7th Meeting of the S-100 Working Group

S-100 Validation Tests Workshop

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Agenda Item 8

OBJECTIVES

Wednesday 7 Dec (UTC+1)	S-100WG7 Plenary
12:00 - 13:30	Lunch
13:30 - 15:00	S-100 Validation Sub Working Group
15:00 - 15:30	Break
15:30 - 17:00	S-100 Validation Sub Working Group

- Formation of Sub Working Group

  - Lead: Liz Hahessy

  - Volunteers – if want to participate email Yong Baek (yong.baek@iho.int) and Liz Hahessy (elihh@gst.dk)

  - Agree next meeting

- Consensus on different types of Validation

- Explanation of background, existing work and discussion around potential issues. Develop understanding of the task and importance

- Agree on next steps and actions

- If time:

  - Agree format structure for S-100 Validation Tests

  - look at some of the existing proposed S-100 Validation tests

Validation tests between **multiple product specifications**, aimed at increasing the **harmonisation of datasets** and **user experience** of them for **live navigation on the S-100 ECDIS**.

- Need to ensure safe navigation whilst using multiple interoperable product specifications

  - Safe = ECDIS Behaviour e.g. if alarms on S-102 must alarm on S-101

- Need to ensure data producers understand the implications of producing multiple product specifications

- Enable validation software to be produced that supports S-100 validation

HSSC task – HSSC14/15

Action:

"For the same reasons as above, HSSC noted the slow progress on the development of a harmonized data validation process and associated catalogues across the S100 framework and agreed on the establishment of a dedicated subgroup."
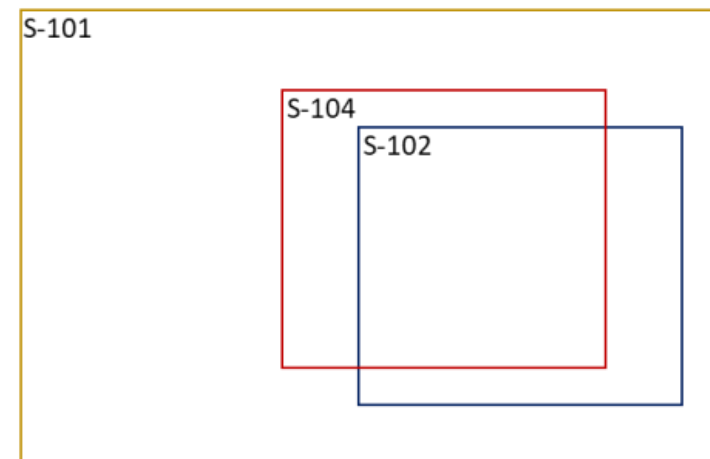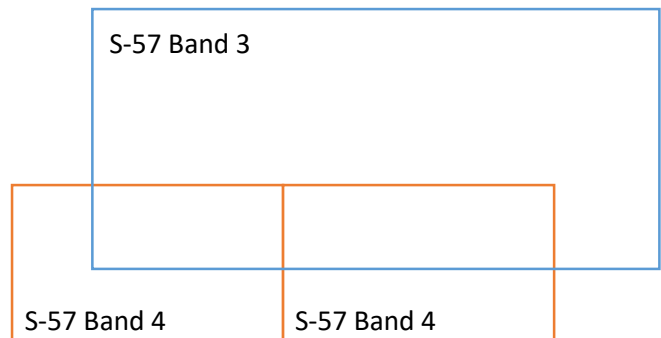
Deadline:

HSSC 15

Producing multiple datasets containing similar data that needs to interoperate and be safe for use

- Not necessarily same model

- Not same limits (no requirements for coincident/identical coverage)

- May not be the same data producer

Current validation

- Modelled from S-58

- Integral part of IHO Standards
  - S-58 ENC Validation Checks
    - Cover semantic, formatting and structural aspects of S-57 ENC data
    - Majority of tests carried out "within" the cell, without reference to other datasets or external data

  - Horizontal & Vertical consistency checks are conducted by HOs and RENCs – most are not formalised

