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NEW PATHS. NEW APPROACHES

IIC Technologies:

# The Path to S-101

ENC Transition from S-57

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# IIC Technologies



- ➢ IIC Technologies provides solutions and services for the acquisition, management, integration and dissemination of geospatial data.
- ➢ Global Presence – Clients in over 30 countries
- ➢ End-to-end geospatial solutions to the Aeronautics, Defense, Government, Infrastructure, Marine, Oil & Gas, Transportation and Utility sectors.

Marine Sector.

- ➢ Production of Marine Charts and publications data for Navigation
- ➢ Consultants on international standards for hydrography with over 25 years experience in pioneering digital navigation
- ➢ Senior Consultants specializing in modelling, development, data production and cross-sectoral integration.



Software solutions &

Marine Solutions
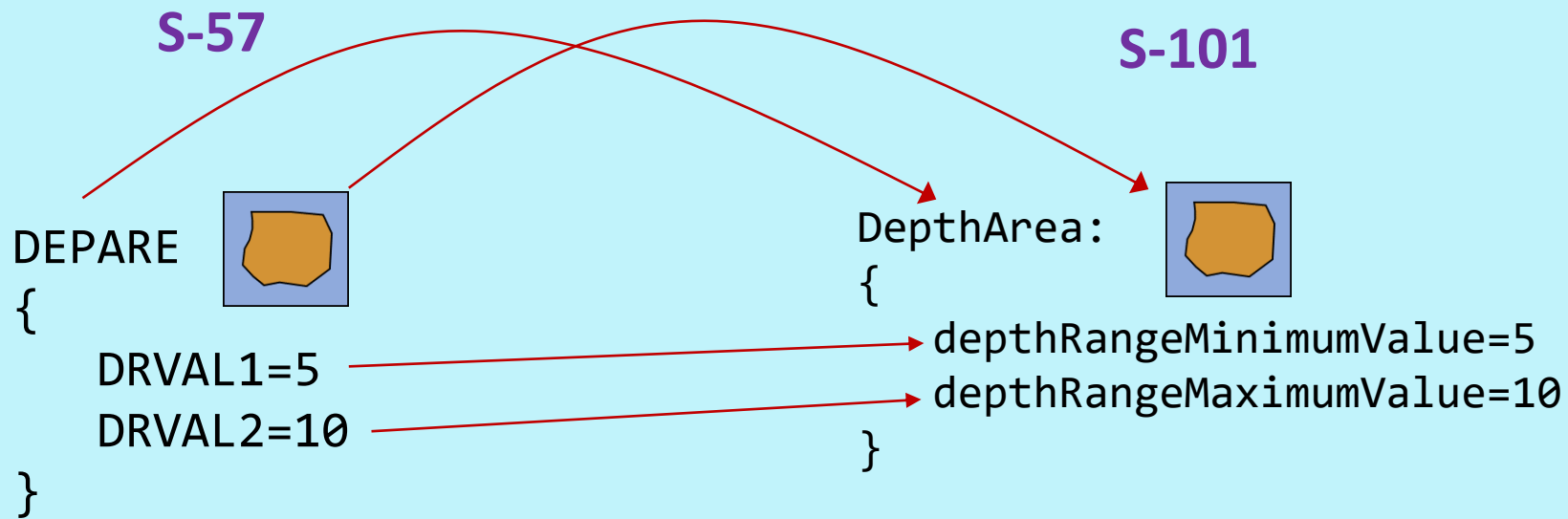
Terrestrial Solutions

GeoSurveys

# Our Projects…

- Multiple S-100 products
  - S-101, S-102/S-104, S-128, S-131, S-130, S-127, S-123, S-421, S-121, S-122, S-124

