The New Standard S-100 and CARIS Hands-on Approach

NIOHC

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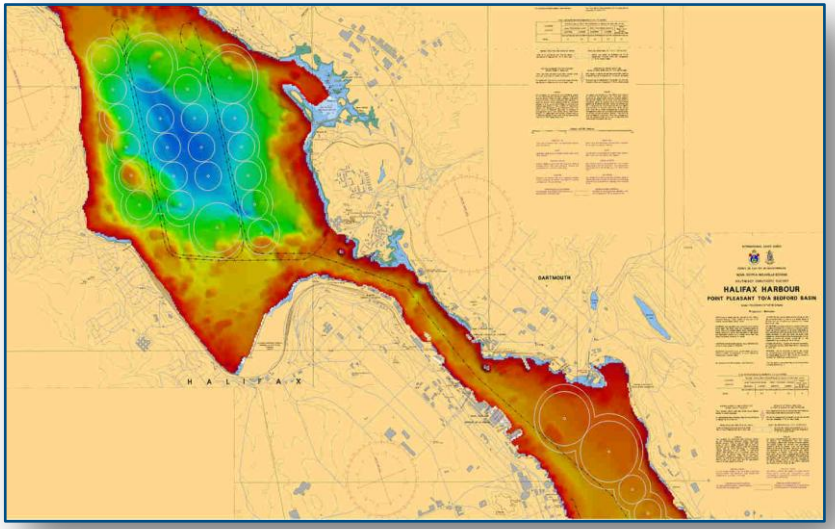
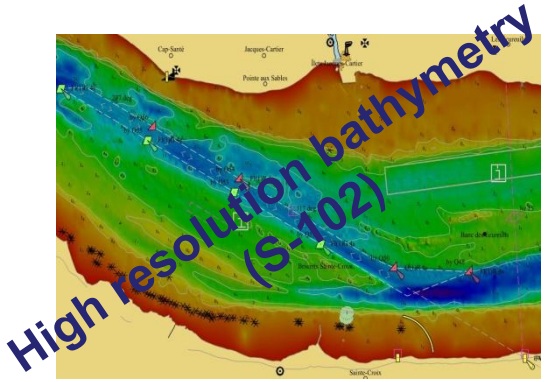
- Introduction
- Familiarization with S-100 products
- Use cases
- Education and knowledge transfer
- Conclusions

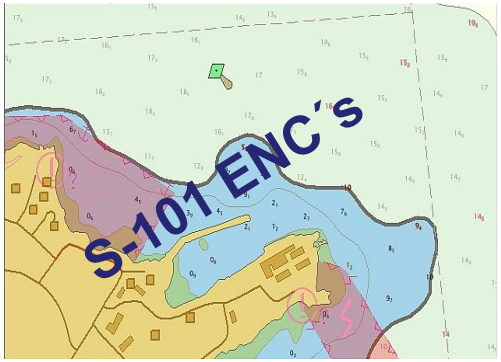
- S-100 purpose
  - Support a greater variety of:
    - Hydrographic-related digital data sources
    - Products
    - Customers
  - “Beyond the scope of traditional hydrography”
  - Easier integration with geospatial solutions
    - For data and products
    - Greater use and lower cost of implementation
- S-100 benefit
  - Support sustainable resource management and economic development (i.e. the Blue Economy)

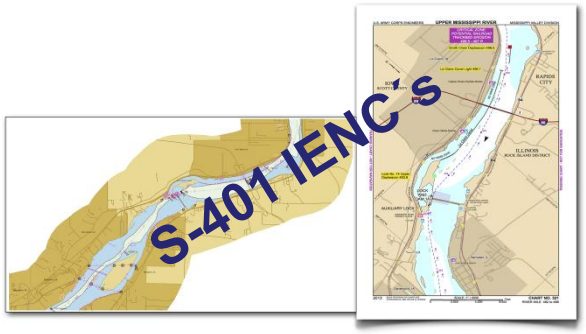
- S-100 Products: an incomplete list
  - S-101 ENC
  - S-102 Bathymetric Surface
  - S-111 Surface Currents
  - S-112 Real Time Tidal Data Transfer
  - S-121 Maritime Limits and Boundaries
  - S-401 Inland ENC
  - S-411 Sea Ice
  - S-412 Met-Ocean Forecasts
  - ...