3.4 Checks relating to Use of the Object Catalogue for ENC

No.	Check description	Check message	Check solution	Conformity to:	Cat
1500a	For each CBLARE feature object which is WITHIN OR OVERLAPS a LNDARE feature object of geometric primitive area.	CBLARE object overlaps a LNDARE object.	Amend objects to remove overlap.	Logical consistency	W
1500b	For each SBDARE feature object which is WITHIN OR CROSSES a LNDARE feature object of geometric primitive area.	SBDARE object is within or crosses a LNDARE object.	Amend objects to remove overlap.	Logical consistency	W
1501	Check removed.				

Validation
- Geometry
- Feature/Attribute
- UOC conformance
- Encoding
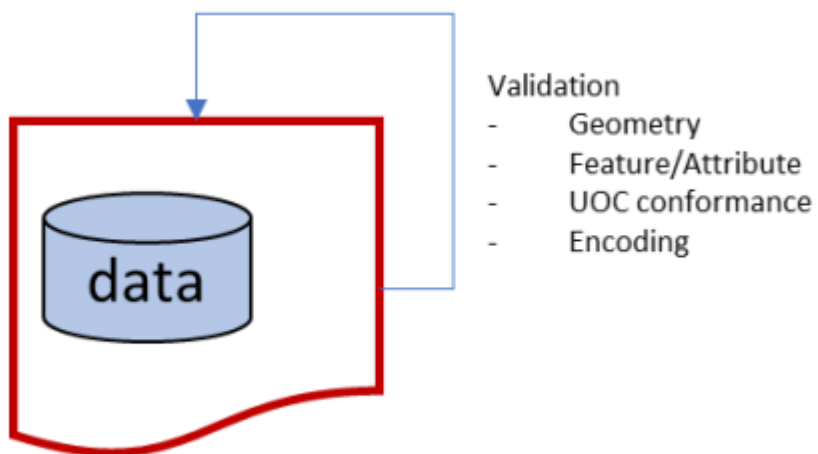
Figure 2: Single (S-57) Product Validation

Figure 3: Validation between different cells of the same product type

Intra – cell validation

Inter – cell validation
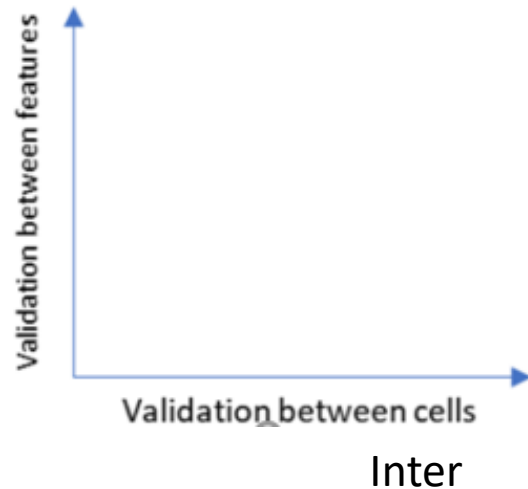
WHAT IS VALIDATION?

- Intra-cell – Validation tests to ensure cell validates against itself
- Inter-cell – Tests to ensure the cell validates against those it spatially intersects, touches or joins with
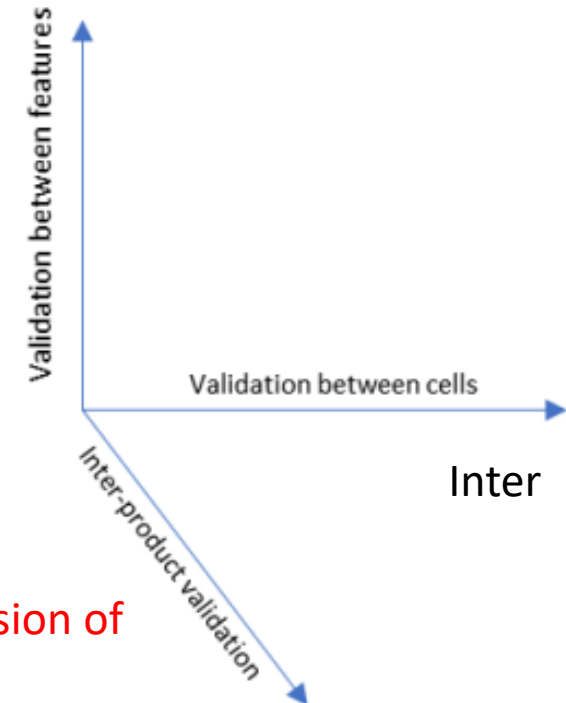
- At a simple level there are 3 types of data validation tests (content)