- Production of S-101 and S-12X products

- S-101 and S-57 migration

- Data migration, transformation and manipulation

- Automated creation of metadata and S-128

- Part 15/Part 17 implementation

- Interoperability

- Software library and API development and implementation

- OGC API Features for IHO data

- Training
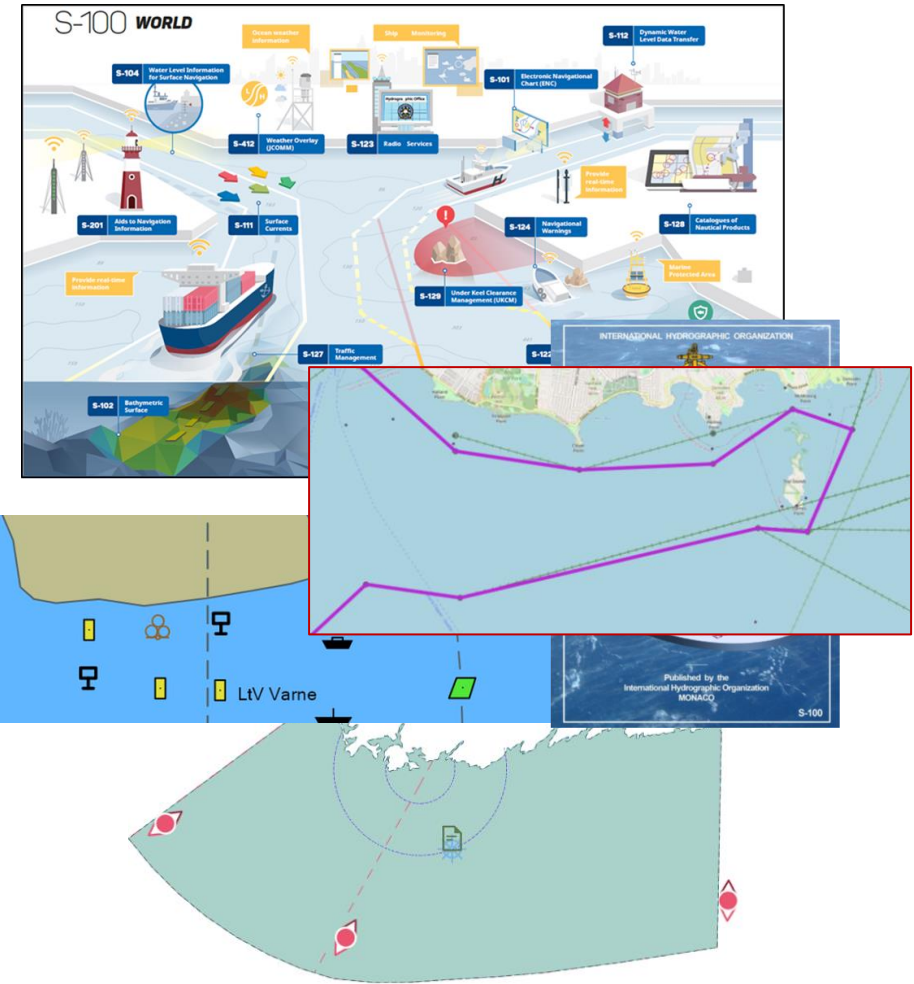
# IHO Singapore Lab Conversion Workshop

- IHO S-57 to S-101 ENC conversion workshop – A 5-Day training and "hands on" workshop

- 30 participants from 20 countries took part

- Program structure - training for an initial day, followed by 2 days of facilitated conversion, then 2 further days of conversion exercises with support from industry partners.

- Availability of multiple software tools and representative member state data

**S-57**

**S-101**

```
DEPARE
{

    DRVAL1=5
    DRVAL2=10

}
```

```
DepthArea:
{
    depthRangeMinimumValue=5
    depthRangeMaximumValue=10
}
```

| S-57 | | S-101 | |
|---|---|---|---|
| DEPARE | | DepthArea | |
| Polygon | | Surface | |
| Name=DRVAL1 | Value=5 | Name=depthRangeMinimumValue | Value=5 |
| Name=DRVAL2 | Value=10 | Name=depthRangeMaximumValue | Value=10 |
| | | | |

**Surely it's all just simple mappings from S-57 to S-101? Surely…..?**

# Mappings and INFORM values

- S-65 uses INFORM values to guide conversion in "special cases".

- This is when certain objects have a special purpose or meaning. IN S-57 the UOC often guides producers to use INFORM to note particular aspects.

- S-101 conversion tools can use INFORM values to cause particular conversions.

- E.g.

- The S-101 Feature type **Discoloured Water** has been introduced in S-101 to encode areas of discoloured water. This information is encoded in S-57 as an instance of the S-57 Object class **CTNARE**, using the attribute INFORM (see clause 2.3). In order for this information to be converted across to S-101, the text string encoded in INFORM on the **CTNARE** should be in a standardised format, such as *Discoloured water*.

# Conversion Mappings

- Not everything is a simple mapping!

