



International Hydrographic Organization

S-100 - UNIVERSAL HYDROGRAPHIC DATA MODEL Background Brief

XIII REUNIÓN

COMISIÓN REGIONAL HIDROGRÁFICA DEL PACÍFICO SURORIENTAL (CHRPSE)

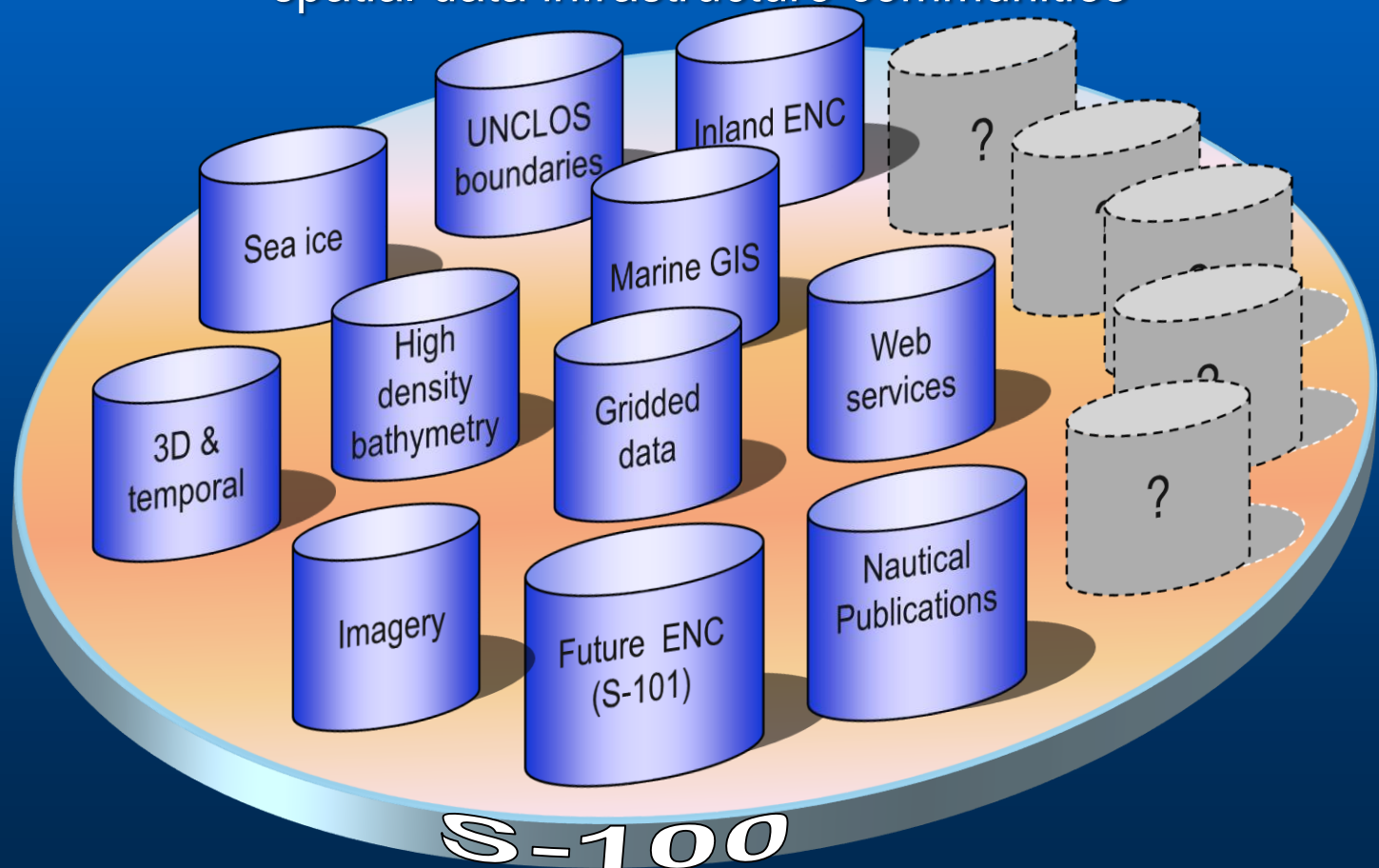
Cartagena de Indias, Colombia

21 a 27 de Agosto 2017

Taller de Actualización para Hidrógrafos y Cartógrafos

S-100 Basics

S-100 - IHO Universal Hydrographic Data Model - provides a contemporary data framework that can support a wide variety of digital data sources, products and services required by the hydrographic, maritime and spatial data infrastructure communities



