The Benefits of a Hands-on Approach to S-100

IHO HSSC-7 Open Session

12 November 2015

Busan, Republic Of Korea

Presented by: Matt Holland, CARIS

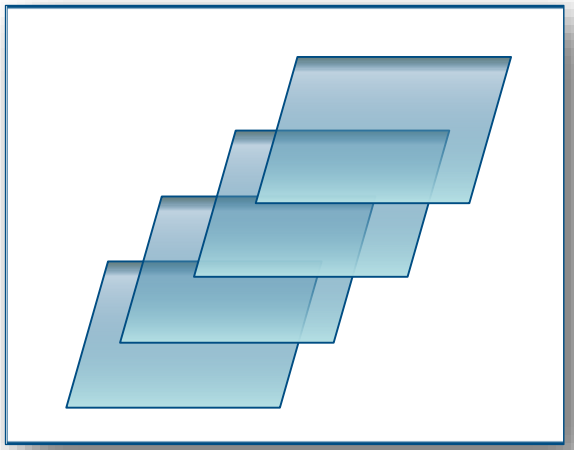
Content

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

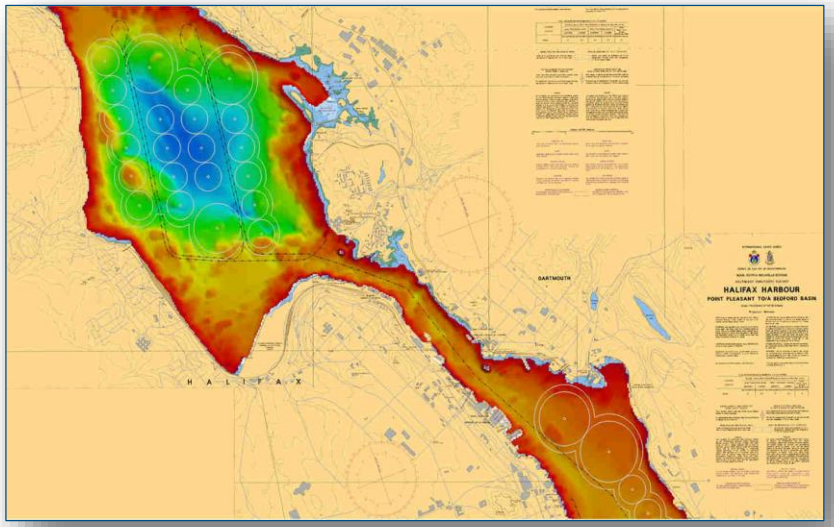
- S-100 purpose
  - Support a greater variety of:
    - Hydrographic-related digital data sources
    - Products
    - Customers
  - “Beyond the scope of traditional hydrography”
  - Easier integration with geospatial solutions
    - For data and products
    - Greater use and lower cost of implementation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

- Many products identified in preliminary list of S-100 based product specifications

- Solution needed for creation of sample products based on S-100
  - Create wide range of test data sets
  - Export content in formats for trials in S-100 enabled ECDIS
  - Support interoperability with other geospatial applications
  - Flexibility needed to support expansion and modern navigation requirements



