International Hydrographic Organization

World-Wide Navigational Warning Service Sub-Committee

WWNWS-5

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S-100 Basics
Background Brief

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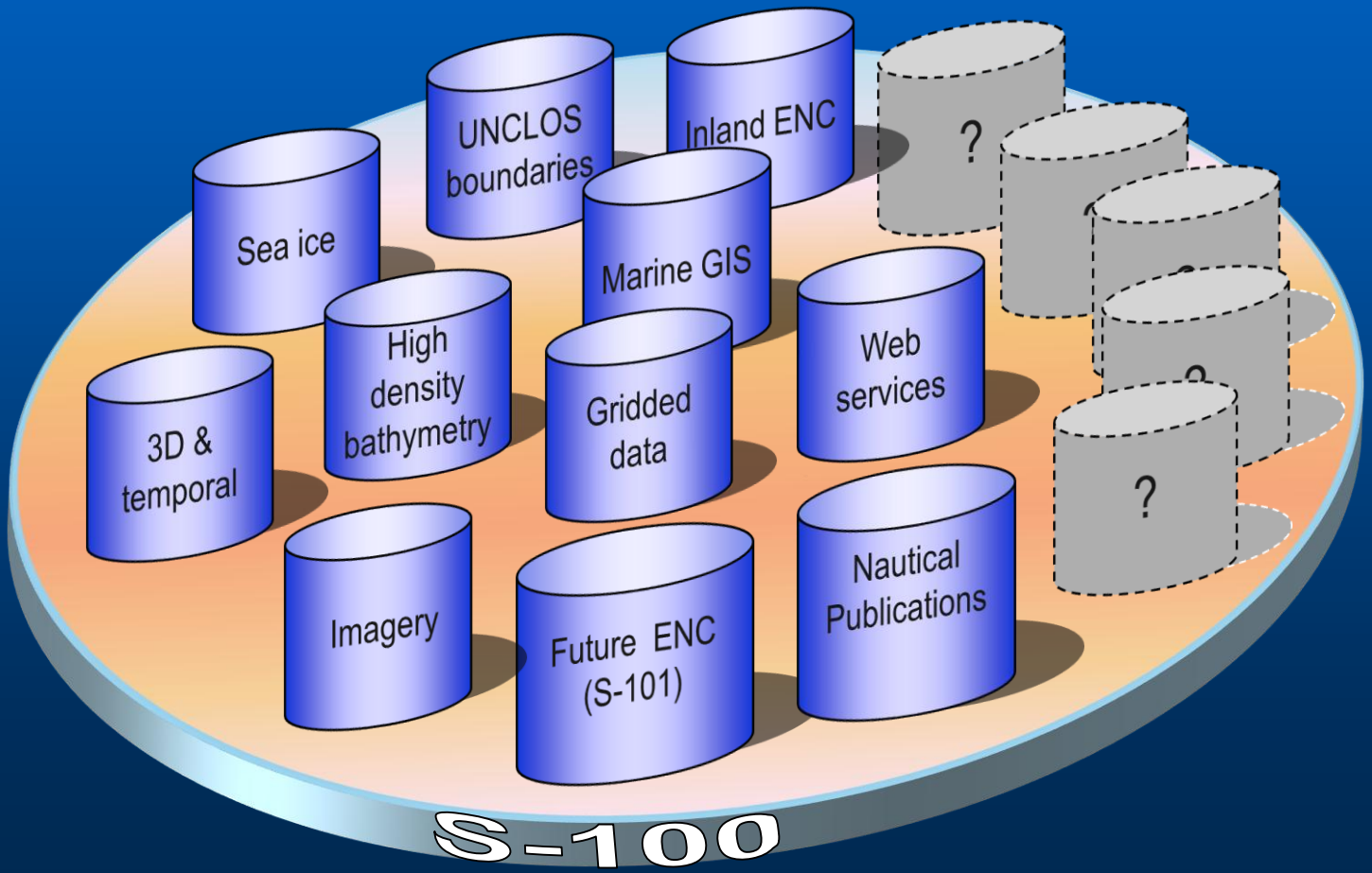
S-100 Basics