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**

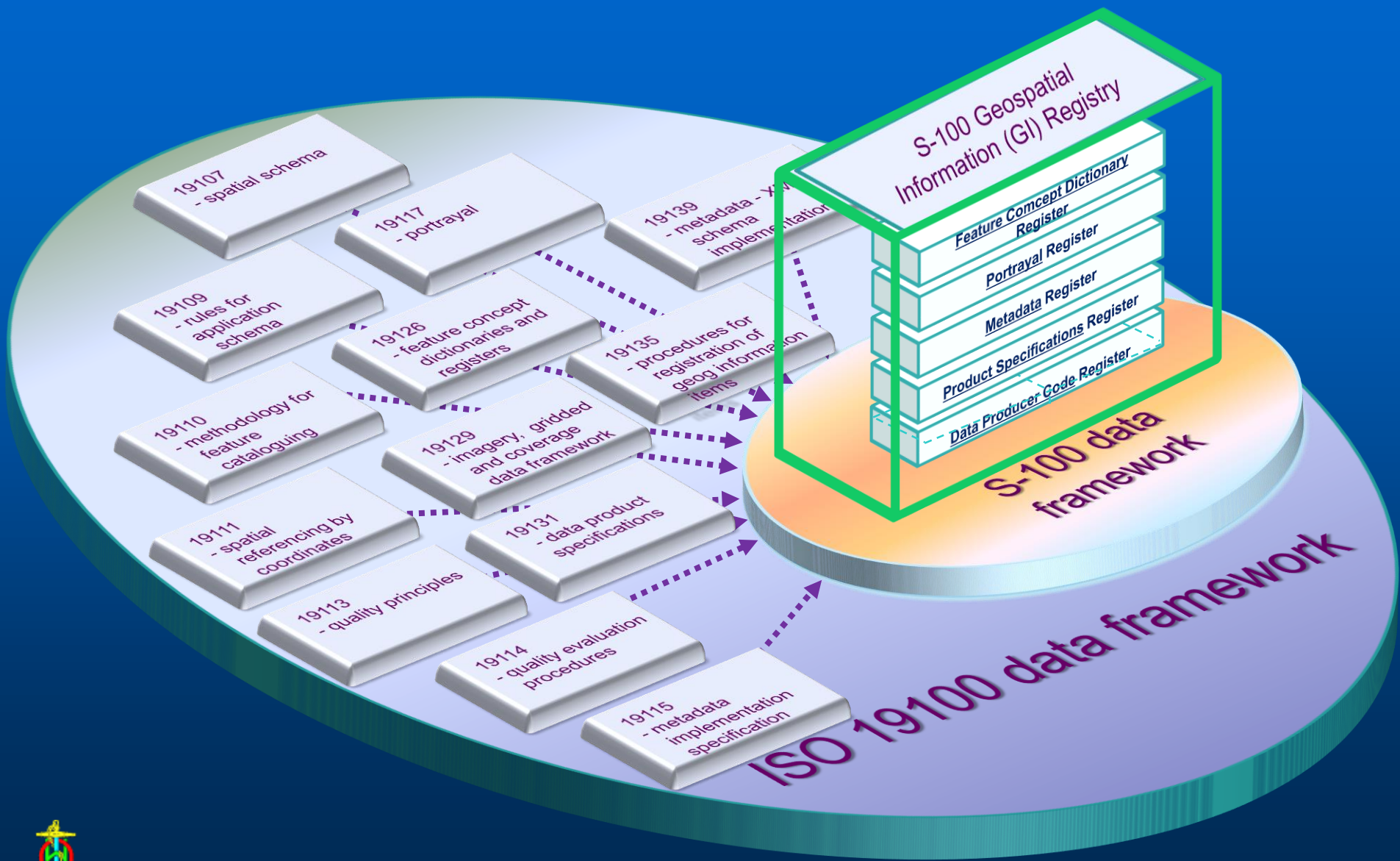


Main characteristics of S-100

- 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



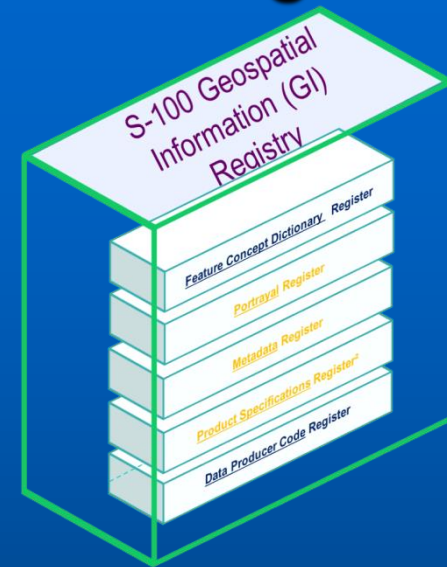
S-100 – Based on ISO/TC211 Conceptual Standards



S-100 Geospatial Information Registry

■ Registry

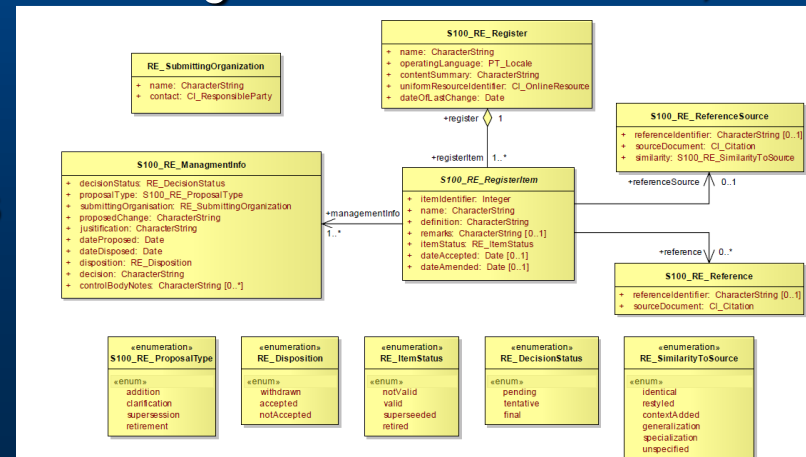
- A registry is the information system on which registers are maintained.
 - **Registry** = collection of **registers**



■ 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 point symbols, pattern symbols, complex line styles, and colour symbols

Metadata Register

- Register containing the core set of metadata items and a structure for defining additional items (to be established, subject to further requirements)



S-100 Registers



Product Specifications Register

- Description of which elements from FCD and other registers are used to define a data exchange standard (*under construction*)

Data Producer Code Register

- Register containing the list of codes identifying the producers of a particular data product (*under construction*)



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.