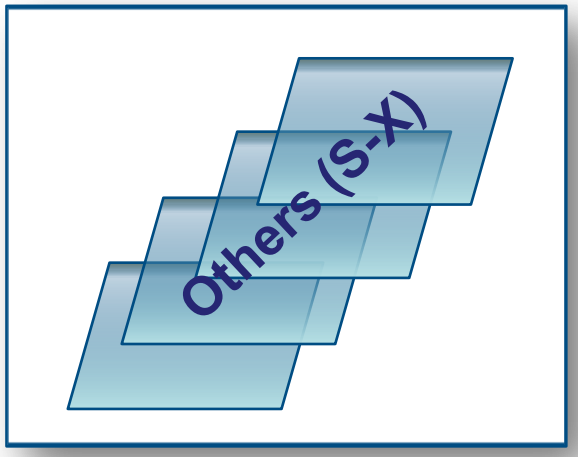


S-100 data products need to be created and tested





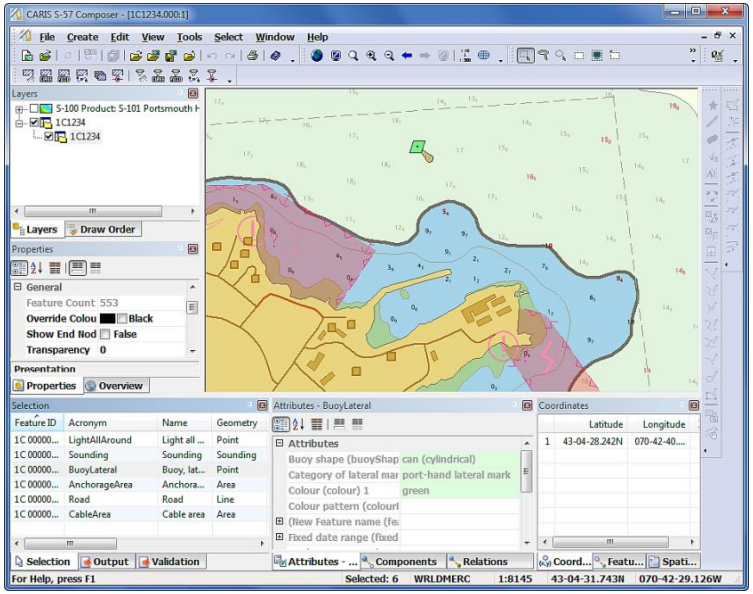




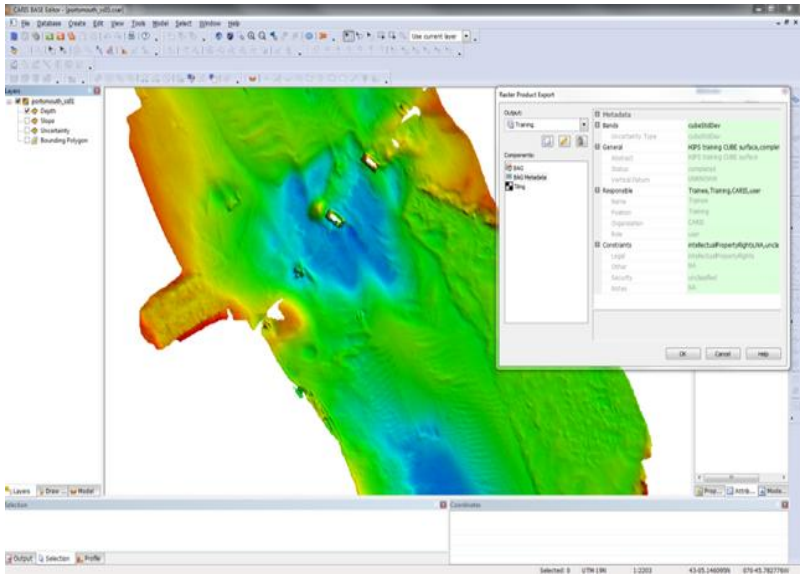
- Tools are needed for creation of sample products based on S-100
  - *Needed*: different data sets for testing
  - *Needed*: run trials in S-100 enabled ECDIS
  - *Needed*: support interoperability with other geospatial applications
  - *Needed*: flexibility to support expansion and modern navigation requirements

Available Tools in CARIS

Agencies can currently experiment with creation of products using existing CARIS production tools