S-100 - IHO Universal Hydrographic Data Model - provides a contemporary hydrographic geospatial data standard that can support a wide variety of digital data sources, products and services



Background

- 1987: adoption of the first IHO digital format for the exchange of hydrographic data ("CEDD format")
- 1992: publication of IHO Publication S-57 – Transfer Standard for Digital Hydrographic Data
- 2000: publication of S-57 Edition 3.1
  - S-57 used mainly for encoding Electronic Navigation Charts (ENC)
  - Ed. 3.1 frozen until further notice
  - preparation of Ed. 4 initiated to include additional data types such as bathymetric and matrix data
- 2005: change of name

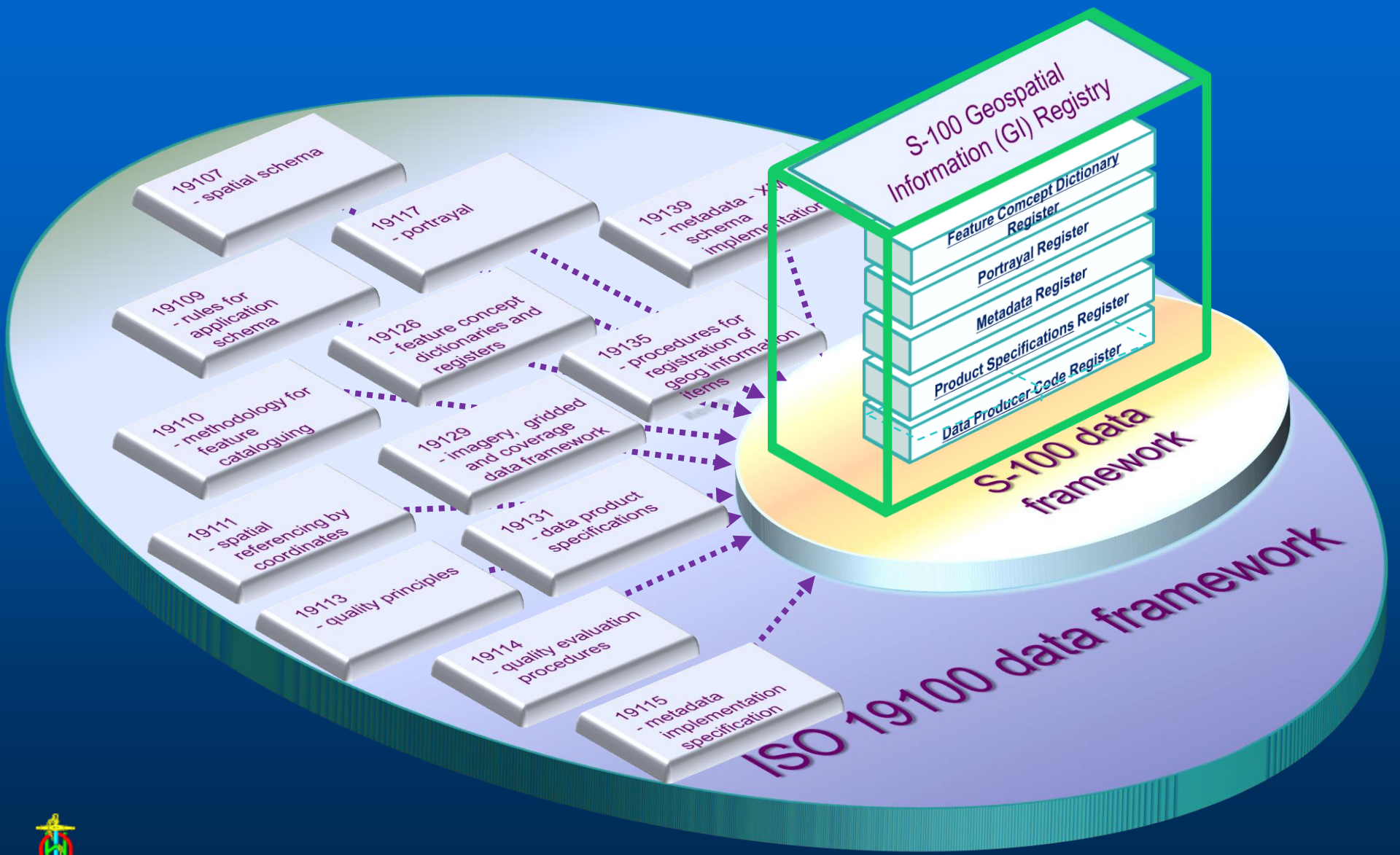
~~S-57 edition 4.0~~	→	S-100
~~S-57 Edition 4.0 ENC Product Specification~~	→	S-101

