

Office of Coast Survey

IHO S-100 and S-101

*21st Century Framework Data Structure
for Hydrographic and Related Data*

Why Switch to S-100 ?

- Join mainstream GIS
 - maximizes access to COTS software and development
- New components not developed in isolation
- Easier use of hydro data beyond HOs and ECDIS users
 - coastal zone mapping, security, inundation modeling ...
- Extensible and active feature catalogue registry
 - Supports dynamic feature catalogues
- *Plug-and-Play* updating of data and symbology
 - Will not need to update software to cater for changes in features and display

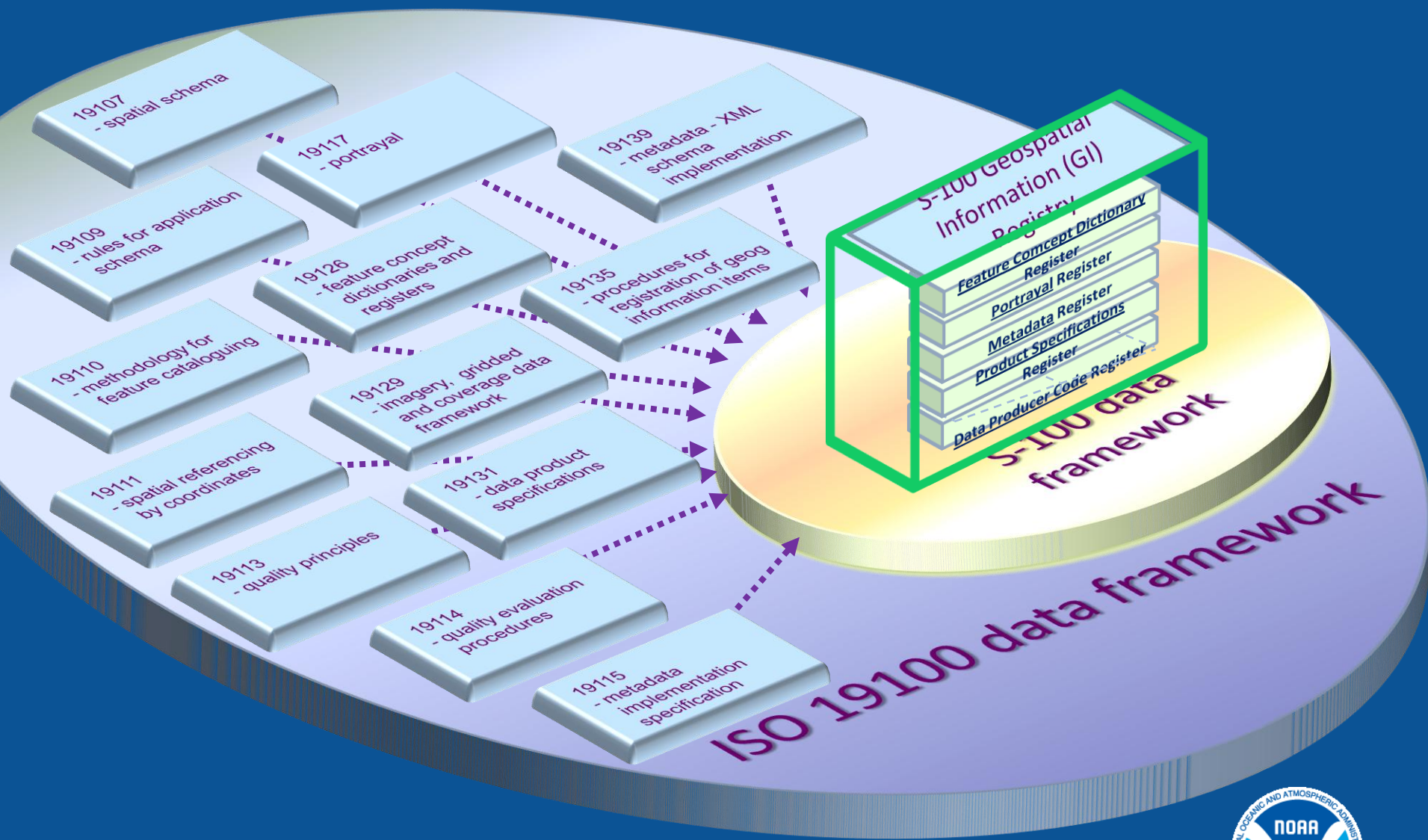
S-100 will support :

- Imagery and gridded data
- High-density bathymetry
- Surface Currents
- 3-D and time-varying data (x,y,z and time)
- Dynamic ECDIS
- Supplementary layers - MIOs
- Marine GIS
- Web-based services
- other maritime data applications ...