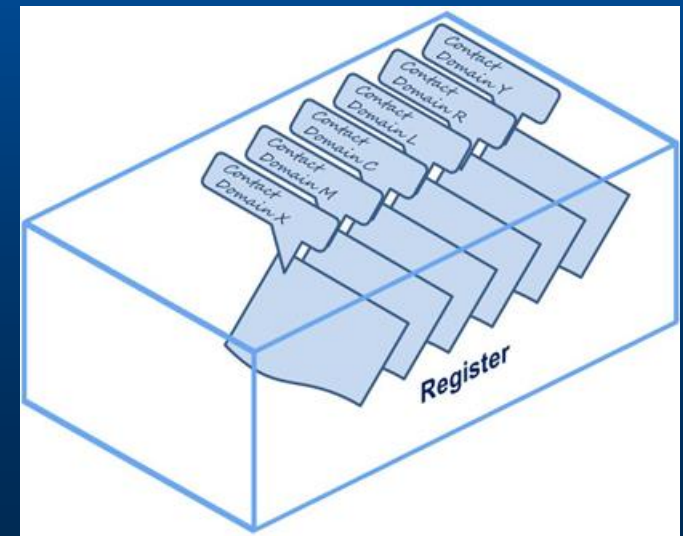
S-100 Domains

■ 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 ENC's
- port ENC's
- sea ice coverage
- weather



S-100 References

- S-100 - Universal Hydrographic Data Model
Edition 3.0.0 - April 2017
- 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

<http://registry.iho.int>



Welcome to the S-100 Geospatial Information Registry (Version 2.1)

This registry is owned by the International Hydrographic Organization (IHO) and is managed by the Secretariat of the IHO. The site contains many registers of hydrographic information together with registers of supplementary information owned by specialist domain experts. Each register type is further sub-divided into domains e.g. hydrographic, nautical publications, ice, inland ENC etc. The administration of this registry conforms to IHO Publication S-99 (Operational Procedures for the Organization and Management of the S-100 Geospatial Information Registry) a copy of which can be downloaded [here](#).

The information contained in the Registry can be freely accessed, however items can only be added or changed by the managers of approved Submitting Organizations. Application to become a Submitting Organization can be made by fulfilling the requirements of the prerequisite form available [here](#). Please note: It is not necessary to be a submitting organization in order to request new (S-62) Data Producer codes. Requests for new Data Producer codes, or changes to existing codes should be sent to the following email address (adcs@iho.int).

Once accepted as a submitting organization you are free to submit proposals to any register. The Registry interface undergoes periodic improvements and any difficulties using this site should be reported to the [Registry Manager](#).

- Go to [Portrayal Catalogue Builder](#)

➤ Feature Concept Dictionary Register according to S-100

No.	Type	Valid	Superseded	Retired
1	Feature Type	<u>308</u>	<u>245</u>	<u>269</u>
2	Information Type	<u>9</u>	<u>1</u>	0
3	Simple Attribute Type	<u>529</u>	<u>227</u>	<u>86</u>
4	Enumerated Type	<u>3253</u>	<u>472</u>	<u>199</u>
5	Complex Attribute Type	<u>92</u>	<u>20</u>	<u>1</u>
6	Code List Type	<u>15</u>	<u>1</u>	0

➤ Portrayal Register

No.	Type	Valid	Superseded	Retired
1	Symbol	<u>572</u>	0	0
2	Line Style	<u>55</u>	0	0
3	Area Fill	<u>26</u>	0	0
4	Font	<u>4</u>	0	0



Status and Perspectives

■ S-100

- Edition 3.0.0 - April 2017
 - additional encoding formats
 - portrayal elements
 - use of *alerts* and *indications*
- Further evolution required to support service-centric model and further development of product specifications
 - revised or new edition expected in 2019 / 2021

■ 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-100 Interoperability specification for ECDIS
- S-101 – ENC
- S-103 – Sub-surface navigation
- S-104 - Water Level Information for Surface Navigation
- S-111 - Surface Currents
- S-112 - Dynamic Water Level Transfer
- S-121 - Maritime Limits and Boundaries
- S-122 - Marine Protected Areas
- S-123 - Radio Services
- S-124 - Navigational Warnings
- S-125 - Navigational Services
- S-126 - Physical Environment
- S-127 - Traffic Management
- S-128 - Catalogues of Nautical Products
- S-129 - Under Keel Clearance Management



