

S-57 to S-101 Conversion Project

Background

Initial S-101 operational edition (2.0) and production is planned for the beginning of 2024. From then a Dual-Fuel era will begin where Hydrographic Offices (HOs) will co-produce both S-101 ENC's and S-57. The initial source for S-101 ENC's is the data used to produce current S-57 ENC's.

As the conversion from S-57 to S-101 is not straightforward, an S-57 to S-101 Conversion Sub-Group has been formed under the ENC Working Group to define a conversion guidance document. This document will be used by the manufacturers to produce conversion tools and by the HOs to prepare their S-57 data prior to conversion and for adjustment of S-101 data after conversion.

The ultimate goal of the IHO guidance document is to achieve maximum automation in the conversion process, driving down production costs for HOs who will be expected to support two ENC formats.

Overview

Main Project Objectives

- The goal of the *S-57 to S-101 Conversion Project* is to thoroughly test, and propose refinements to, the "S-57 to S-101 Conversion Guidance" document, produced by the IHO ENC Working Group (ENCWG).
- The goals are to use existing conversion tools to test the Conversion Guidance document and produce outputs conformant to its contents. The goal of the project is not to compare technology offerings from different companies. Feedback will be produced for the companies involved but the primary aim is to test and quantify the content of the Guidance Document

Team composition

The Project Team Leader is Thomas Mellor, Chair of the ENCWG.

The Team also comprises:

- Christian Mouden (France) and Jonathan Pritchard (IIC Technologies), co-chairs of the S-57 to S-101 Conversion Sub-Group;
- Yong Baek, Jeff Wootton (IHO Secretariat);

Project items

The project comprises the following tasks:

1. Set up a workspace (test database and/or GitHub) to share data/issues/etc. with the Project Team participants;

2. Identify and acquire existing converters and S-101 visualizers available on the market and identify their different capabilities and methods of operation. Initial candidate companies and organisations who may provide software tools and technologies to the project are:
 - SevenCs;
 - Teledyne Caris;
 - Geomod;
 - IIC Technologies
 - KHOA
 - NIWC
 - ESRI
 - Lloyds I4-Insight
3. Identify countries that agree to provide S-57 ENC's for conversion;
4. Define a testbed capable of testing:
 - Existing S-57 data in its original form.
 - Data pre-encoded according to the guidance document.
 - All relevant S-57 objects and attribute combinations.
5. Execute
 - Pre-conversion data preparation and validation
 - Data conversion
 - Analysis of both source and converted data
 - Visualisation and use
6. Define any improvements necessary to the "S-57 to S-101 Conversion Guidance" document;
7. Define recommendations to either ENCWG or S-101PT for refinement of standards specific to ENC.
8. Quantify resources necessary to
 - Pre-encode data prior to conversion
 - Perform the conversion process
 - Post-editing of ENC data to achieve conformance with the S-101 DCEG.

Project timing

The project should be launched in 2022, with the release of edition 1.1.0 of S-101, for a period of one year.

Project deliverables

The project will come up with the following deliverables:

- Global report identifying the software used, the various activities, details of the testing method, results with references to the "S-57 to S-101 Conversion Guidance" document and the ENC's concerned, etc.;
- Feedback to software/technology suppliers on the tools used.
- S-57 original and S-101 converted ENC's with specific comments on their conversion issues.

Project funding

To be completed.

Challenges and innovation opportunities

In its final version, the "S-57 to S-101 Conversion Guidance" document should be as complete as possible so that any ENC producer can find all information needed to convert his ENCs from S-57 to S-101.

Some possible challenges and opportunities for innovation exist already:

1. S-101 standard is still in progress and some data models will probably change during the project, with implications on the conversions and on the conversion document.
2. Initial S-57 to S-101 converters and S-57/S-101 co-production tools are still in a development phase and substantial improvements will probably occur during the project. A systematic approach to the specification and outputs of such tools is yet to be defined or rigorously stated. The mapping to IMO requirements for ENC under S-101 is also yet to be defined.
3. Due to different S-57 encoding rules between different data producers, the conversion will need to be adapted to individual HOs, while remaining conformance with S57 and S101 standards at all times.
4. S-101 validation checks are still in development and, at this time, there is no S-101 QC tool that can ensure a converted cell complies with a defined standard. No cross-validation standard or set of checks yet exist. Outputs from the project can also be input into validation and S-164 test dataset production.

There may be opportunities for the Innovation Lab to develop tools to compare S-57 and S-101 ENCs and identify different interpretations of conversion and its outputs as well as providing guidance for ongoing co-production to producing HOs during the dual-fuel era.

Industry partnership

As previously stated, the project team will have to use a number of tools to test ENC conversion. Partnership with industry is thus a key for the success. Arrangements will be established with providers of ENC production tools (including converters) and S-101 data visualizers.

On the "data" side, collaboration will be sought with HOs to use and convert their ENCs and to exchange on the issues.