S-100 - Framework Data Structure for Hydrographic and Related Data

- Broad geospatial framework structure
 - Not specific to ECDIS or charting
 - Capable of accommodating other requirements
 - Increasing interest from prospective e-
Navigation data providers
- Based on ISO 19100 series of geographic standards
- Multiple Encodings for different uses
 - ISO 8211, GML, XML

S-100 - built on ISO 19100



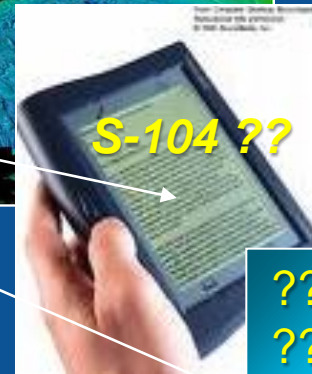
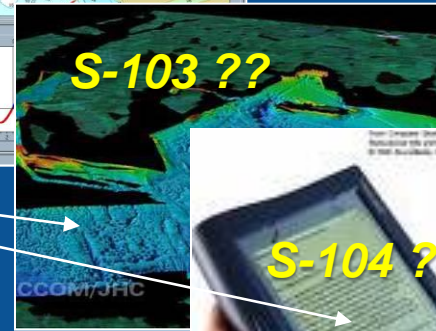
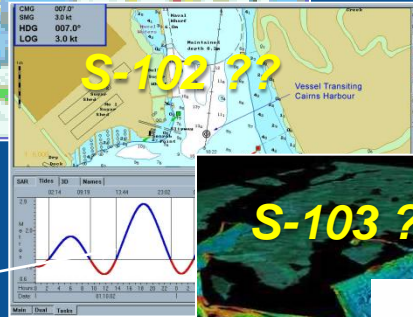
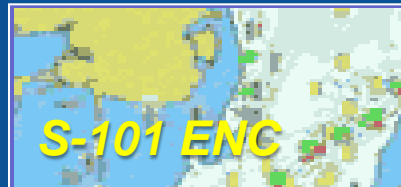
Additional Objectives

- Content and carrier are independent
- No need for new versions of product specifications or system revisions
 - *Plug-and-play* updating
- S-100 structure can easily accommodate present and future requirements
 - ECDIS
 - e-Navigation
 - Inland and Port ENC
 - Nautical Publications

S-100 and Product Specifications



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



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S-10?...

Part Number	Part Title	Description
1	Conceptual Schema Language	Defines the conceptual schema language and basic data types to be used with S-100
2 2a	Management of IHO Geospatial Information Registers Feature Concept Dictionary	Specifies how the IHO registry and registers will be managed and the Feature Concept Dictionary specifies definitions that may be used to describe geographic information and the use of registers to store them
3	General Feature Model and Rules for Application Schema	Introduces the rules for developing an application schema and the creation of the general feature model. The GFM is a conceptual model for features, their characteristics and associations
4	Metadata (General, Imagery and Gridded, Data Quality)	Specifies the metadata structure to be used in S-100
5	Feature Catalogue	Specifies the structure of the feature catalogue – which describes the content of a data product
6	Coordinate Reference Systems	Describes the spatial referencing by coordinates
7	Spatial Schema	Defines the information to describe and manipulate the spatial characteristics of features
8	Imagery and Gridded Data	Content model for gridded data for use in hydrographic applications
9	Portrayal	Specifies the portrayal model
10 10a	Encoding formats ISO/IEC 8211	Specifies the types of encoding formats in S-100
11	Product Specifications	Describes how to create an S-100 Product Specification
12	Maintenance Procedures	Specifies the maintenance procedures of S-100