- There are some special cases which are linked to particular attributes (INFORM and SORDAT)

- There are other special cases which aren't simple either

- Producers sometimes need to take special actions before or after conversion

- Some information is dropped because of the differences in modelling between S-57 and S-101

**Complex Mappings**

| Fixed | INFORM | Complex |
|-------|--------|---------|
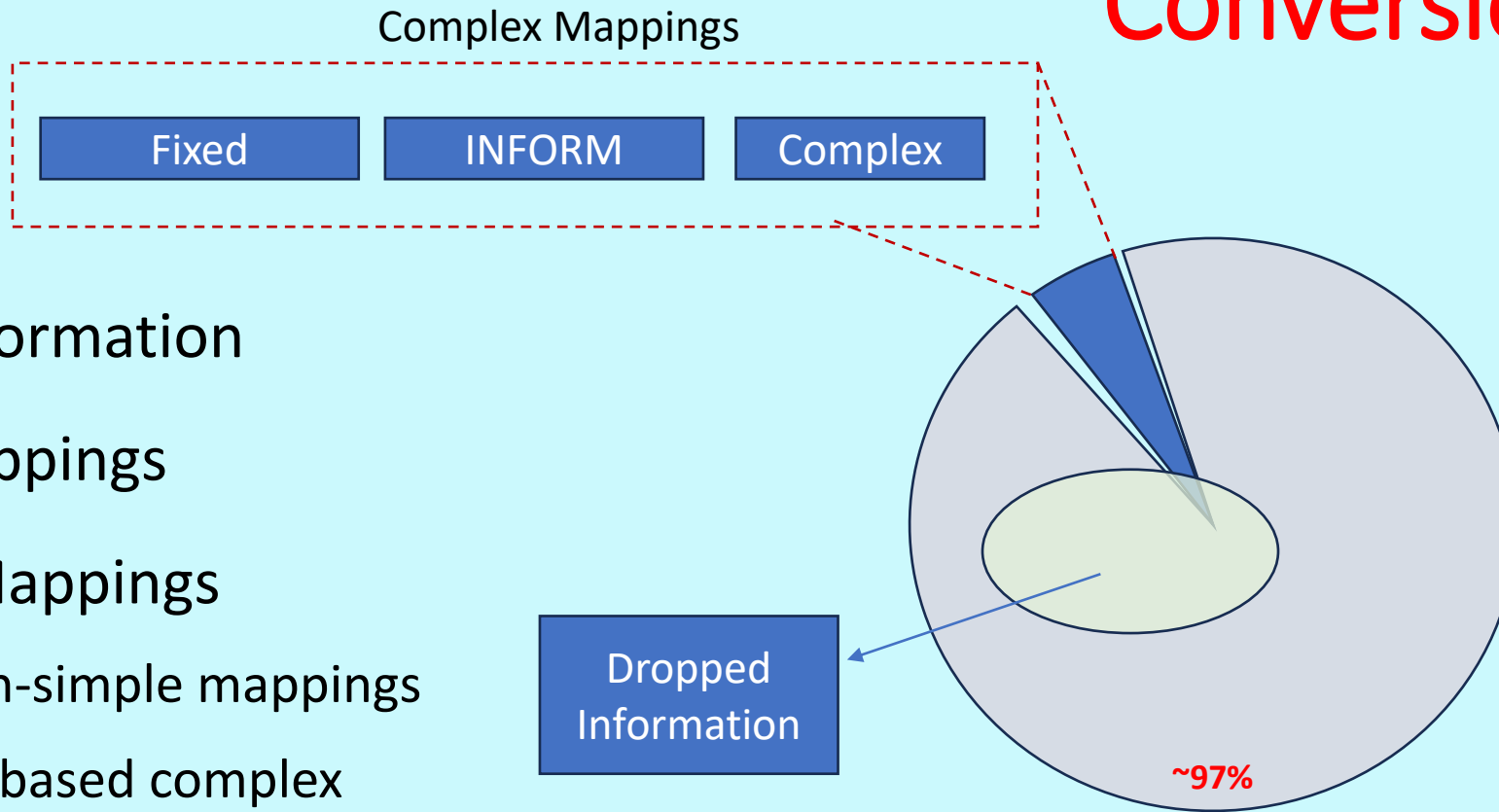
- Missing information

- Simple Mappings

- Complex Mappings

  - Fixed non-simple mappings

  - INFORM based complex mappings

  - Truly "Complex" mappings requiring manual intervention and/or validation.