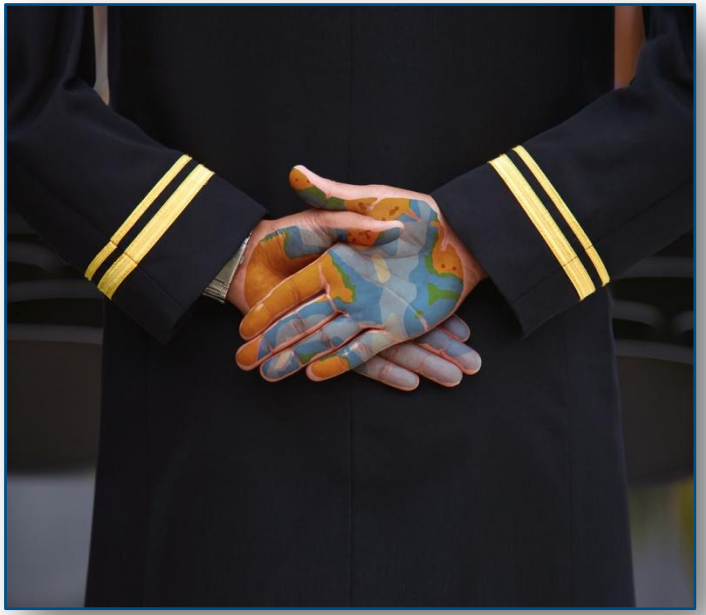


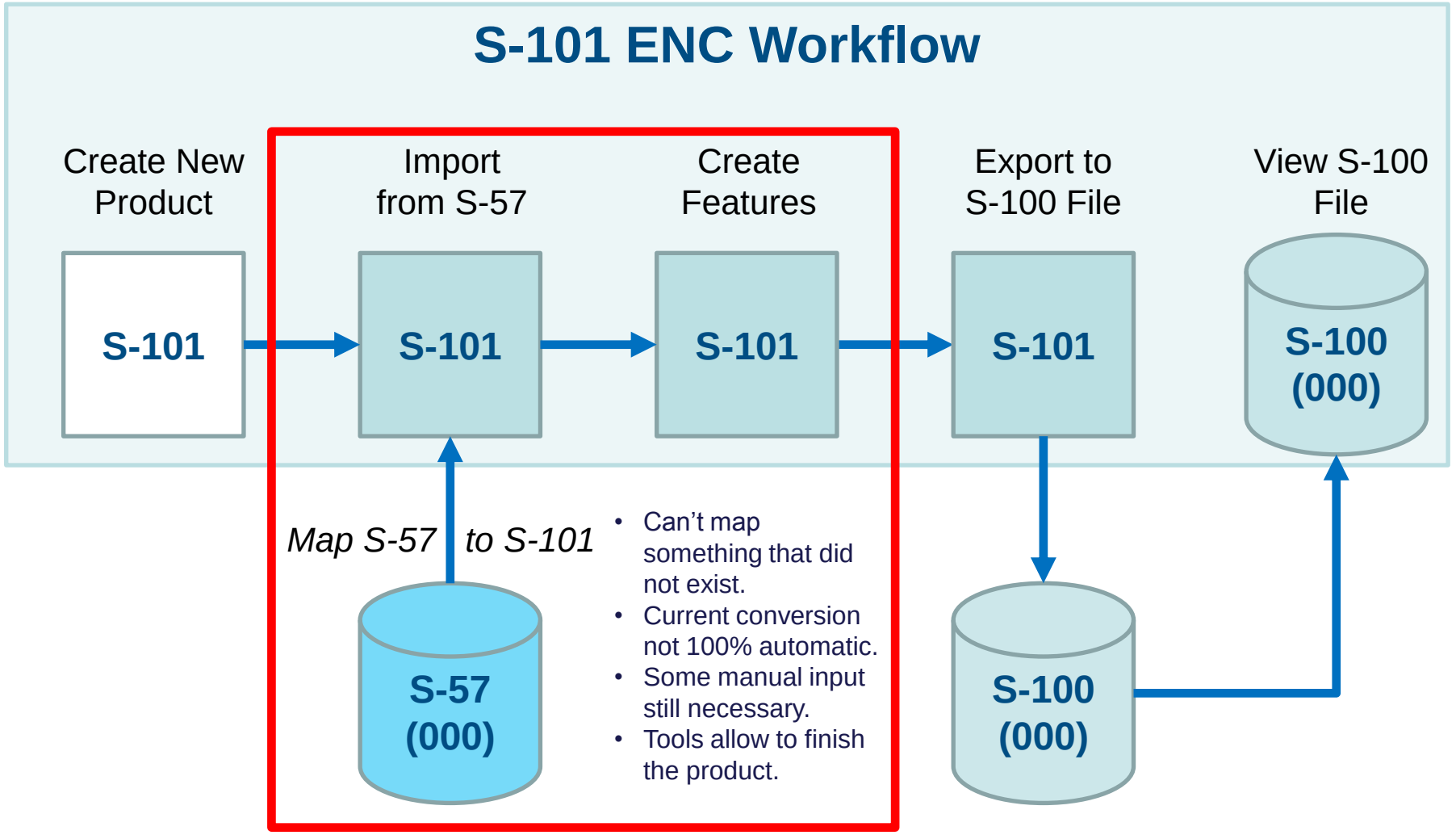
CARIS S-57 Composer allows for the creation of S-100 datasets