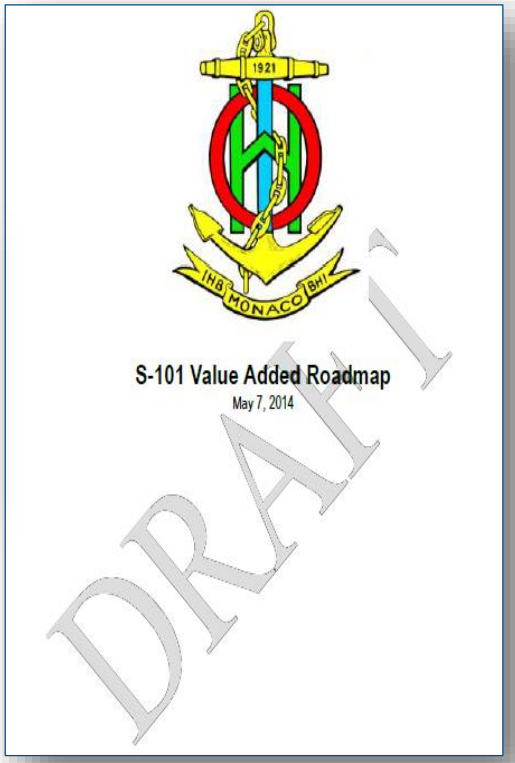
- S-100 Products
  - S-101 ENC
  - S-102 Bathymetric Surface
  - S-111 Surface Currents
  - S-112 Real Time Tidal Data Transfer
  - S-121 Maritime Limits and Boundaries
  - S-122 Marine Protected Areas
  - S-401 Inland ENC
  - S-411 Sea Ice
  - S-412 Met-Ocean Forecasts
  - ...



- Agencies can currently experiment with creation of test datasets using existing production tools

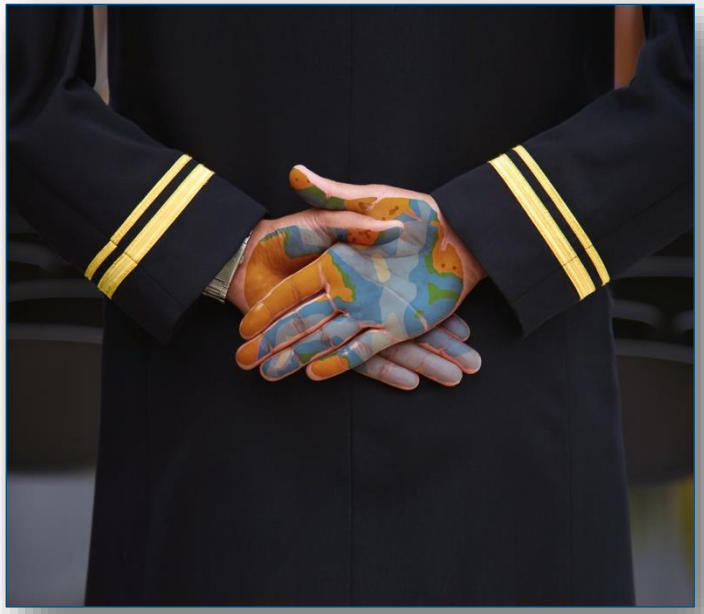
- Draft version of the S-101 product specification
  - April 2014: S-101 ENC PS Draft 0.0.0
  - April 2014: S-101 Appendix A – Data Classification and Encoding Guide (DCEG) Baseline Version
- *Estimated* timescale
  - 2014-15: S-101 initial review and testing
  - 2015-17: HO familiarization, OEM implementation