  - Inside cell
  - Between adjoining cells
  - Between product specifications for different types

- Do we agree?

- Responsibilities
  - Inside the Product Specification - intra and inter - lies with Product Specification owners

  - Outside - within this group?
    - With support from Product Specification owners
    - Is some of this temporary with the formation of an S-98 sub group?
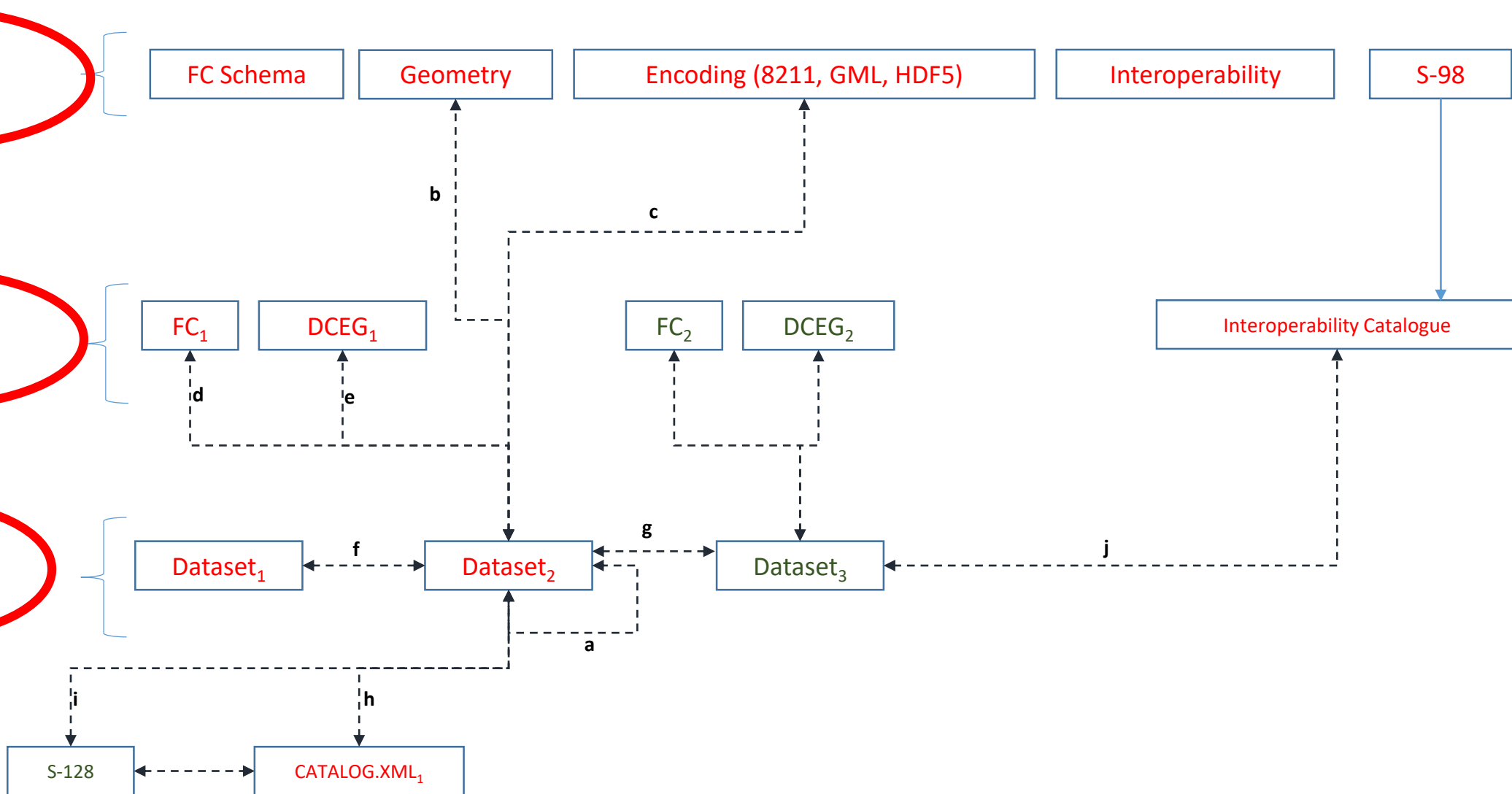
Validation	Against	Who?	Notes / Examples
a	Dataset against itself	Data Producer	Incorrect ordering of features
b	S-100 Geometry Schema	Data Producer	Things which contravene the geometry model, e.g clockwise/anticlockwise rings, unused curves
c	S-100 Encoding (Part 10a, b or c)	Data Producer	Formatting problem with encodings, corrupt ISO8211, non-conformant GML, incorrect HDF5 group names, incorrectly formatted attributes (e.g. dates, Booleans or unknowns), bad filenames
d	Product Specification Feature Catalogue	Data Producer	Names of attributes or features which aren't in the feature catalogue. Missing mandatory attribution
e	Product Specification DCEG		Bad combination of attributes
f	Against other datasets of the same type	Aggregator	Horizontal/vertical consistency
g	Datasets of a different type	Aggregator	e.g. S-102 depths shoaler than S-101 depths
h	Part 17 Catalogue (and Part 15)	Aggregator	Bad digital signatures, coverage of dataset doesn't match coverage in catalogue, incorrect encoding or mismatch of producer code
i	Corresponding S-128	Distributor?	Mismatch of coverage or dataset name.
j	Against interoperability catalogue	Producer	Incomplete substituted layer (L2), mismatch of positions (L1)