Dropped Information

~97%

Simple Mappings

A → a
B → b
C → c
D

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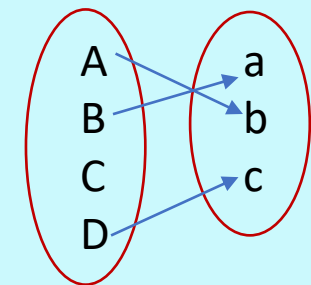
# IHO ENC Conversion Workshop - Process

Information    Assembly    *Phase 1*

- Training *(Are we ready?)*
- Objectives *(Do we know what to do?)*
- Tools *(do we have everything we need?)*
  - Production
  - Editing
  - Validation
  - Testing
- Scheming, Scales and Metadata

Analysis

Validate    *Phase 2*    Edit

Convert

**S-101 Capability**

Making "initial S-101" data
- **Analysis** *Running Pre-conversion checks, validation (S-57)*
- **Edit** *Do we need to edit the original data at all?*
- **Convert** *Running the actual conversion process*
- **Validate** *Is the created data valid, does it match the original? Does it need further work?*

# Pre Conversion Readiness Checks

- Concept proposed within ENC conversion Sub Working Group

- A set of tests designed to :
  - Be run on S-57 data before conversion
  - Highlight where certain elements of an S-57 cell may not convert as expected
  - Primarily missing information
    - **Objects which are discontinued in S-101 (e.g. ICNZNE)**
    - **Attributes no longer used in S-101**
    - **Bindings (combinations of objects/attributes no longer used in S-101)**
    - **Geometric primitives no longer used**
    - **Where conversion is not "simple"**

- INFORM value analysis usually happens at this point too…

# S-101 Data Production and Analysis

# Convert My ENC



- Convert the Null Island Test Data Set (sent out)
  - How many non-simple conversions can you find?
  - Are there any that <u>should</u> be non-simple but aren't – does your software tool convert everything according to S-65?
  - Try with a different tool? Do you get the same results
  - Suggestions – what shall we add to this cell?
  - We can add some features and retry

http://13.42.127.199/2C3NULL3.000
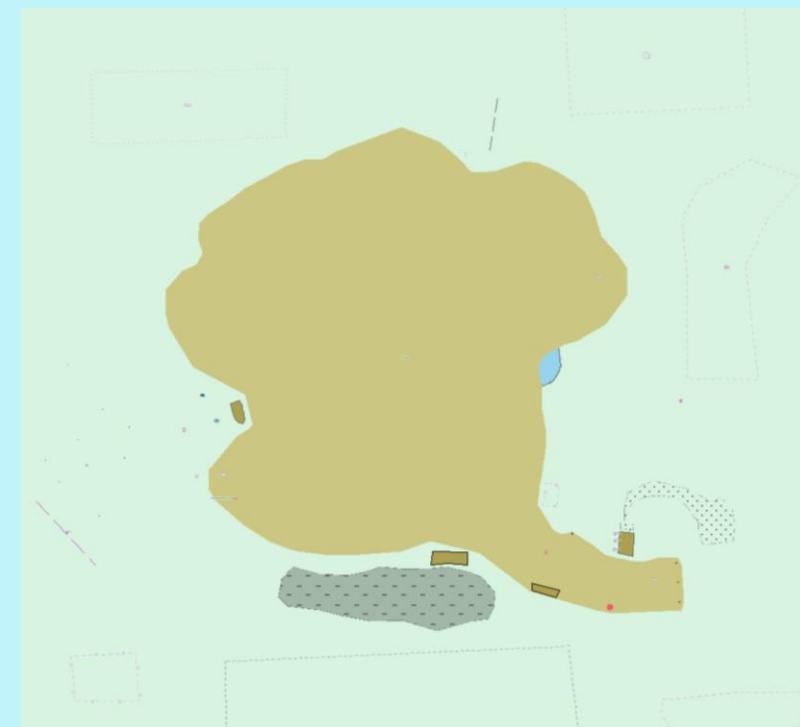
# Dual Fuel Production?

