International Hydrographic Organisation

S-100…the geospatial standard for Hydrographic Data

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www.iho.org

About the IHO

The IHO is an intergovernmental consultative and technical organization established in 1921 to support the safety in navigation and the protection of the marine environment. It is based in Monaco.

The object of the Organization is to bring about:

- **The coordination of the activities of national hydrographic offices**
- **The greatest possible uniformity in nautical charts and documents**
- **The adoption of reliable and efficient methods of carrying out and exploiting hydrographic surveys**
- **The development of the sciences in the field of hydrography and the techniques employed in descriptive oceanography**

The role of the IHO

- Community built on quality & professionalism
- Experience & expertise
- Sets standards and imparts guidance
- Knowledge sharing
- Members ingest, manage and disseminate spatial data
- Not just about charting!
- Hydrographic data as an important ingredient to SDI's
- Encourage HO's to support NSDI's
- EU INSPIRE Directive –IHO as a SDIC

Some IHO Standards

- S44 - Standards for Hydrographic Surveys
- S52 - Specifications for Chart content & display aspects of ECDIS
- S57 - Transfer standard for Digital Hydrographic Data
- S100 - Geospatial standard for Hydrographic Data

S-57 Limitations

- Developed to meet ENC requirement for an IMO compliant ECDIS (the IMO specifications were in their infancy and not completely defined)
- Inflexible maintenance regime (requiring the freezing of standards)
- Cannot support future requirements (gridded bathymetry, time-varying info, 3D)
- Data transfer mechanisms limited (data model embedded in encapsulation)

S-100

References:

Development of IHO S-100 Geospatial Standard for Hydrographic Data

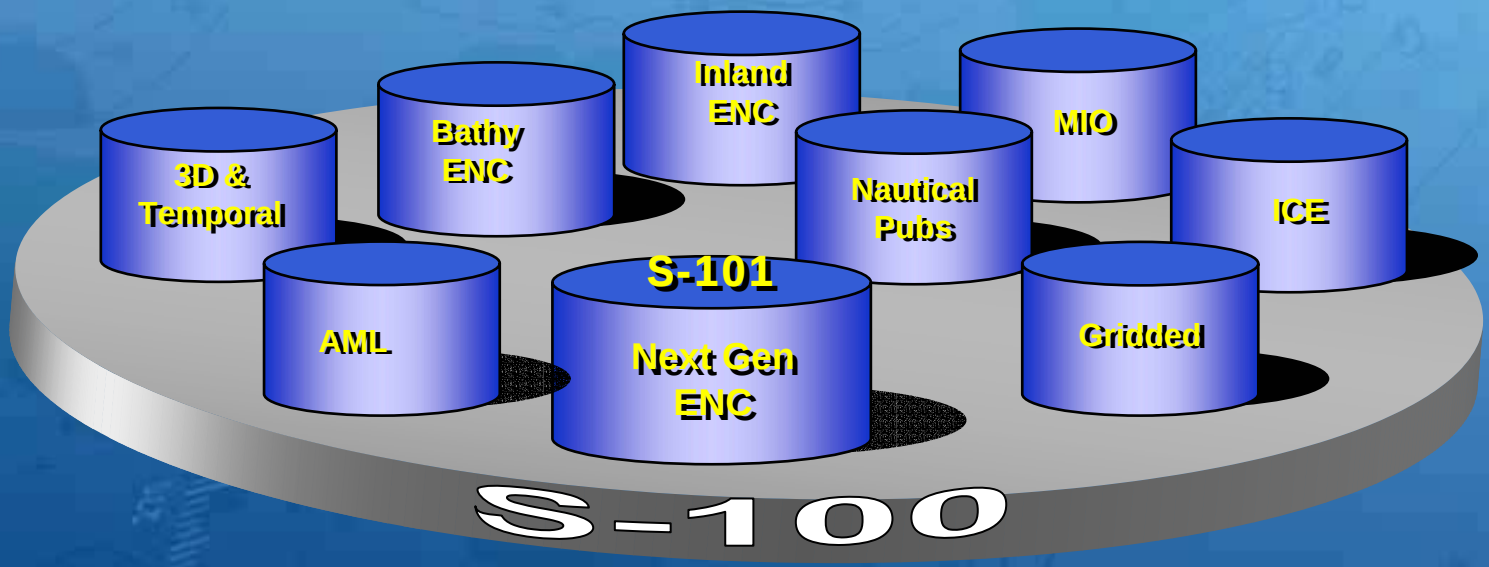
By

L. Alexander (UNH), M. Brown (NOAA),B. Greenslade (UKHO) and A. Pharaoh (IHB)

The birth of S100

- Many regard the S-57 standard and the ENC Product Specification as the same thing
- The need to “break the link” between product specification and data standards
- S-57 Edition 4.0 revision work under development is henceforth designated as S-100 - the ***IHO Geospatial Standard for Hydrographic Data***
- S100 will be Product neutral
- Any product specifications developed using S-100 would follow in an S-10*x* series as they are produced (e.g. S-101 Next Generation ENC Product Specification)