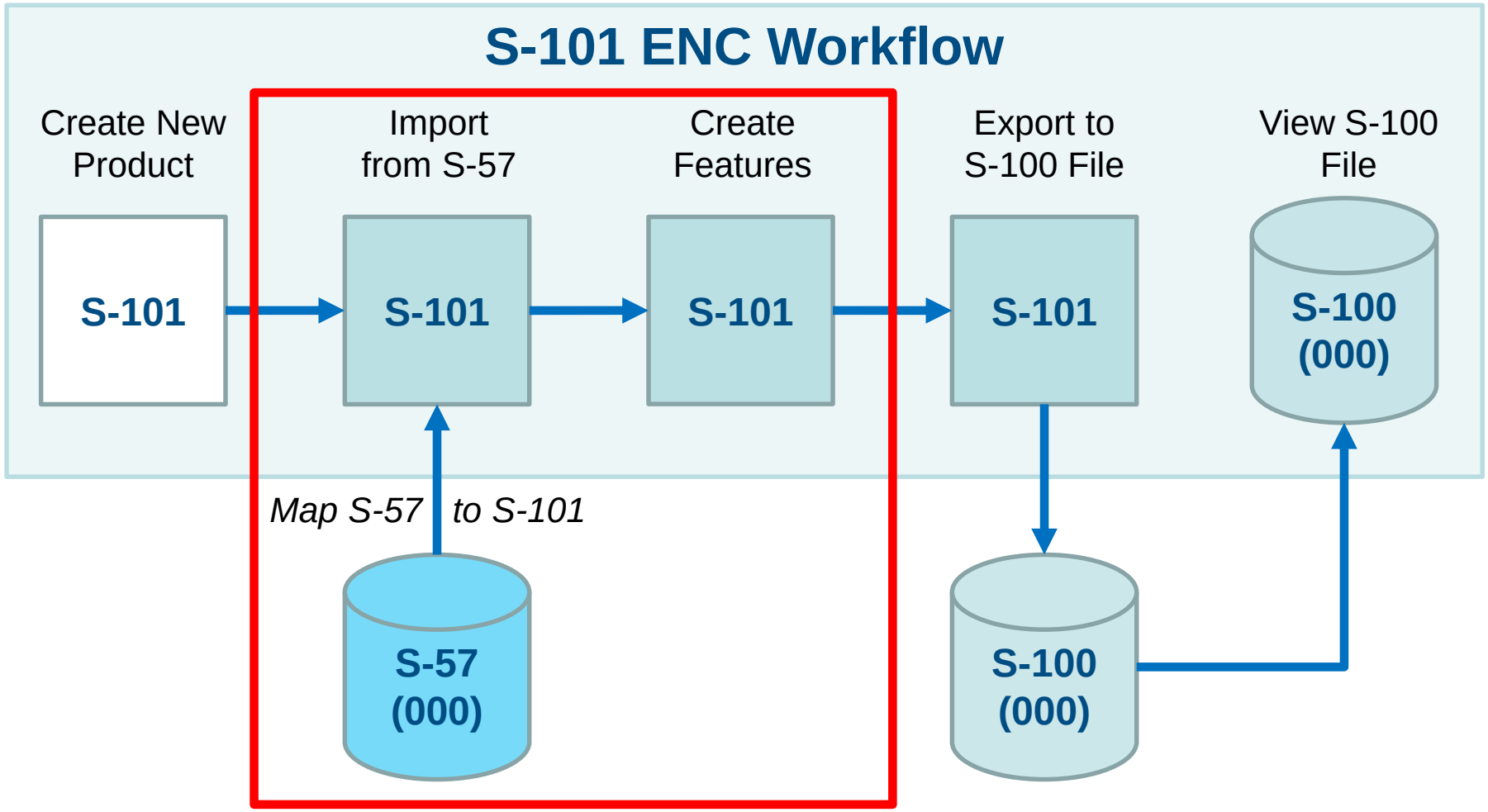
    "…a new draft version of S-101 will be made available to stakeholders giving them opportunity to begin assessing the requirements for the transition to producing S-101 ENCs."



Source: IHO S-101 Value Added Roadmap (DRAFT – May 7, 2014)

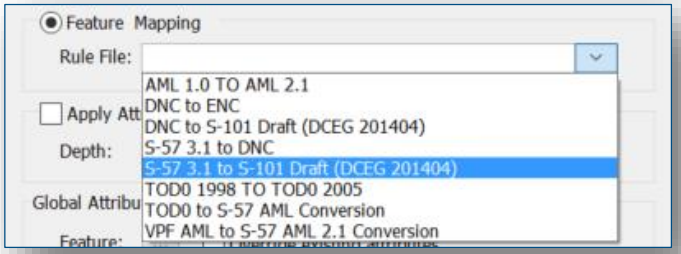
- Agencies can take a hands-on approach to working with S-100
  - Experiment with existing production tools
  - Gain familiarity with new complex and multiplicity attribute types
  - Work with information objects and assign S-100 portrayal to features
  - Work with the expanding registry of S-100 product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