Responsibilities:
- Who writes & maintains the different types of validation

- S-100 Conformance Tests

  - Test dataset against FC

  - Standard for all Product Specifications – so all S-100 level?

    - Should that fall within PS validation or at S-100 validation level?

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- Is this group responsible for tests between PS?

- If yes, focus on interoperability?

  - Interleaves

  - Replaces features – bigger implications

  - How maintain onwards?

  - Is this a temporary home until S-98 sub group set up?

- S-101 Project Team has reviewed S-58 and identified which validation tests are:

  - Relevant to S-101 and carried forward

  - Which tests are more generic S-100 tests

  - Initially identified some new tests for S-101

PROGRESS SO FAR...2

- IIC Technologies have produced a Technical Report on Validation of S-100 datasets (Agenda item 8.1)

  - Covers background to validation

  - Beginning of description of 'methodology' of Validation

  - Primarily looking at S-101, S-102, S-104 & S-111

  - Proposed categorisation of S-100 Validation Tests

  - Initial list of 45 tests (Primarily focused of S-101, S-102, S-104 & S-111)

  - Testing validation of:

    - S-102 against S-101 using UKHO test data (Isle of Wight)

    - Working with US datasets to find examples of reconciling S-111 data with tidal data in S-101

https://iho.int/uploads/user/Services%20and%20Standards/S-100WG/S-100WG7/S100WG7-8.1_2022_EN_Validation%20Tests%20v7.3.0_Draft.pdf