Main characteristics of S-100

- Data content separated from the carrier (file format)

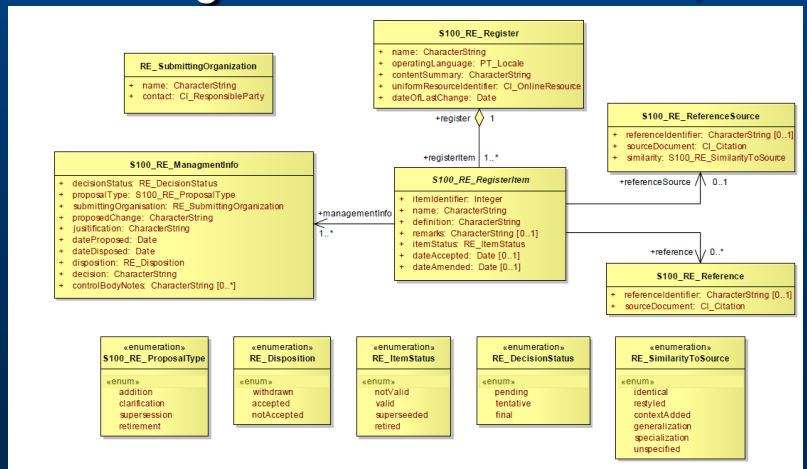
  Note: S-57 data model embedded in ISO/IEC 8211 encapsulation
- Manageable flexibility that can accommodate change
- Alignment with ISO 191xx series of current geospatial information standards - interoperable with other domains
- ISO-conforming web-based registry
- Specifies methods and tools for data management, processing, analyzing, accessing, presenting and transferring data between different users, systems and locations

S-100 – Based on ISO/TC211 Conceptual Standards



S-100 Geospatial Information Registry

- Registry
  - *A registry is the information system on which registers are maintained.*
    - Registry = collection of registers
- Registers
  - *A register is simply a managed list. It is easier to maintain than a fixed document, because new items can be added as needed to the register, and existing items in the register can be clarified, superseded or retired.*
    - Register = collection of tables



S-100 Registers

Feature Concept Dictionary (FCD) Register

- *Register containing definitions on how to digitally describe and encode any piece of information*
  - *a buoy*
  - *a sounding*
  - *a ship position*
  - *a radio service*
  - *…..*

Portrayal Register

- *Register containing the elements of portrayal schemes such as symbols (under development)*

Metadata Register

- *Register containing the core set of metadata items and a structure for defining additional items (under development)*

S-100 Registers

Product Specifications Register

- *Description of which elements from FCD and other registers are used to define a data exchange standard*
  - *IHO ENC product specification*
  - *real-time tidal height exchange standard*
  - *sea ice product specification*
  - *ship reporting exchange standard*
  - *VTMS route definition product spec.*
  - *…..*

Data Producer Code Register

- *Register containing the list of codes identifying the producers of a particular data product*

S-100 Product Specification

- **Product Specification**

  A product specification is a description of all the features, attributes and relationships of a given application and their mapping to a dataset. It is a complete description of all the elements required to define a particular geographic data product.