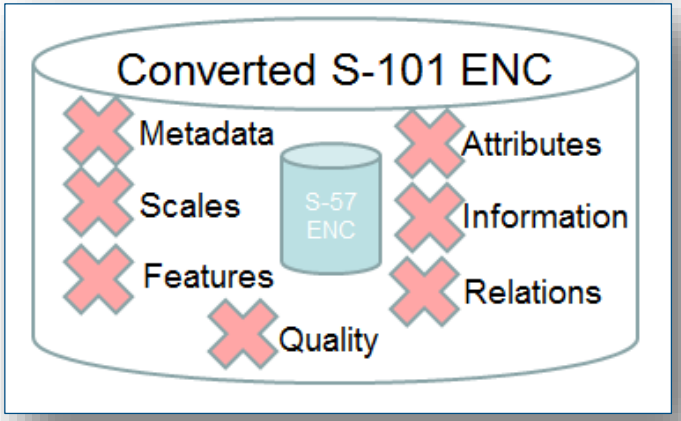

S-101 ENC Workflow
Create New Product
Import from S-57
Create Features
Export to S-100 File
View S-100 File
S-101
S-101
S-101
S-101
S-100 (000)
Map S-57 to S-101
S-57 (000)
S-100 (000)

S-101 ENCs – Feature mapping

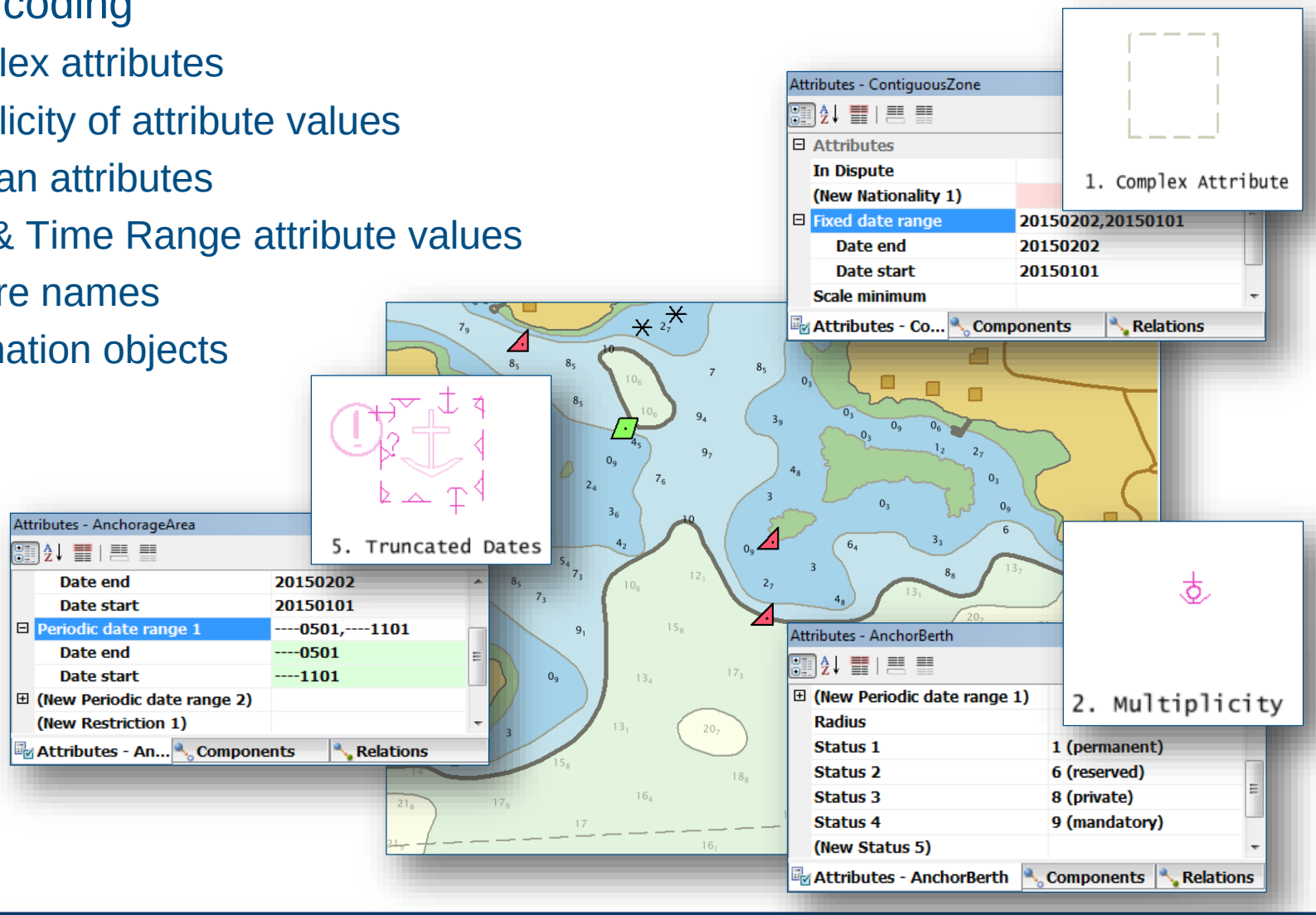
- Perform automated conversion from S-57 ENC (and others) into S-101
  - Only a part of the solution
  - S-101 is a superset of S-57 ENC