CARIS Bathy DataBASE for creation of S-102, S-111, S-112 datasets

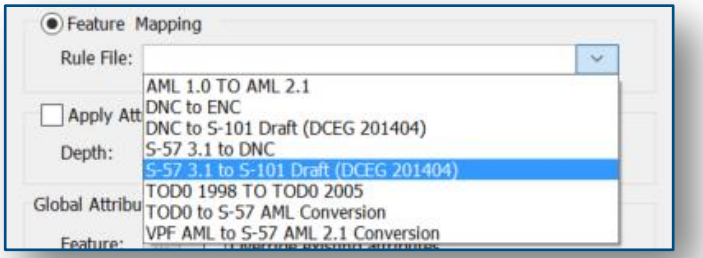
- Agencies can take a hands-on approach to working with S-100
  - Experiment with existing production tools
  - Gain familiarity with new complex and multiplicity attribute types
  - Work with information objects and assign S-100 portrayal to features
  - Work with the expanding registry of S-100 product specifications
  - Create sample S-100 datasets
  - Export content in exchange formats
    - ISO 8211 for S-101 ENCs
    - GML for other S-100 overlays




S-101 ENC Workflow
Create New Product
Import from S-57
Create Features
Export to S-100 File
View S-100 File
S-101
S-101
S-101
S-101
S-100 (000)
Map S-57 to S-101
S-57 (000)
S-100 (000)
• Can't map something that did not exist.
• Current conversion not 100% automatic.
• Some manual input still necessary.
• Tools allow to finish the product.

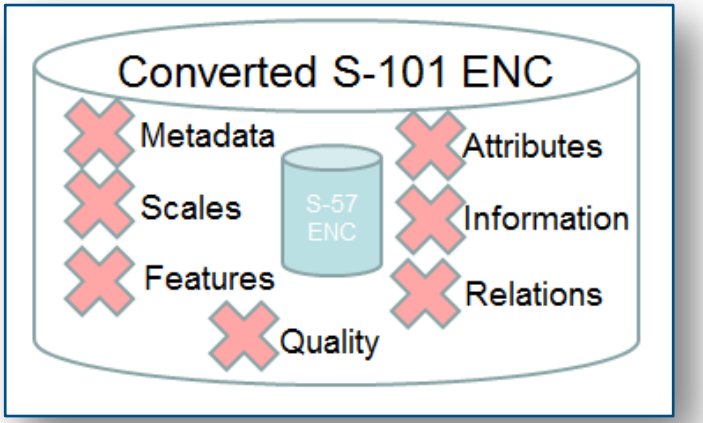
Currently, CARIS S-57 Composer users can

- Perform automated conversion from S-57 ENC (and others) into S-101
  - S-101 is a superset of S-57 ENC
  - Only a part of the solution

