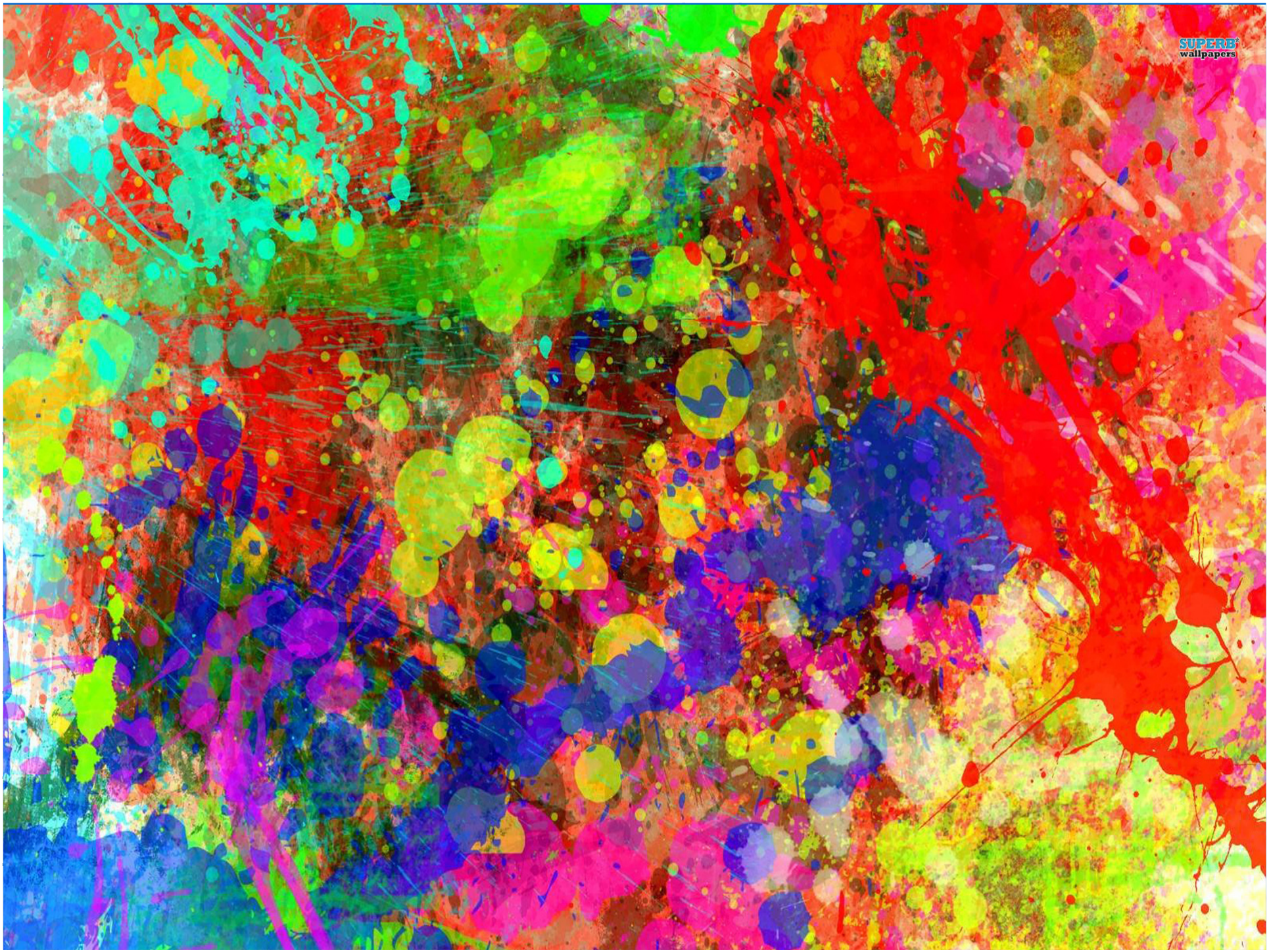
- Long and diverse list of requirements ~70
- Provide support for complex data loading scenarios
  - Data Interleaving
  - Partial Data Suppression
  - Data Replacement
  - Partial Data Replacements
  - Data Overlays
- Facilitate easy loading of predefined product combinations

S-100 Interoperability Analysis - Requirements

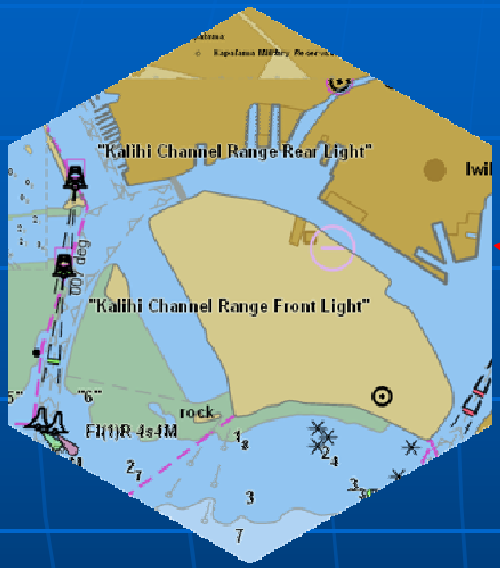
- Address Potential Data Clashes
  - Duplicate Feature Instances
  - Duplicate Feature Domains
  - Combined Geometry
  - Spatial Discrepancies
- Facilitate Skin-Of-The Earth Replacement
- Provide support for comprehensive hierarchy of data and display priorities

S-100 Interoperability Analysis

- Support Harmonized Portrayal
  - Display of Significant Features
  - Avoid Obscuring Overlay
  - Colour Set-Asides
  - Day / Night / Dusk Modes
  - Portrayal of Data Quality for Combinations of Information Layers
  - Display of Text


SUPERB
wallpapers

ECDIS - Today


"Kalihi Channel Range Rear Light"
"Kalihi Channel Range Front Light"
rock

S-100: ECDIS of Things

S-101 ENC

S-10X Sailing Directions

S-111 Surface Currents

S-112 Tidal Information

S-412 Ocean Weather

S-102 High Resolution Bathymetry

S-411 Ice Prediction