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

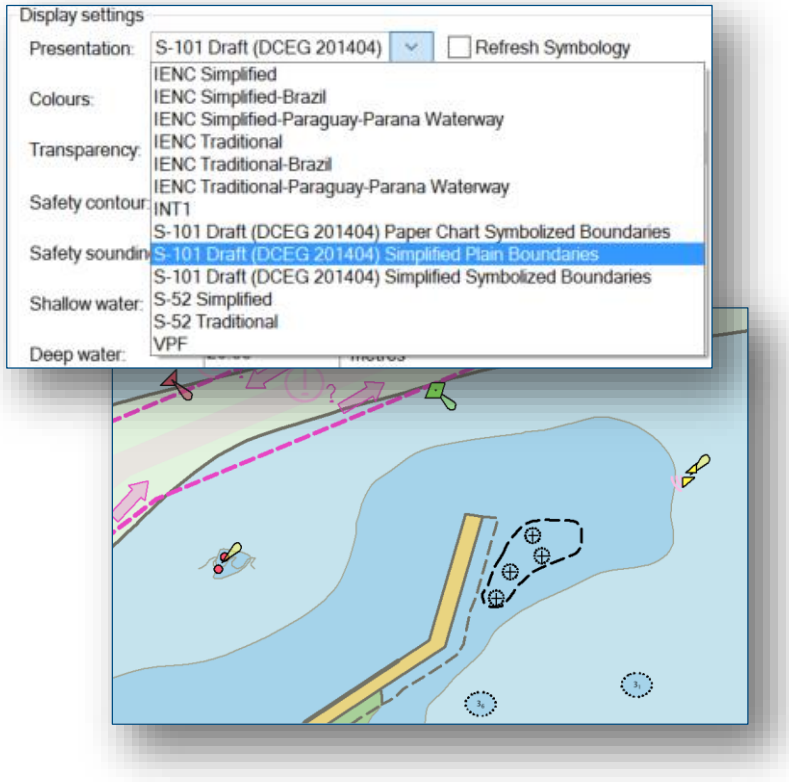


- Users can access familiar tools to create features and attributes using S-100 encoding
  - Complex attributes
  - Multiplicity of attribute values
  - Boolean attributes
  - Data & Time Range attribute values
  - Feature names
  - Information objects