The data model



S-100 will support a greater variety of data sources, products and services

Support for applications

Includes:

- Imagery and gridded data
- 3-D and time-varying data (x,y,z and time)
- Marine Information Objects [MIO]
- High-density bathymetry
- Seabed characterisation & bedform

In support of:

- Marine GIS applications
- Web-based services
- Dynamic ECDIS

Additional benefits

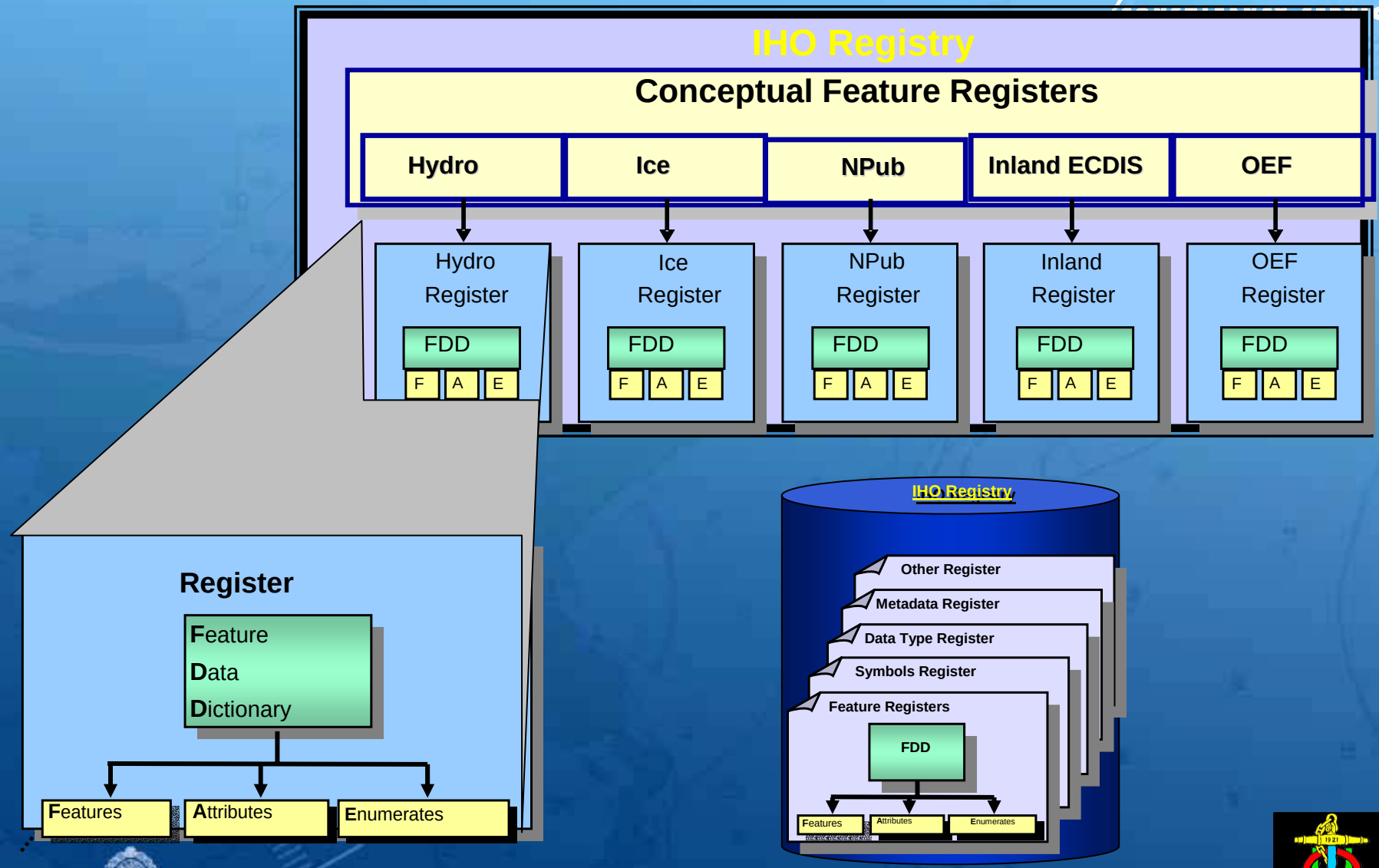
- No permanent tie to single exchange mechanism (taking advantage of contemporary technologies → web)
- Evolve core standard through extensions without continued need for producing new versions of product specifications or system revisions (and … re-generating, re-distributing, re-loading … the data in the new version)
- Deliver Product Feature Catalogues that are more flexible and capable of expansion (e.g. in support of new IMO regulations)