User Requirements

- Need to determine what the users want
- Survey the users to determine the requirements
 - This will help focus on what is needed and what pieces of S-100 will be used (product requirements)
 - Hi Resolution Bathymetry
 - Gridded Format
 - Sailing Directions
 - GML and Vector
 - ENC
 - Vector

Building a Product Specification

- What is the Geometry Requirement
 - Vector or Coverage (Gridded)
 - This will help you determine which parts of S-100 you will need
- How will the data be primarily used
 - ECDIS, GIS
 - This will help you determine the encoding
 - 8211 – vector products that are intended for use on ECDIS
 - GML – Feature based products that are text heavy
 - Gridded – hi resolution bathymetry

Building a Product Specification (Vector)

- Define your real world features and attributes
 - What is it that is being modeled?
 - If possible re-use existing features
- Determine how the features and attributes will be put together
 - What is a mandatory attribute
 - Is it a point, curve or surface
- Create a UML model of your features to better visualize
 - Forms the application schema
- Use the DCEG format for initial documentation
- Register any new features and attributes in the IHO Registry

Building a Product Specification

- Create a Product Specification Document
 - Geometry
 - Coordinate Reference Systems
 - Encoding
 - Metadata
 - Product Delivery
- TSMAD has developed a common template

Components of an S-100 Product Specification

Main

- Specifies what is need to build a complete product
- Feature Types
- Geometry
- Data formats and file size
- Metadata

Feature Catalogue

- Features
- Attributes
- Enumerants
- Bindings
- Point, Curve or Surface

Portrayal Catalogue

- Symbols, Line Styles and Area Fills
- Rule for how the feature attribute combination must be portrayed

Data Classification and Encoding Guide

- Contains the guidance for how the data should be encoded by the data producer
- Useful as a template for building the feature catalogue

Exchange Format

- Data format that is used for data exchange
- ISO 8211 – normally used for ECDIS
- GML – good for exchanging information outside of the ECDIS arena
- XML – text based data exchange for both ECDIS and non - ECDIS

Building a Product Specification

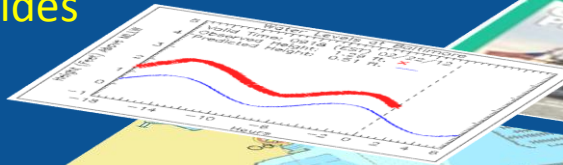
- Create an XML Feature Catalogue
- Determine if you need new portrayal
- Create an XML Portrayal Catalogue
- Create Test Data
 - Enlist the assistance of expert contributors
- Organize a test bed



Beyond S-100

- Multiple Product Specifications are in the works
 - Coast Pilot Information
 - Marine Protected Areas
 - Surface Currents
 - Ocean Forecast

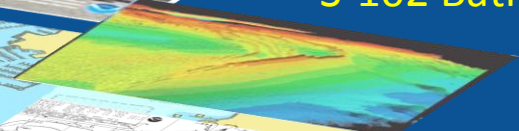
S-10X Tides



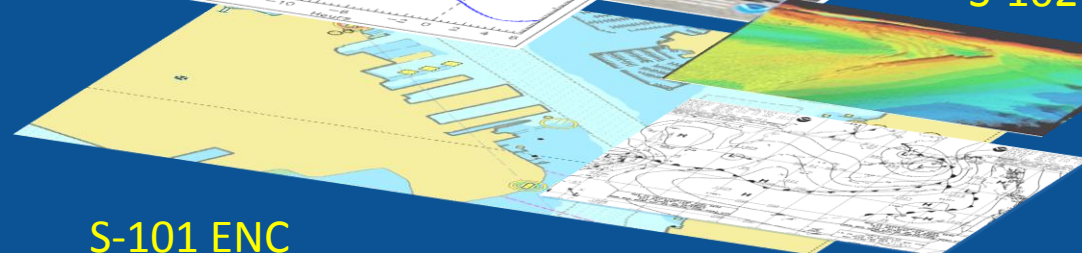
S-10X Nautical Publications



S-102 Bathymetry



S-101 ENC



WMO – Met Ocean



What does this all mean?

- Improved Standardization between hydrographic products
- Improved data interoperability
- Data is not just for Shipboard Navigation