S-101 ENCs – Portrayal

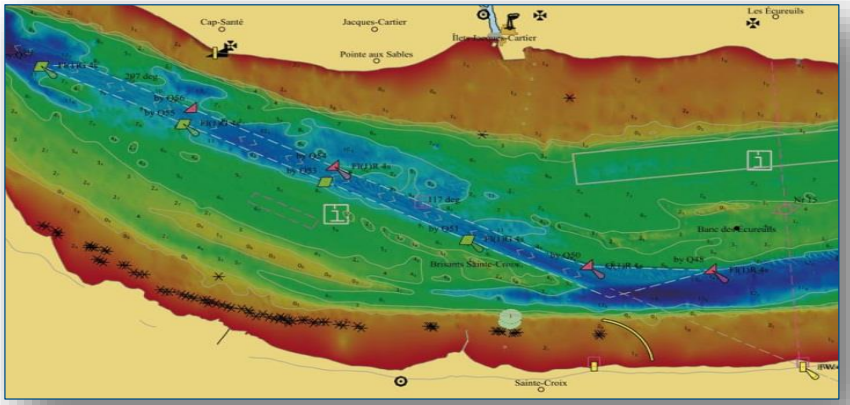
- Display S-101 ENC using draft portrayal catalogue
- Display rules, colours and symbols encoded as XML
  - Symbols encoded using SVG
  - Rules defined as templates using XSLT
  - Based on S-52 look up tables/symbols



S-102 Bathymetric Surface

- IHO specification for high resolution raster bathymetry product
  - Edition 1.0.0 – April 2012
  - Encoding based on HDF5
- Overlay for S-101 ENCs
  - Compliment/enhance ENC information
  - Water level adjustments for situational awareness or planning
- Requires:
  - High resolution / quality survey data
  - Rich metadata for traceability
  - Process automation to support frequent resurvey schedules

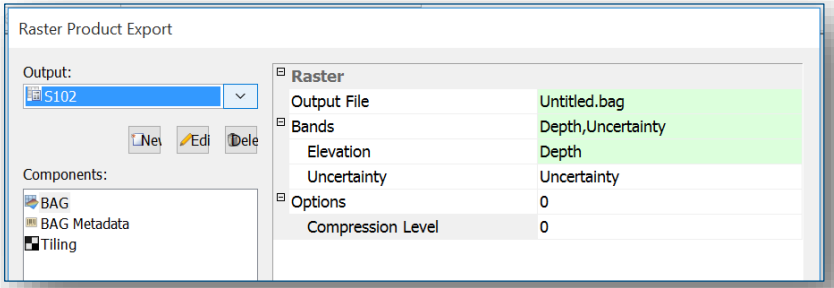
Filtered ENC and S-102 in Background [1]

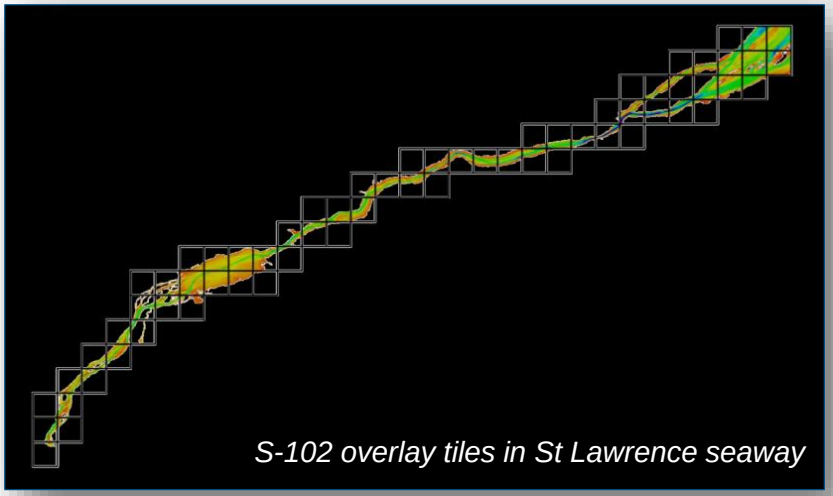


[1] *Image: Marc Journault and Louis Maltais, Canadian Hydrographic Service and Ed Kuwalek, IIC Technologies Canada; The New IHO S-102 Standard; Hydro International, May 2012, Volume 16, number 3*

