

## Paper for Consideration by S-101PT

### Identification in S-101 for equivalent S-57 ENCs

<b>Submitted by:</b>	IC-ENC
<b>Executive Summary:</b>	Options paper for identifying equivalent S-57 ENCs in S-101.
<b>Related Documents:</b>	S-101 PS, S-98 Annex C WENDWG13-06.3A paper on IC-ENC and PRIMAR position on S-128, S-100WG7-06.8 paper and presentation on S-1XX Dataset Naming Convention, HSSC14-05.1G: S-100 ECDIS Governance Document paper and Update presentation (Annex A), IHO S-100 Implementation Strategy.
<b>Related Projects:</b>	S-101 and S-57

### Introduction / Background

The IHO S-100 Implementation Strategy states:

*In order to maintain ECDIS devices already installed on SOLAS vessels which are technically not ready nor required to be upgraded to S-101 ENC process capability and to be in line with the applicable IMO regulations pertaining to existing navigation equipment, **identical coverage has to be provided for S-57 ENCs and S-101 ENCs for a transition period** until the end of the decade.*

During this transition period of dual fuel production, Members will be providing both S-57 and S-101 ENCs to the RENCs. It is therefore essential to identify which S-57 ENCs are equivalent to S-101 ENCs to ensure consistent coverage and provide optimised validation in the RENCs.

### Analysis/Discussion

The RENCs will be receiving both S-57 and S-101 ENCs from their Members, during the dual fuel transition period. It is therefore imperative to ensure consistent coverage and validation of S-57 and S-101 in the RENCs. IC-ENC has explored how to identify equivalent S-57 ENCs in S-101, and this paper provides a number of options to achieve this and includes a recommendation.

Data producers will need to provide information on the corresponding S-57 ENCs during dual fuel production. Currently, there is no mechanism specified to provide this information. A number of options are available within S-101 and S-128 to enable the identification of equivalent S-57 ENCs, these include:

- a) S-101 file naming convention: 8th to 15th characters in the dataset file name could be utilised to contain the equivalent S-57 ENC, as shown in the example below:
  - S-57 - GB100100.000
  - S-101 - 101GB00GB100100.000

Data producers may decide to do this, however, this method is not considered desirable, as it introduces over specification. Therefore, only the first seven characters of a dataset name and the extension are standardised in S-100.

- b) Extension of S100\_DatasetDiscoveryMetadata for S-101, to include new attribute to identify corresponding S-57 ENC, such as:

Name	Description	Mult	Type	Remarks
equivalentS57ENC	Cell name	1	CharacterString	Corresponding S-57 ENC

Noting the IHO requirement for identical coverage of S-57 and S-101 ENCs, this attribute would be mandatory during the dual fuel transition period. No change to S-100 Part 17 is needed, as this is only required in S-101. This attribute is necessary for identification of equivalent S-57 ENCs, required by RENCs to ensure consistent coverage of S-57 and S-101 ENCs and optimised validation, and S-128 generation.

To note: RENCs will generate S-128 datasets on behalf of Members at the release stage. Reference: WENDWG13-06.3A.

S-128 datasets will contain (currently a gap in S-128) corresponding S-57 ENC dataset names for the S-101 ENCs to provide the necessary information to the VARs and ECDIS.

To note: As discussed at the NIPWG S-128 VTC meeting, equivalence in S-128, will provide what is available at input for the ECDIS not what is available in the ECDIS, and is therefore not relevant to ECDIS loading strategies. S-98 Annex C may require updating to read the S-128.

- c) S-101 datasets: use of the Dataset metadata in ISO format (S100\_ResourcePurpose) to provide information required to identify equivalent S-57 ENCs.

Role Name	Name	Description	Code	Remarks
Value	ISO Metadata	Dataset metadata in ISO format	11*	

This information can then be mapped across to populate the relevant metadata field in the S-128 datasets (development required in S-128) generated by the RENCs.

The S-100 Exchange Set model provides a mechanism for including ISO compliant metadata records for each dataset in an Exchange Set. These optional supporting resources can be included and referenced using the individual ISOMetadataFile records. They are not intended to be used on ECDIS, but may be optionally included to support wider interoperability with other user communities or to fulfil ISO metadata requirements where needed.

\*To note: S-101 Edition 1.2.0 (redline) shows Code has changed from 11 to 2.

- d) On upload of ENCs to RENCs, Members provide S-128 datasets which contain information to identify equivalent S-57 ENCs (development required in S-128).

This is not considered desirable, as the responsibility would be on all Members to produce S-128 datasets when uploading ENC data to RENCs, in order to identify equivalent S-57 ENCs (Reference to WENDWG paper in option b).

## Conclusions

IC-ENC has considered the four options above and provides a conclusion for each option.

- Option A: Naming convention was discussed at S-100WG7, with the conclusion that it introduces over specification, and therefore, this option is not considered desirable.

- Option B: Provides the optimum solution as it could be automated through the production tooling. And also provides a route for non-RENC Data Producers. This is also useful for Data Producers to track their migration from S-57 to S-101 ENCs.
- Option C: This could be utilised, however, for consistency Option B is preferable, as it provides a dedicated attribute for equivalent S-57 ENCs.
- Option D: Noting the joint RENC paper to WENDWG (13-06.3A), the RENCs will generate S-128 datasets on behalf of their Members, and therefore reduce their burden during the dual fuel transition period.

## **Recommendations**

Based on the conclusions above, IC-ENC proposes that the S-101PT consider implementing Option b) as the optimum solution for identifying equivalent S-57 ENCs in S-101.