Status and Perspectives

■ Product Specifications

• Non-IHO Product Specifications

- IALA S-201 - Aids to Navigation Information
- IALA S-210 - Inter-VTS Exchange Format
- IALA S-230 - Application Specific Messages
- IALA S-240 - DGNSS Station Almanac
- IALA S-245 - eLoran ASF Data
- IALA S-246 - eLoran Station Almanac
- IALA S-247 - Differential eLoran Reference Station Almanac
- IEHG S-401 - Inland ENC
- JCOMM S-411 - Ice Information (developed by ETSI)
- JCOMM S-412 - Weather Overlay (developed by ETMSS)

■ GI Registry: IALA, IEHG & JCOMM involved in maintaining domains

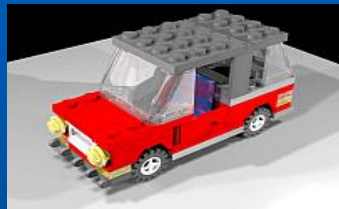


Development of S-100 Product Specifications

Base Standards and Services (Building Blocks)



- S-100 - Geospatial Framework
- IHO GI Registry



Product Specifications

- S-101 - ENC
- S-102 - Bathymetric Surface
- S-122 - Marine Protected Areas
- S-123 - Radio Services
- S-104 - Water Level Information
- S-111 - Surface Currents
- S-401 - Inland ENC
- S-121 - Maritime Boundaries
- Other IHO Product Specifications
- Other non-IHO Product Specifications

Hydrographic Services and Standards Committee (HSSC)

S-100 WG

Nautical Information Provision WG (NIPWG)

Data Quality WG

Nautical Cartography WG (NCWG)

Tides, Water Level and Currents WG (TWCWG)

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 ENC
 - 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