S-102 Bathymetric Surface

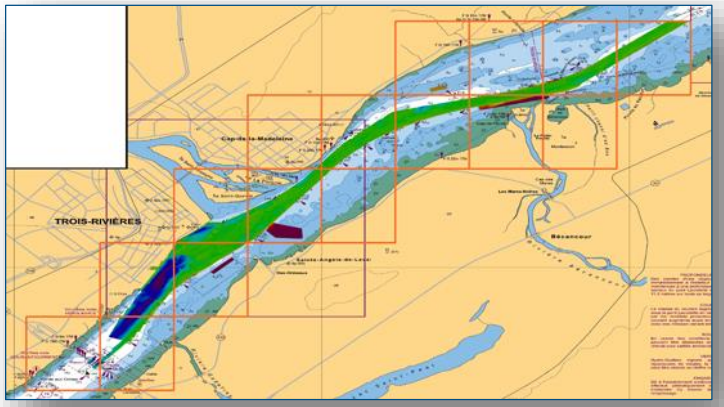
- Available solution allows:
  - Source bathymetry to be prepped and deconflicted into single surface
  - Tiling scheme to be applied
  - S-102 Ed. 1.0 metadata to be produced
  - Production to be completely automated
- Specification revisions expected





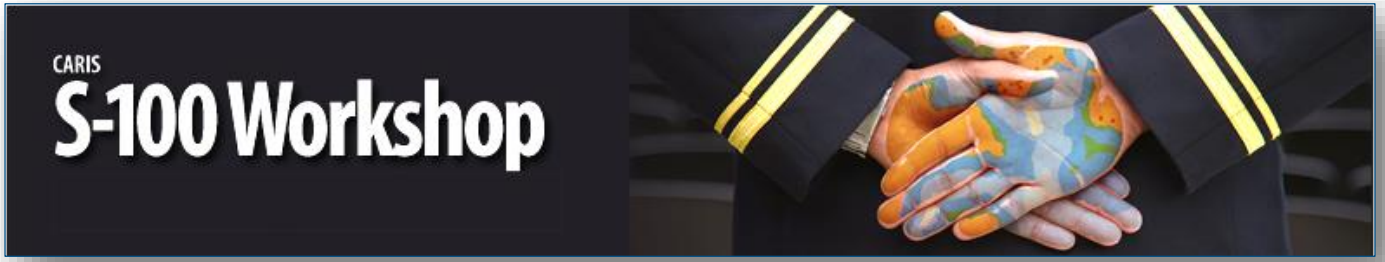
S-102 overlay tiles in St Lawrence seaway

- CHS High Definition Bathymetry Trials [2]
  - Permit the management of gridded bathymetric data in high definition
  - Test in collaboration with software manufactures, mariners and other users
  - 18 HD bathymetry cells
  - Level 1 (approx. 2m) and Level 2 (approx. 8m)
  - Files have a resolution of 1000 x 1000 pixels
  - Datasets available for tests and trials



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

Education and knowledge transfer



- S-100 educational / hands-on workshops
  - SEPRHC (Nov. 2013)
  - CARIS 2014 users conference (June 2014)
  - US Hydro conference (March 2015)
  - SWAtHC (Nov. 2015)
- 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 allowing marine spatial data to be used, “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

Matt Holland, Deputy Marketing and Sales Manager, CARIS
T: +1.506.458.8533, E: matthew.holland@caris.com, E: info@caris.com
W: www.caris.com