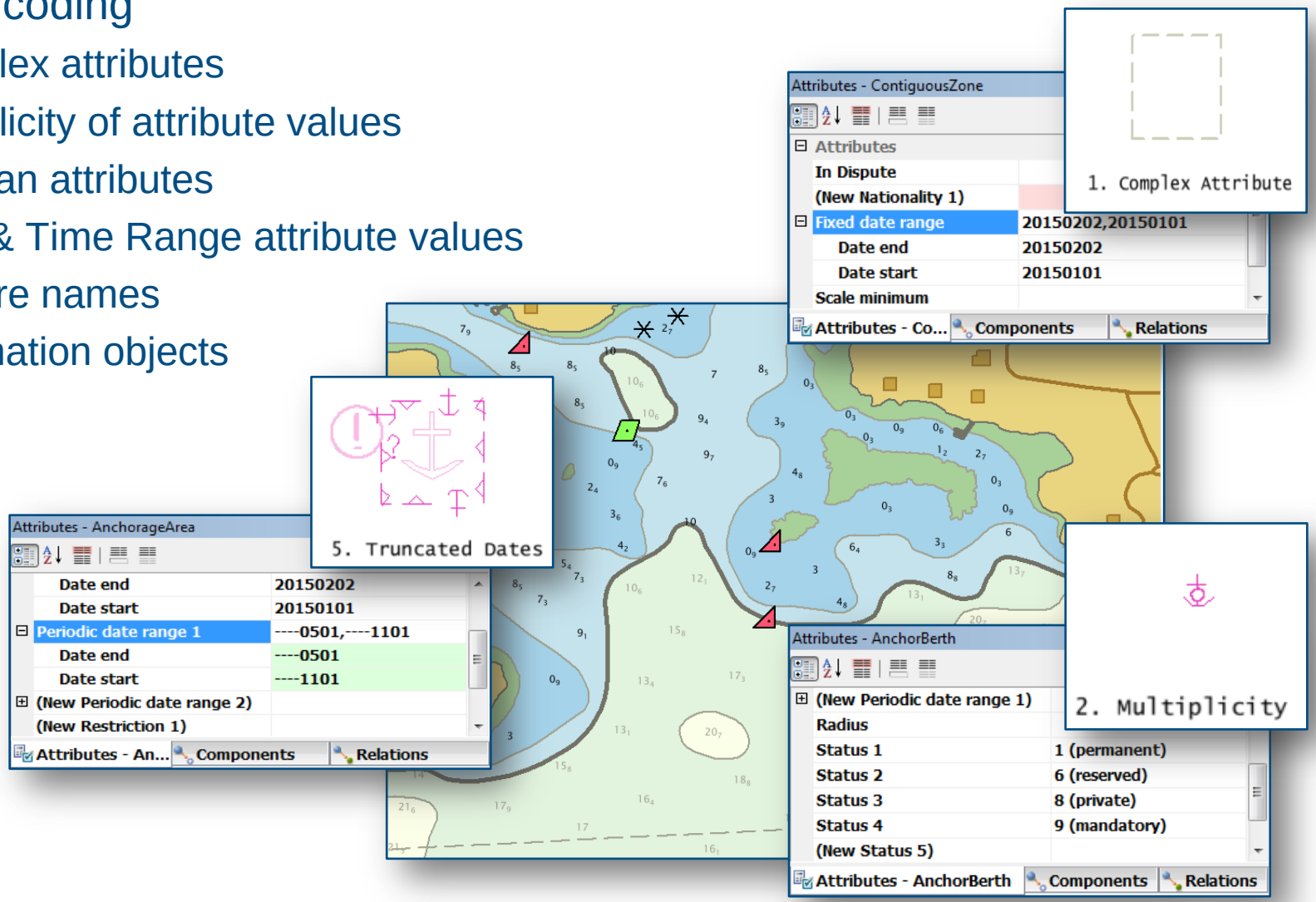


But…

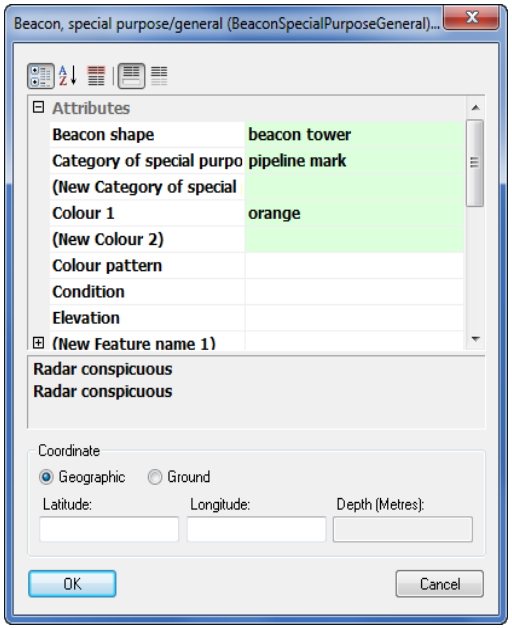
- Still need to completely populate the product…
  - Features
  - Attributes
  - Information
  - Relations
  - Metadata …