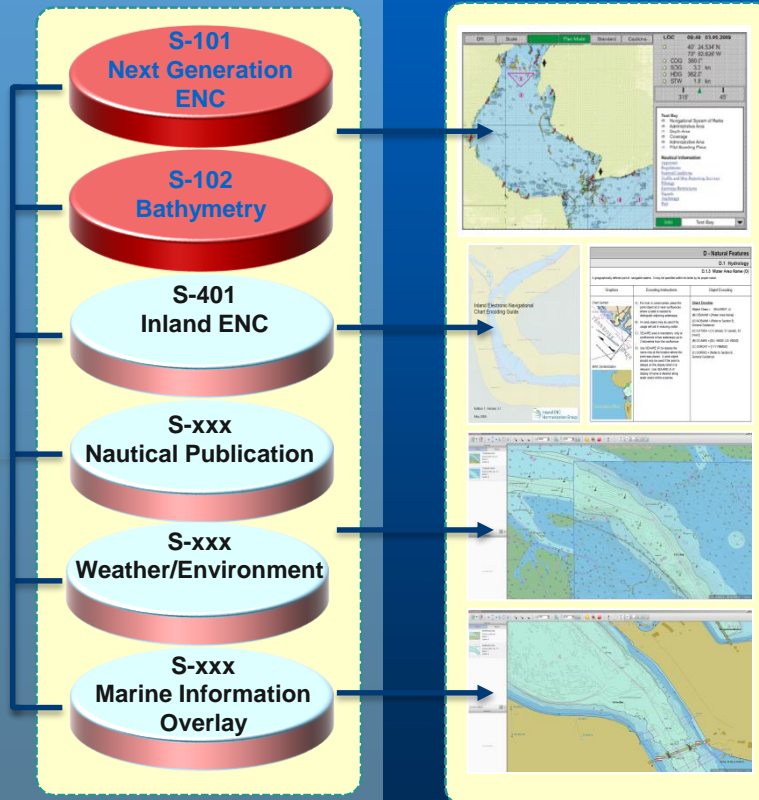
Next Generation ECDIS



S-100 based
Single Window

Challenges

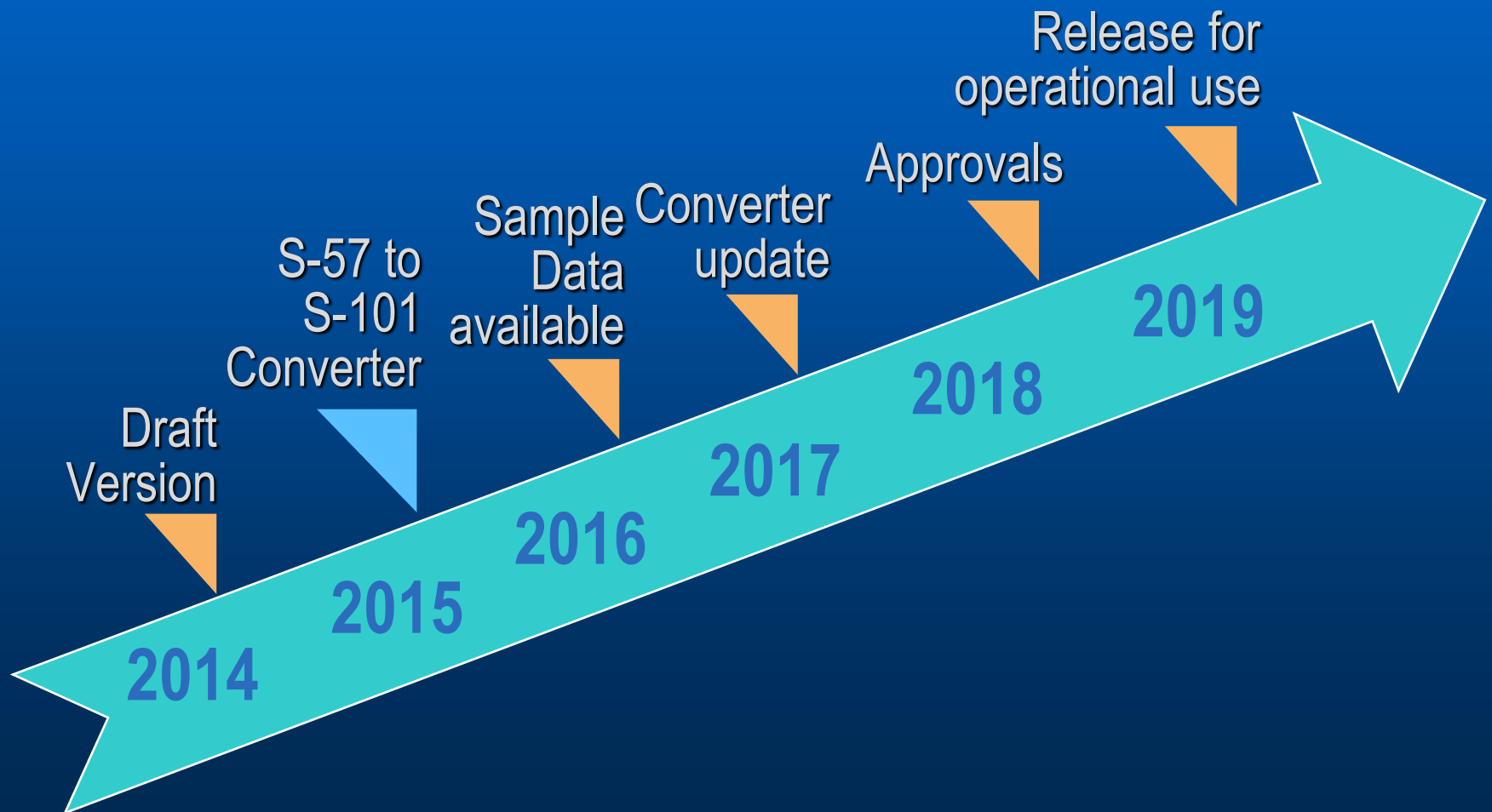
S-100, S-101, S-xxx
Standards



- ✓ 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



Ramp up for the future: S-101 Next Generation ENC Test bed and time line



S-100 How to

- 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 How to

- 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 ...