Strong Foundation

Built on strong international standards:

- ISO /TC211 with 130 countries/members
- In liaison with DGIWG (military), OGC (strong industry/web involvement presence) and GDSI (Global Spatial Data Infrastructure)
- Harmonized data model between S-100 and NATO DGIWG “suite of standards”
- IHO will host Registry c/w the facility to store/access various registers of hydrographic-related information

(such as feature concept dictionaries, data types, metadata)


IHO Registry
Conceptual Feature Registers
Hydro
Ice
NPub
Inland ECDIS
OEF
Hydro Register
Ice Register
NPub Register
Inland Register
OEF Register
FDD
F
A
E
Register
Feature Data Dictionary
Features
Attributes
Enumerates
IHO Registry
Other Register
Metadata Register
Data Type Register
Symbols Register
Feature Registers
FDD
Features
Attributes
Enumerates

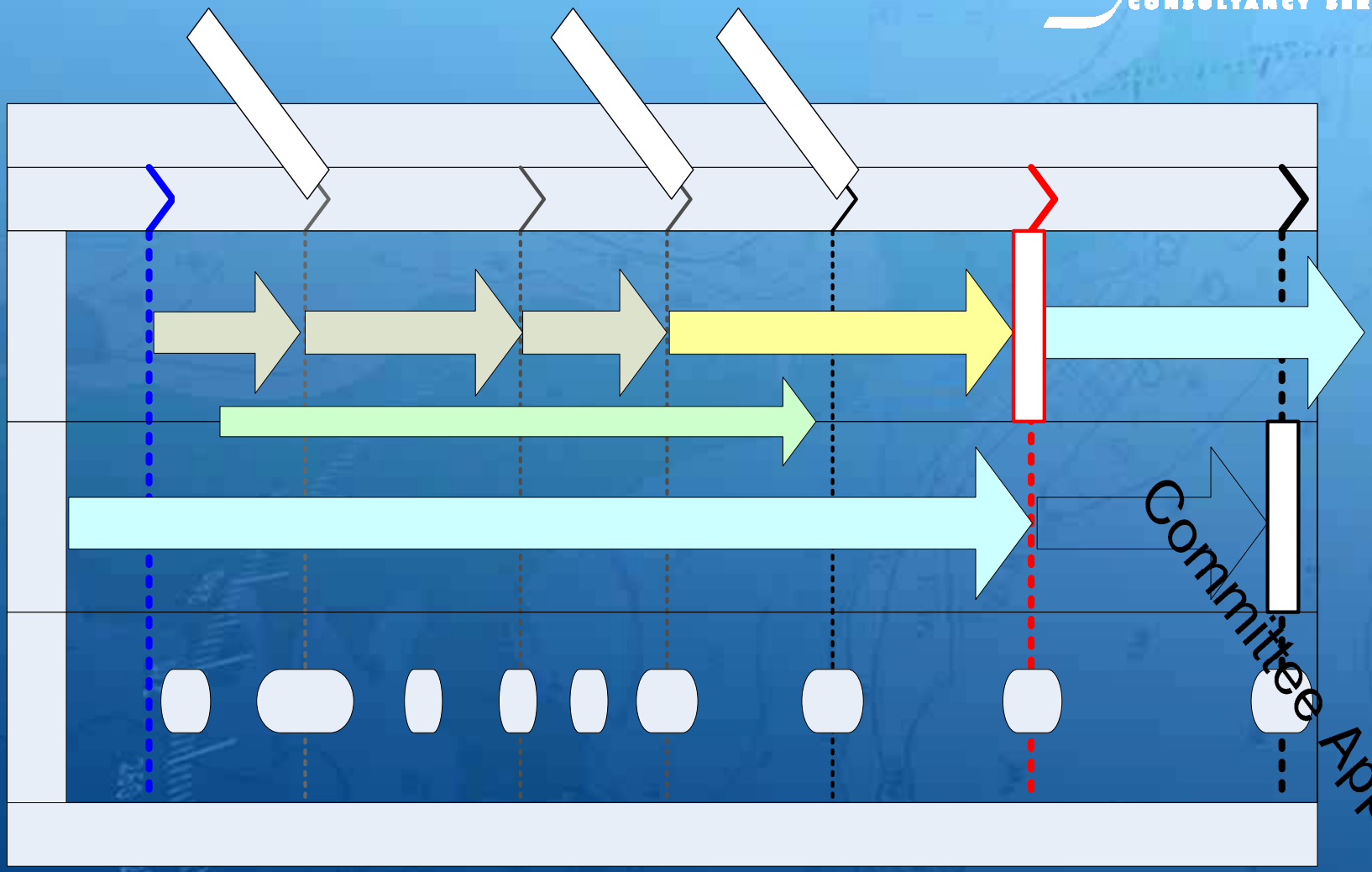
Registry / Register

- Registers for Hydrographic Info (existing features, dynamic ice coverage, nautical publications, Inland ENCs, Open ECDIS)
- Other features (even in other registries) can be specified in a Product Specification.
- If new item is registered, a new version of current Product Specification not required
- Operational Registry available.. Go to

www.Ukhoftp.gov.uk / iho_registry

S-100 Benefits

- Using defined standards ensures S-100 stays in mainstream of geospatial info industry → greater use and lower cost of implementation/use
- Conformance to defined standards maximizes COTS software applications and development
- New components not being developed in isolation
- Interoperability with other ISO/TC211 based profiles (e.g. NATO DIGEST, ICE, weather, …)
- Greater usage of data (beyond HOs and ECDIS users) hence greater HO leverage/support for extended coverage and operations
- Enhanced usage (coastal zone mapping, security,…)
- "Plug and Play" updating of data, symbology and software enhancements.
- Inclusion of 10 years worth of deferred corrections and extensions



Identify Need

Propos

Progress to date (% complete)

1. Feature Data Dictionary (100%)
2. Feature Catalogue (60%) - ISO issues
3. Framework (75%)
4. Application Schema Template (75%)
5. Product Specifications (75%)
6. 2D Spatial (100%)
7. 3D Spatial (50%)
8. Coordinate Reference System (100%)
9. Imagery & Gridded Data (100%)
10. Meta Data Part 1 (100%)
11. Meta Data Part 2 – Quality (100%)
12. Temporal Data (100%)
13. Encoding (50%)
14. Maintenance (0%)

Migration from S-57 to S-100

- Completion of S-100 development by March 2008
- S57 3.1 will continue to be used for many years even with S-100 release
- Opportunity to use other Product Specs (e.g. gridded) with existing ENC Product Spec as overlay