  - product identification
  - data content and structure
  - coordinate reference system
  - data quality
  - data capture
  - data maintenance
  - portrayal
  - encoding
  - product delivery

S-100 Product Specification

- Product Specification – main document defining the product
- Feature Catalogue (XML) – Application scheme, Features and Attributes
- Portrayal Catalogue (XML) - (optional) – Display rules and symbols
- Encoding - e.g. GML, ISO8211, WKT, KML etc …
- Capture guide (optional) – Guidance/rules for capturing product data.

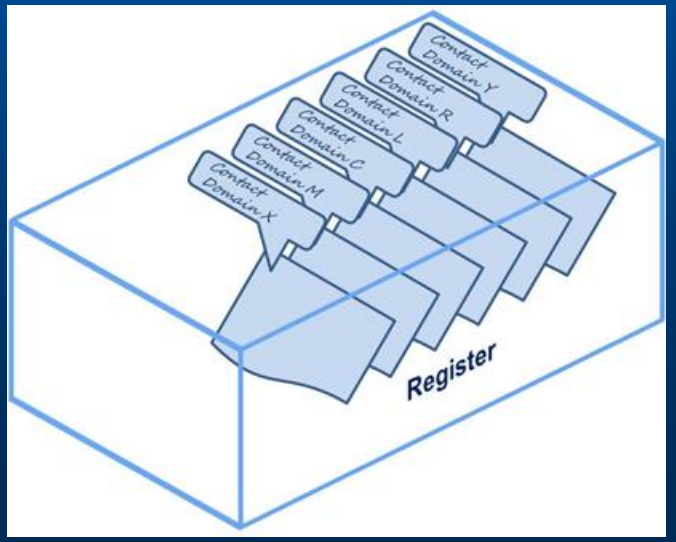
S-100 Domains

- Domains

Within the Feature Concept, the Portrayal and the Metadata Registers each entry is assigned to a recognised domain. The purpose of designating domains and a related Domain Control Body is to ensure that the key stakeholders (as represented by the domains) are consulted in any subsequent proposals to adjust items contained in a Register.

Domains of Feature Concept Dictionary Register:

- nautical charts
- nautical publications
- inland ENCs
- port ENCs
- sea ice coverage
- marine information overlays



S-100 References

- S-100 - Universal Hydrographic Data Model

  Edition 1.0.0 - January 2010

- S-99 - Operational Procedures for the Organization and Management of the S-100 Geospatial Information Registry

  Edition 1.1.0 - November 2012

- S-100 on-line GI Registry: http://registry.iho.int/

Status and Perspectives

- S-100
  - Edition 1.0.0 - January 2010
  - Section on portrayal under development
  - Approval of Edition 2.0.0 foreseen in 2014
    - Completion will enable an S-100/S-101 test phase to begin
  - Further evolution required to support service-centric model
- Product Specifications
  - Focus on geospatial products

Status and Perspectives

- Product Specifications
  - IHO Product Specifications
    - S-102 - Bathymetric Surface Product Specification : Edition 1.0.0 - April 2012
    - Under development:
      - S-101 - ENC: draft 1st Edition expected in 2013
      - S-10x - Marine Protected Areas
      - S-10x - Digital Routeing Guide
      - S-10x - Surface Currents
      - Generic template to guide the development of product specifications
  - Product Specifications being developed with other organizations
    - Maritime Boundaries Data (UN DOALOS)
    - Sea Ice (JCOMM/ETSI)
    - Ocean Forecasts (JCOMM/ETMSS)
- GI Registry: IALA & IEHG involved in maintaining domains

Development of S-100 Product Specifications

Base Standards and Services (Building Blocks)

- S-100 - Geospatial Framework
- IHO GI Registry

Product Specifications

S-101 - ENC
S-102 - Bathymetric Surface
S-10x - Marine Protected Areas
S-10x - Radio Signals
S-10x - Tidal Information
S-10x - Surface Currents
S-20x - Inland ENC
S-20x - Maritime Boundaries
Other IHO Product Specifications