IHO

International Hydrographic Organization

- Summary of UKHO findings - wreck
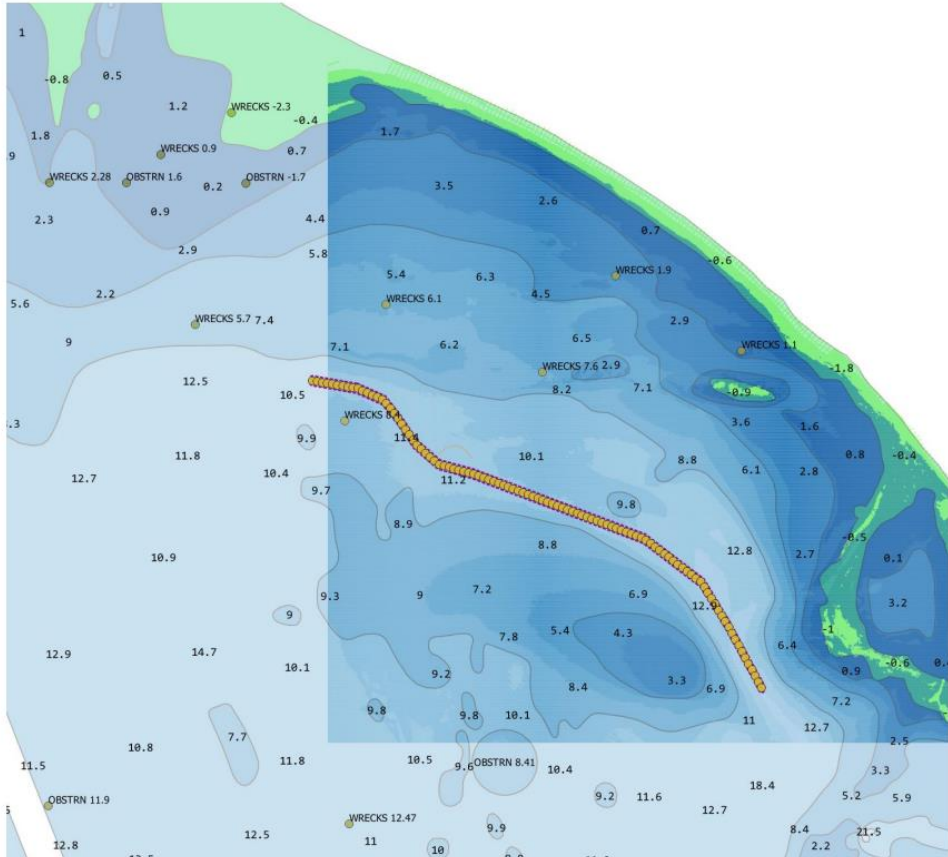
S-101 Wreck feature (with a coincident Obstruction) with a valueOfSounding of 8.4m