- Option b) to extend the S100\_DatasetDiscoveryMetadata to include a new attribute to identify corresponding S-57 ENCs.

## **Justification and Impacts**

Option b) provides the optimum solution for the identification of S-57 ENCs in S-101 to ensure consistent coverage and provide optimised validation in the RENCs. This is also useful for Data Producers to track their migration from S-57 to S-101 ENCs without additional resource as it could be automated through their production tooling. This also provides a route for non-RENC Data Producers.

This option also negates the requirement for RENC Members to produce S-128 datasets for S-101 to provide equivalent S-57 ENC information, and for RENCs to ingest S-128 datasets to retrieve equivalent ENC information.

This approach supports the provision of both S-57 and S-101 datasets and then S-128 shows which one should be used, but also allows VARs to create coherent services themselves at S-101 level; having both options is preferred at this stage.

## **Action Required of S-101PT**

The S-101PT is invited to:

Discuss and agree on this proposal.

## Annex A - Related HSSC14 documentation

Extracts from HSSC14-05.1G: S-100 ECDIS Governance Document paper and S-100 ECDIS Dual Fuel Mode Governance Document Update presentation:

In order to transition to the use of S-100 exclusively (in the context of navigational data) on ECDIS used on the bridges of commercial SOLAS vessels, there is a need to go through a period of transition where:

1. Data producers will migrate their existing tools and methodologies to produce:
  - a. S-100 versions of existing S-57 charts (using the S-101 product specification).
  - b. Optionally, other datasets conforming to S-100 product specifications.

In essence, the only differences to alarm/indication and anti-grounding under the IMO sections (MSC232.(82)11.4.3 and 11.4.6) are either

1. Those conditions which have been withdrawn because of remodeling of S-101 data and which are captured in the S-101 DCEG.
2. Improvements due to User selected safety contour and (optionally) WLA processing, as specified in S-98 Annex C.

In summary.

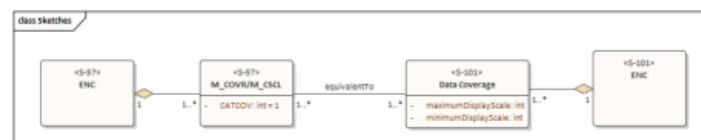
[1] Every alarm/indication generated by S-101 data on an S-100 ECDIS should also generate an alarm/indication on an S-57 ECDIS using the corresponding S-57 "version" of the data.

[2] S-57 data (under Dual Fuel mode) may generate more alarms/indications than the S-101 version of the data. These "extra" alarms generated by S-57 data are those which the S-101 data modelling has concluded as "not required" under the S-100 regime.

### 7.1. Dataset Equivalents.

No comprehensive and complete versioning mechanism currently exists between S-57 and S-101 Charts. This is a complex area because of the structural differences in coverage between S-57 and S-101, and the way coverage is implemented by the ECDIS loading strategy. It is an issue which may require thorough discussion to establish the optimal way forward. During the transition period all producing authorities will be releasing ENCs in both S-57 and S-101 forms. There will, hence, be  $\geq 2$  "versions" of each ENC dataset for any area. Although this relationship is not 1-1 and equivalence undoubtedly exists and there is nowhere in the S-100 hybrid exchange set mechanism to define it.

Moreover, for maximum flexibility for data producers the equivalence is between S-57 M\_COVR/M\_CSCALE features and S-101 DataCoverage features with a many to many relationship.



This lack of equivalence currently defines an area of ambiguity when a hybrid exchange set contains S-57 and S-101 which overlap and may be close in scale. A "versioning" mechanism which defines such a many-to-many relationship between the components of S-101 cells and S-57 cells would remove this ambiguity and enable ECDIS to make clear choices about which data to install (or which data to select from the SENC for its operations). It would also give the data producer more choices of scale and scheming when migrating ENC data holdings from S-57 to S-101.

Such a change necessarily involves referring to both S-57 and S-101 so probably does not belong in any of the S-100 component standards. If a lower level of granularity is settled on (at a cell level rather than a coverage feature level) then the solution is a lot simpler and could be defined either in S-98 or the S-128 product specification both of which are in development. The impacts for data producers on scheming can then be defined accordingly.

A recent meeting of the data loading subgroup has concluded that all coverage features are to be loaded and simultaneously as a single entity. This establishes the "dataset" as the granular element of equivalence and, if agreed, will substantially simplify the task of specifying equivalence between cells.

### 7.13. S-128 development

The S-128 data model is still at an early stage of development with v1.0.0 to be approved by NIPWG. S-128 has been identified as crucial for reliable exchange of S-100 exchange catalogues between service providers and end users for two main purposes:

1. The specification of revision information for a user's service which determines the content of the revised Update Status reports on the ECDIS (contained in S-63 and S-98 Annex C).
2. Mapping of equivalent "versions" of ENC's, should such equivalence be established as part of the conclusion of the loading strategy discussions currently underway.

S-128, ultimately, fulfils the goal of "service metadata" for S-100 ECDIS and each service provider will need to develop compatibility with it in order to present a full service to end users and to satisfy requirements for ECDIS update status reports to satisfy inspection regimes. Lack of a mature S-128 product specification will impact the ability of ECDIS to fulfill SOLAS compliance in respect of tracking update status and management of updates and equivalents under Dual Fuel mode.

**IHO**

## **IDENTIFIED AREAS FOR DEVELOPMENT**

### **Specifically Dual Fuel**

- **Loading Strategy.** Currently incomplete for ENC's and non-ENC data
- **Dataset Versions.** No defined mapping between "S-100 version of a corresponding S-57 cell"