Other non-IHO Product Specifications

Hydrographic Services and Standards Committee (HSSC)

- Transfer Standard Maintenance and Application Development WG (TSMAD)
- Standardization of Nautical Publications WG (SNPWG)
- Data Quality WG
- Marine Spatial Data Infrastructure WG (MSDIWG)
- Surface Currents WG
- Data Protection Scheme WG (DPSWG)
- Digital Information Portrayal WG (DIPWG)
- Chart Standardization and Paper Chart WG (CSPCWG)
- Tidal and Water Level WG (TWLWG)
- Hydrographic Dictionary WG (HDWG)

- Inland ENC (IEHC)
- E-Navigation
- UN DOALOS
- Others …

Status and Perspectives

- Time scale for the take-up of S-100?
  - E-navigation
    - S-100 endorsed as the baseline for the “Common Maritime Data Structure”
    - Barriers to implementing S-101 in the near future
      - Overhead associated with dual S-57 and S-101 ENCs
      - Cost of upgrading ECDIS
    - Key driver: availability and appeal of S-100 based products & services associated with e-navigation
  - MSDI applications
    - S-102 registered in the EU Inspire framework
    - Development of web map services to provide access to S-102 products
- Ability to use S-100 to model non-geographic information?
  - Successful exploration of the feasibility of an S-100 based PS for notice of arrival and pilot requests

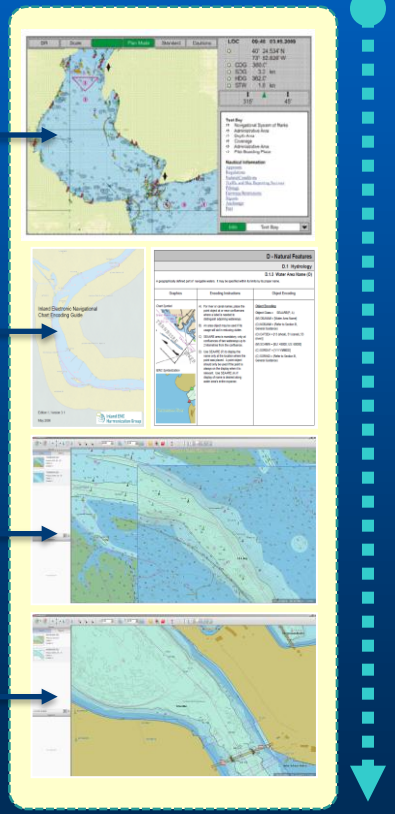
Transition to an S-100 ECDIS

Next Generation ECDIS

S-100, S-101, S-10x Standards

- S-101 Next Generation ENC
- S-102 Bathymetry
- S-10x Inland ENC
- S-10x Nautical Publication
- S-10x Weather/Environment
- S-10x Marine Information Overlay

S-100 based Single Window



Challenges

- ✓ S-57 to S-101 conversion
- ✓ S-101 Implementation
- ✓ S-101 Display
- ✓ S-10x Product Overlays
- ✓ Conventional ECDIS functions
- ✓ New ECDIS functions
- ✓ S-101 ENC Onboard Test
- ✓ S-101 ENC Quality Assessment
- ✓ S-101 ENC Protection
- ✓ S-10x Product distribution

S-100 Howto

- Identify the requirement
  - What information does one want to exchange in a digital, standardised way ?
    - *"enter once – use many"* applications
- Are the definitions that one needs already in the S-100 Registry?
  - Yes => Go ahead
    - develop own Product Specification / Exchange Standard

S-100 Howto

- No? (Definitions not in the registry):
  - Find or become a submitting organization to :
    - revise an existing entry
    - propose something new
  - Then develop own Product Specification / Exchange Standard
- IHO/HSSC will not create or control definitions or standards outside its scope
  - But it can help and advise if asked …

Questions?

For more information: http://www.iho.int

IHO Contact: info@iho.int