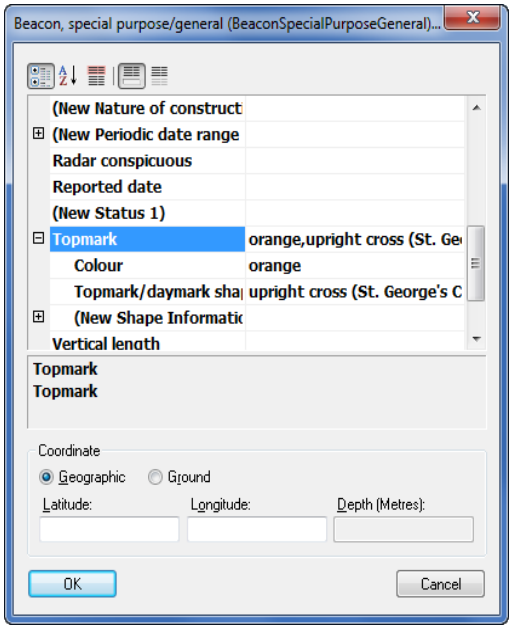
- Users can access familiar tools to create features and attributes using S-100 encoding
  - Complex attributes
  - Multiplicity of attribute values
  - Boolean attributes
  - Data & Time Range attribute values
  - Feature names
  - Information objects



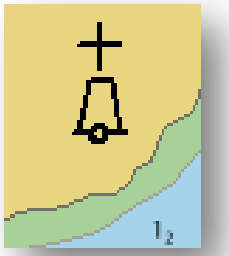
Creation of a Special Purpose General Beacon attributes in S-57 Composer



Define
- Beacon shape
- Category of special purpose mark
- Colour



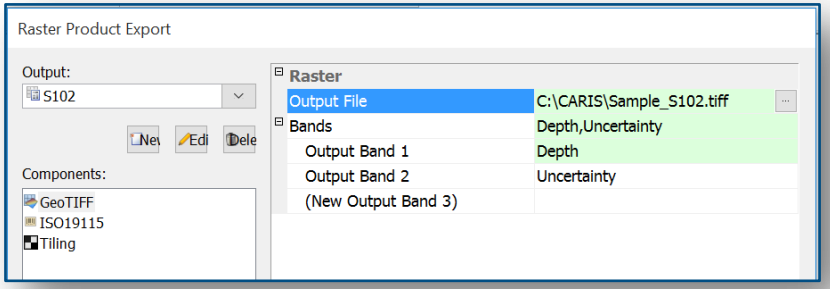
Define further attribute values
- *Define the Topmark attribute (*this is a complex attribute)