S-102 value corresponding to the point feature (which is within the bounding rectangle of the S-102 point) is 8.39999961853027
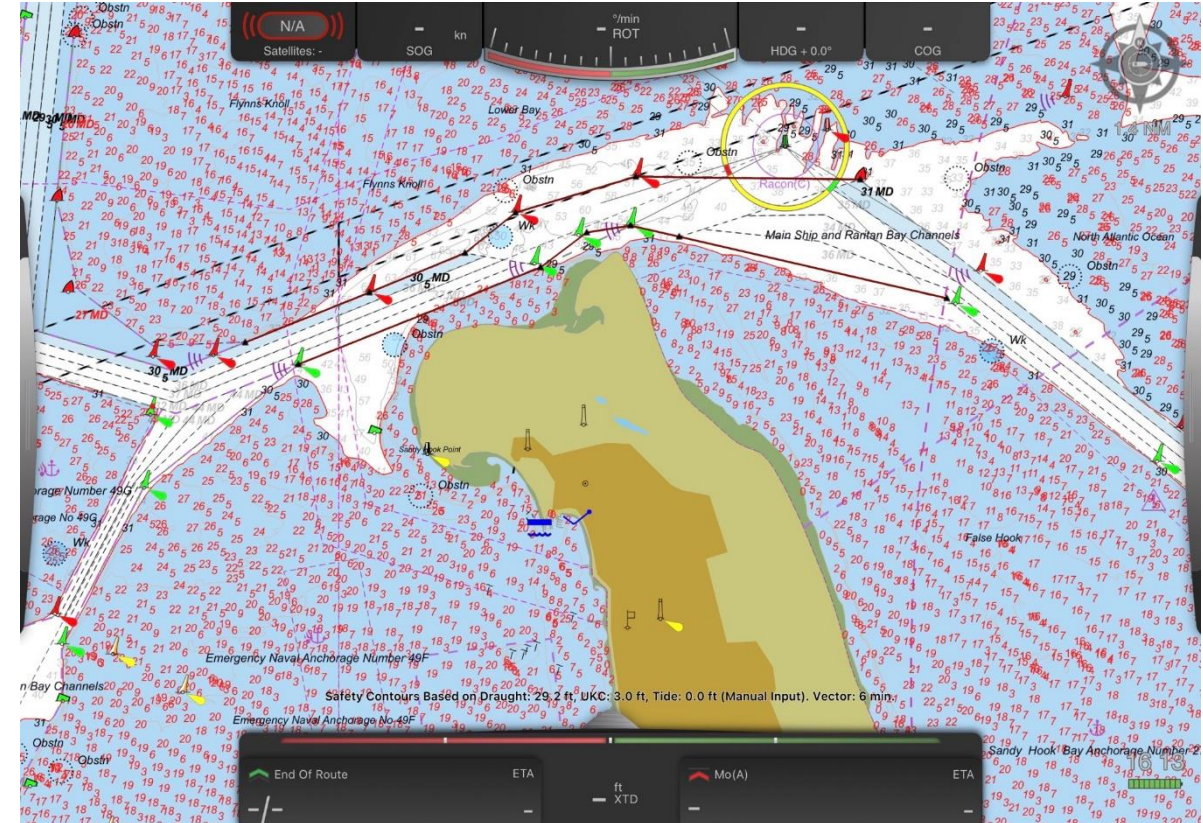
NOAA Sandy Hook – Interoperablity issues between products

S-102 with a user selected safety contour selected, however, the S-102 data was interpolated over land, so Sandy Hook is no longer visible on screen

S-102 Turned off

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- Have other Test Beds or organisations starting working on S-100 Validation tests that they are willing to share?

  - Production Software manufacturers

  - Validation Software manufacturers

  - RENCs

  - OEMs

  - Test Beds

  - Data producers

  - Others…

WHAT IS THE DELIVERABLE?

- List of S-100 Validation Tests - is this a Part of S-100 or separate standard (S-158?)

  - What is the format of these tests – propose use IICs suggestion to start with

  - Explanatory section including description of what 'Validation' is

- Recommendation of how we organise validation between different products – **Is this S-98 now?**

  - How do, how record, how update/maintain

  - Update S-97?

- Guidance document for data producers?

  - But not hold up factor

  - Scope of work - is this limited in the first instance to Route Monitoring PSs?

  - Link to DCEG?

ASSUMPTIONS

- S-101 must always be 'safest'
  - Do we need a definition

- Must be possible to use S-101 ENC without additional S-xxx products

- Do we need a generic list of assumptions and/or ones specific between product specifications?

- Combination of products must be least as safe as individual

- "After S-57 is no longer a live standard, the S-57 tests can be deleted from the test cases and documentation without any impact. Therefore, S-100 and S-57 datasets should be standalone (except where specific DF tests are planned/executed)" – S-164
  - So want to keep S-58 & S-158 separate

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5 Initial register of tests.

This is an initial register of tests compiled using individual product specifications, and mapping between features in different product specifications. The column headings are as follows:

1. Category. The broad area of functionality the test refers to
2. Description. Description of the conditions the test is attempting to capture.
3. Inputs. Whether tests are designed to be run on single datasets or between datasets of different type/product.
4. Products. Which products the test is focused on
5. Classification "C" – critical, "W" – warning. A draft classification based on possible user/ECDIS impacts.