- To build a DF capability:
  - What is involved?
  - Using a variety of tools
  - Validation of results?
  - Updates, in theory and in practice?
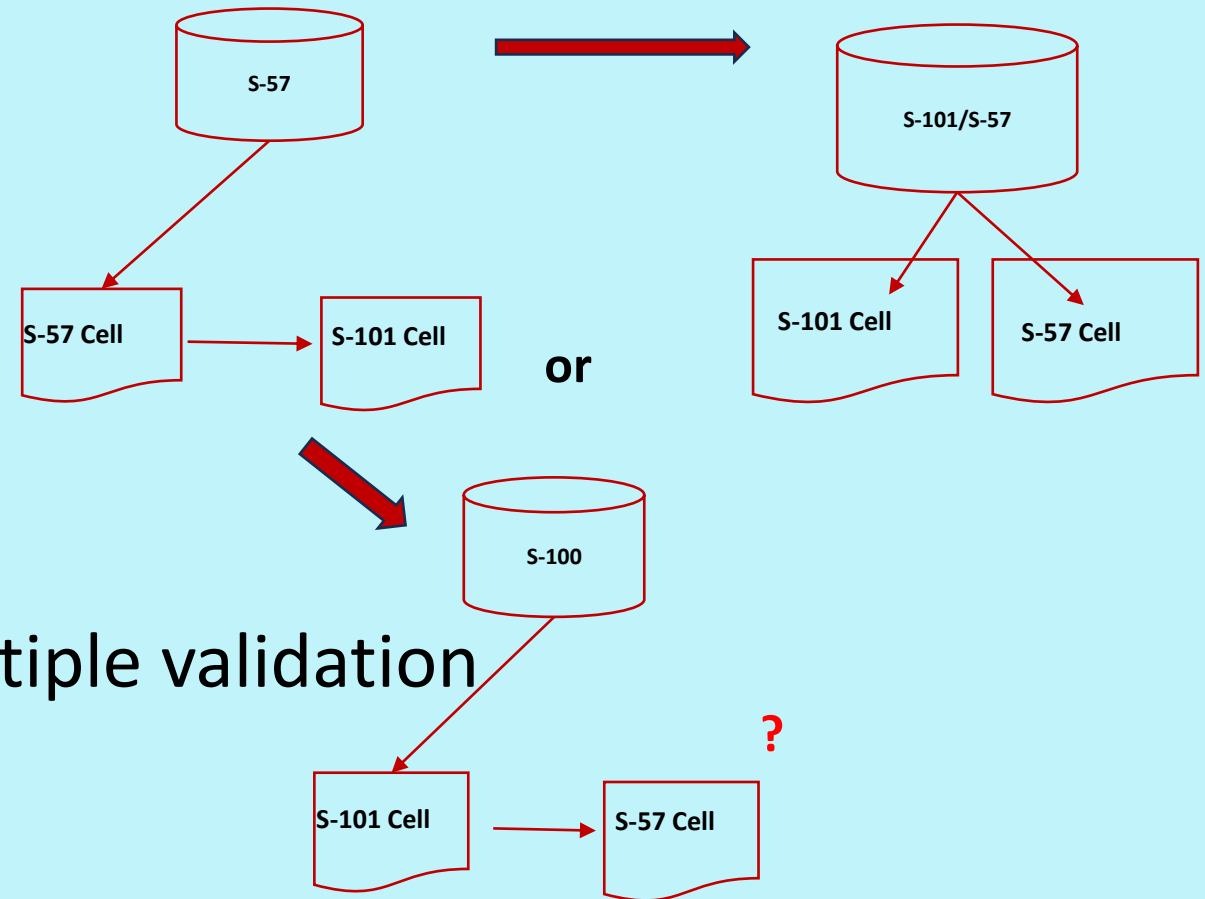
- Testing reverse conversion and multiple validation

- What model is optimal for <u>you</u>?

# Some Conclusions

- Software tool availability is a huge advantage, access to many tools helps participants focus on data content and the underlying IHO standards

- Need to raise awareness that S-57 to S-101 conversion is not 100% "simple"

- Dual Fuel production and the reverse conversion is still in the early stages – dual fuel production tooling is "young". It is also hard to prototype/demonstrate and must take producer models into account.

- How can IHO support be enhanced?
  - Definitive test datasets (all non-trivial mappings, plus a "Chart 1" approach)
  - Verification technologies are missing
  - Clarifications in documentation (and HTML version)

- Training and communication materials must deliver the message. More workshops in different regions would help significantly.

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# thank you

**Questions?**