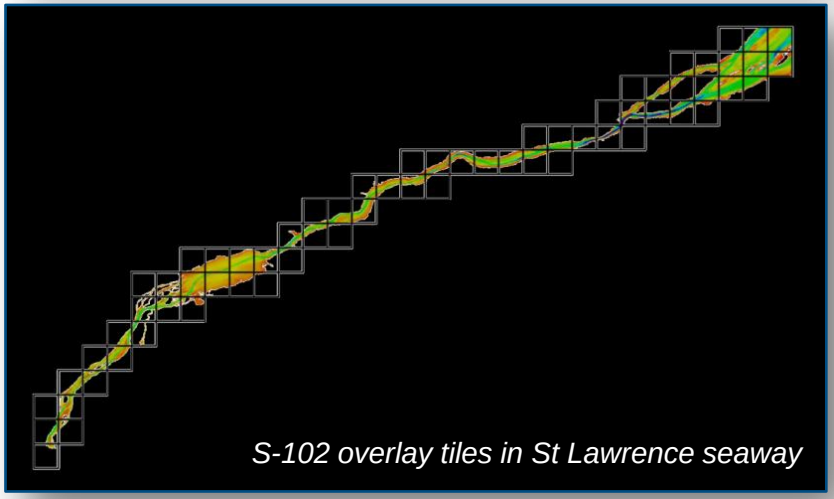


Define position
Digitize location

S-102 Bathymetric Surface

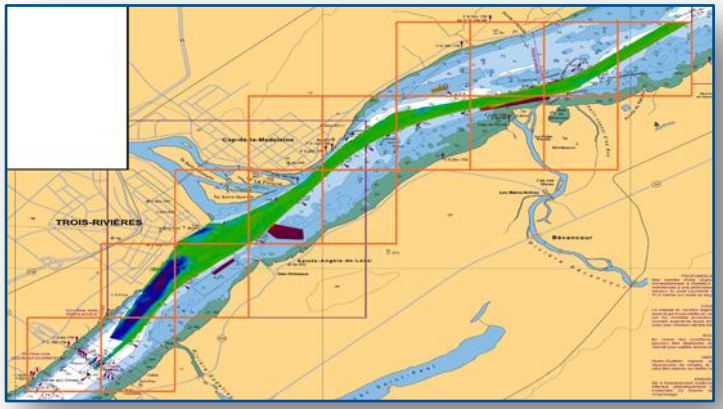
- Available solution allows:
  - Bathymetry from multiple sources needs to be prepared and deconflicted into a single surface
  - Apply tiling scheme
  - S-102 Ed. 1.0 metadata needs to be produced
  - Production to be completely automated
- Specification revisions expected by the working / project group





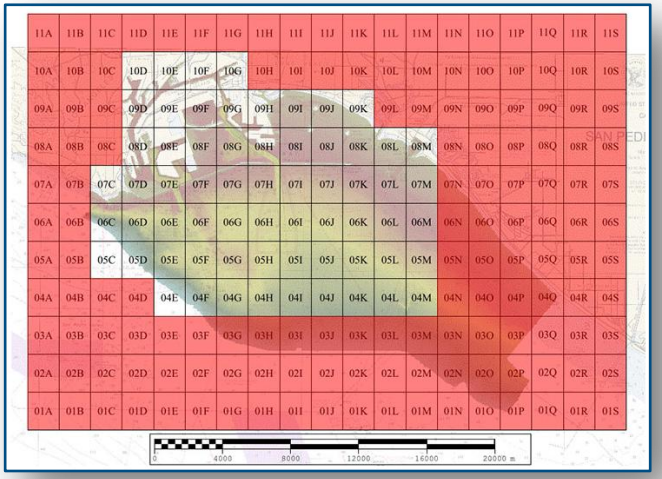
S-102 overlay tiles in St Lawrence seaway

- CHS High Definition Bathymetry Trials [2]
  - Test in collaboration with software manufactures, mariners and other users
  - Data in 32 bit GeoTIFF
  - 18 HD bathymetry cells
  - Datasets available for tests and trials



[2] Source: http://charts.gc.ca/data-gestion/bathy-trials-developpment/index-eng.asp

- NOAA pilot project to produce 'harmonized data' to support precise navigation [3]
  - Project area: Port of Los Angeles and Port of Long Beach, California
  - Producing S-102 and IENC overlays
  - Overlays and other sources (e.g. environmental observations and forecast products) feed into UKC system



[3] Sources: https://noaacoastsurvey.wordpress.com/2015/03/23/developing-products-for-precision-navigation/

http://www.nauticalcharts.noaa.gov/mcd/enc_overlays.html

The endless dilemma?

Bad data vs No Data

Better Data

Currently working with Canadian organizations to equip vessels with real-time processing tools

- Example: Common Operating Picture (COP) for Oil Spill Response
  - Uses open standards to Integrate spatial data with other information
  - Used to improve response to oil spill incident and minimize impact [3]

[3] *IOGP, IPIECA, Resource Data Inc, OGC; Recommended practice for Common Operating Picture architecture for oil spill response – Final Report*

Education and knowledge transfer

- S-100 / S-101 webinars and on-site trainings (Q1 2016)
  - General familiarization with S-100 concepts and theory
  - Hands-on experience with creating S-101 features and products
- S-100 / S-101 self-paced online training (2016)
  - Deliver theory and exercises through online access
  - Similar to other S-57 ENC and chart production courses (www.caris.com/elearning)

Conclusions

- S-100 allows the use of marine spatial data, “beyond the scope of traditional hydrography”
- Various S-100 based product specifications at various stages
- Now is the time to assess requirements for transition to producing S-101 ENCs, and other products
- Marine GIS solutions have evolved to support familiarization and trials for some products; continuing to evolve to support others
- Education and training is needed for data producers to build capacity
- A hands-on approach now will help agencies prepare for full implementation in future

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