Propose adding Standard/document to refer to

Category	Description	Inputs	Products	Classification
Dataset Coverage and Datums				
	Spatial limits must match CATALOG.XML	Dataset / CATALOG.XML	All	C
	Temporal limits must match CATALOG.xml	Dataset / CATALOG.XML	All	C
	Temporal limits start must be before temporal limits end	CATALOG.XML	All	C
	Spatial limits must be well defined polygon(s)	CATALOG.XML	All	C
	Horizontal Datum must be WGS84. horizontalDatumValue = 4326 and horizontalDatumReference = "EPSG"	Dataset	All	C
Data Values	Depth must be negative up	Dataset	S-102	C
	All depth values must be Real numbers	Datset	S-102	C
	All Water Level values must be real numbers	Dataset	S-104	C
	All Current speed numbers for Current Speed shall be real numbers. All trend indicators shall be integers, 1, 2 or 3	Dataset	S-104	C
	-90.0°<gridOriginLatitude<90.0° and -180.0°<gridOriginLongitude<180.0°	Dataset	All	C

Categories:
Dataset Coverage and Datums
Data Values
Coverage
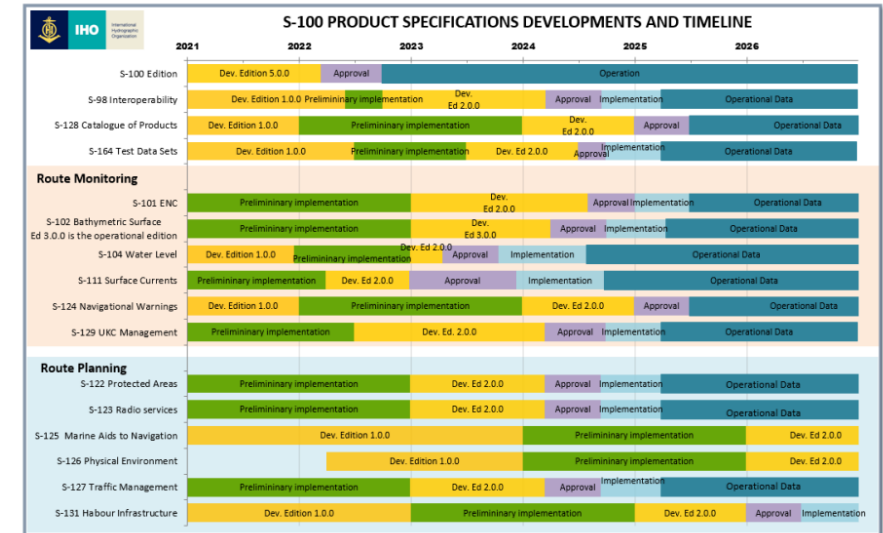Grid Structure
Resolution
Dataset Metadata
Cross Validation

S-100 PRODUCT SPECIFICATIONS DEVELOPMENTS AND TIMELINE

- When required?

  - Are there phases

  - What is phase 1? Route Monitoring

- What are S-100 Validation tests a dependency to?

  - Product Specifications being ready for Ed. 2.0.0

    - Generic tests & FC

    - Revisit once Interoperability catalogue produced

- Test data is required to test validation

  - Potentially work with Test Beds and RENCs to start with

  - Resources to test

  - IHO Singapore Lab?

- Link between S-164 and S-100 Validation Tests

  - S-164 needs to be validated?

  - Do we need S-164 datasets for S-100 Validation Tests?

- Initial work
  - Establish GitHub page
  - Identifying which scenarios require validation & who responsible
    - Identifying who to contact
  - Agree to use IICs test structure?
  - Insert S-101 PT S-100 tests into new structure
  - Start producing simple document explaining:
    - 'What validation is'
    - How it is structured
    - Identifying responsibilities for different parts of validation
  - Review Governance Docs gaps
  - Session at TSM
  - Request S-158

- Further work
  - Identify other S-100 Validation tests – do we need a full review?
  - Potentially set up a test scenario for users/ Test beds to test and report back issues found

- Establish list of volunteers – contact WG/PS owners not present
- Next meeting
- VTC correspondence group
  - 1st meeting beginning of February? (S-101to S-57 conversion meeting end Jan)
  - How regularly meet? Monthly?
  - Test Strategy Meeting in early March
  - HSSC meeting June
- Maintenance / Updating regime