More information ...

https://www.iho.int/srv1/index.php?option=com_content&view=article&id=331&Itemid=430&lang=en

Rechercher

INTERNATIONAL HYDROGRAPHIC ORGANIZATION
ORGANISATION HYDROGRAPHIQUE INTERNATIONALE

ENGLISH / FRANÇAIS

Home Letters & Documents Standards & Publications Committees & WG Capacity Building **ENCs, ECDIS & S-100** IHO Calendar External Liaisons IHO Membership IHO GIS

You are here: Home > ENCs, ECDIS & S-100

Website Content Alert Service
» Website Content Alert Service

Upcoming Events/Événements à venir
» Upcoming Public Events / Événements publics à venir
» IHO Meetings & Events / Réunions & Événements OHI

ENCs, ECDIS & S-100
» **S-100**
» ENC Production
» ENC Portrayal
» ENC Data Protection
» ENC Availability
» E-navigation Documents

Operation of ECDIS and S-57 ENCs	<i>Mise en œuvre des ECDIS et des ENCs S-57</i>
Development of S-100	<i>Développement de la S-100</i>
Operation of ECDIS and S-57 ENCs	<i>Mise en œuvre des ECDIS et des ENCs S-57</i>
<u>ECDIS Operation</u> IHO Standards ECDIS Data Presentation and Performance Check in Ships Information on ECDIS Software	<u>Mise en œuvre des ECDIS</u> Normes OHI ECDIS - Vérification de la présentation des données et des performances des ECDIS à bord des navires Information sur les logiciels ECDIS (en anglais)
<u>ENC Production</u> Introduction S-57 Encoding Bulletins S-57 Frequently Asked Questions (FAQs) S-65 - Production, Maintenance and Distribution	<u>Production des ENC</u> Introduction Bulletins de codage S-57 Questions fréquemment posées à propos de la S-57 S-65 - Guide de production, de tenue à jour et de

Search
Search ... Go



More information ...

https://www.iho.int/srv1/index.php?option=com_content&view=article&id=586&Itemid=1011&lang=en

Rechercher

- » ENC Production
- » ENC Portrayal
- » ENC Data Protection
- » ENC Availability
- » E-navigation Documents

IHO Disclaimer, Privacy and Copyright Notice

- » IHO Disclaimer, Privacy and Copyright Notice

S-100 provides the data framework for the development of the next generation of ENC products, as well as other related digital products required by the hydrographic, maritime and GIS communities.

Contents

- [Introduction to S-100 \(video clip -11/5/17\)](#)
- [S-100 brochure \(11-5-17\)](#)
- [S-100 Edition 3.0.0](#)
- [S-100 GI Registry](#)
- [List of S-100 Based Product Specifications](#)
- [More information about S-100](#)
- [Point of contact: \[adtd\\(at\\)iho.int\]\(mailto:adtd\(i\)ho.int\)](#)

Last Updated: 28 July 2017

Contrairement à la S-57, la S-100 est par nature plus flexible et contient des dispositions pour l'utilisation de données de type imagerie et réseaux maillés, de métadonnées améliorées et de multiples formats de codage. Elle permet également un régime de maintenance plus flexible et dynamique via une base de registres dédiée en ligne.

La S-100 fournit le cadre nécessaire au développement de la prochaine génération d'ENC, ainsi que d'autres produits numériques demandés par les communautés hydrographiques, maritimes et des SIG.

Sommaire

- [Introduction à la S-100 \(clip vidéo 11/5/17\)](#)
- [S-100 brochure \(11-5-17\)](#)
- [S-100 édition 3.0.0 \(version anglaise seulement\)](#)
- [Base de registres de la S-100](#)
- [Liste des spécifications de produits basées sur la S-100](#)
- [Plus d'information sur la S-100](#)
- [Point de contact : \[adtd\\(at\\)iho.int\]\(mailto:adtd\(at\)iho.int\)](#)





Questions?

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

IHO Contact: info@iho.int