- Will be done with inclusion of all interested parties via workshops and IHO S-100 Discussion Forum

The IHO role in GI

"The HO is an important part of the National Geospatial Data Infrastructure and the IHO has an important role to play in coordinating requirements and demands for data collection, interoperability, dissemination, access, standards, security, pricing, policy and funding models for hydrographic data."

Vice Admiral Maratos: President of the IHB, March 2007.

What is a SDI?

A spatial data enabling framework that…

- Facilitates access to GI assets held by a range of public and private stakeholders within a Nation
- Maximises overall access to and usage of information
- Supports integrated management of spatial data and information
- Supports interoperability at all levels (process, standards, technology and policies)
- Requires co-ordination and co-operation across ALL sectors
- Takes a holistic view
- Enables policy and management decision making
- Is about people and commitment…AN ETHOS!
- Is facilitated through National legislative / strategic programmes
- Is user driven!

What a SDI is not!

- A service
- A data solution
- A product
- A “box of tools”
- Limiting in terms of data type and source
- Owned by any stakeholder
- Built overnight!

Drivers for SDI

- Creating efficiencies in data capture, management and use
- Improved policy & decision making
- Improved knowledge of and access to spatial data
- Increased demand for spatial data (especially marine)
- Legislation and International Conventions (e.g EU INSPIRE Directive)
- Common standards and specifications (e.g. ISO19XXX series; OGC; IHO S-100)
- Datum / Projection resolution
- Application orientated information built on reference information for analysis
- User appetite for information and content
- Macro environmental concerns

Typical Data elements

- Hydrographic (water)
- Topographic (land; air; seabed)
- Morphological (texture, characterisation)
- Geological (solid; drift)
- Biological (benthic)
- Transport networks (air, sea and land)
- Hydrological (water)
- Temporal (weather, tide, current)
- Boundaries (EEZ, Baselines, Administrative)

…this is not an exhaustive list

Does the HO have a role in NSDI?

- Does NSDI allow for marine component (MSDI)?
- Does MSDI allow for hydrographic input?
- Is HO contributing to NSDI development?
- Is HO data suitable to support NSDI?
- Does HO collect data for navigation only?
- Can data be QA'd for purposes other than navigation?
- Can HO data be accessed for non-navigational use?
- Is HO willing to support NSDI?

Point of Contact

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ANY QUESTIONS?