

PART 2 SUBMISSION –REVIEW OF GUIDANCE DOCUMENT FOR S-57 TO S-101 PROJECT CUM WORKSHOP

Project title: S-57 to S-101 Conversion

Project description: The goal of the S-57 to S-101 Project is to test, and propose refinements to, the "S-57 to S-101 Conversion Guidance" document, produced by the IHO ENC Working Group (ENCWG).

Using existing conversion tools 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. The aim is to evaluate the conversion when the guidance is applied consistently and ensure results are valid, correct and safe.

To value add to the project, it is also proposed that a self-funding workshop be organised alongside the project. This would serve the dual purpose of training and then reviewing the Guidance Document using the experience gained from participants attending the Workshop. The training and workshop will give participants hands on experience converting different ENC datasets. The outputs of the project will inform v2.0.0 of the conversion guidance and will form the basis for individual member states' development of their own strategies to address the challenges of dual fuel production. The workshop approach focuses on hands on training for member states and encourages development of such strategies whilst also informing the global picture of ENC production in the S-100 age.

An objective of the project is to consider and propose methods by which ongoing co-production of S-57 and S-101 data and its updates can be produced during the transition phase and identify any shortcomings or technical difficulties.

Summary of project objectives:

The project will review the latest version (v1.1.0) of the IHO S-57 to S-101 Guidance Document and at same time conduct a structured in-person S-57 to S-101 Training and Conversion Workshop.

The Workshop will invite participants from HOs with support from OEMs and providers of converter, visualisation and validation tools to test a broad set of representative ENCs and test datasets against the guidance document. This will accomplish the objectives and deliverables listed below. Refer to Appendix 4 for further details.

Objectives Summary

- Thorough testing of the latest edition (v1.1.0) of the IHO S-57 to S-101 Conversion Guidance Document against a broad set of representative ENCs and test datasets.
- Impact analysis. This should detail for dual fuel ENC data producers
 - The scale of likely automated and manual effort required to prepare and execute migration of existing data holdings to a form suitable for production of S-101
 - An initial examination of likely resource required for ongoing production during the ECDIS transition period.
- Preparation of recommendations to guide version 2.0 of the Conversion Guidance Document
- Selected conversion tool refinements

Summary of project deliverables:

- Full documentation of scope and content of testing performed within the project.
- Commentary on the existing S-57 to S-101 Conversion Guidance Document 1.x and a summary of recommendations made.
- Impact Analysis documentation
- Sample datasets showing
 - Quantitative testing results
 - Any issues encountered together with recommendations for their resolution
 - Scope and results of validation testing carried out
- Recommendations for IHO data production documentation.
- Recommendations for tool providers on implementation of Guidance Document.

Practical relevance to Hydrographic Community/Industry:**Implementation of IHO Strategic Plan for S-100 transition**

- The current IHO plan is strongly focused on S-100 takeup and rollout of S-101 as a priority in order to tie in with development of S-100 based systems for primary navigation of SOLAS vessels. This must be alongside production of S-57 as well to service the requirements of those end users without access to latest ECDIS equipment.
- In order to implement the IHO Strategic plan Goal 1, implementation of the Universal Hydrographic Data Model is a priority. The vast majority of output from IHO member states, and its primary deliverable is production of updated Nautical Charts in an appropriate format.
- ENC requires particular consideration for migration to S-100 in the form of the S-101 product specification and in order to meet Goal 1, SPI 1.1.1 “operationalized production” a secure foundation for migration of existing ENC production systems and a roadmap for ongoing production must be in place for producing agencies.

Conformance with International Standards

- Official Nautical Charts currently satisfy SOLAS carriage requirements globally for many SOLAS vessels. With the submission of S-100 into a revision of the IMO Performance Standard, the process of introducing live operation of S-100 to the bridge of commercial vessels has begun. This project will cover conformance of S-101 with S-100 and defining IMO standards as well as auxiliary standards such as S-98.
- As part of conformance to such standards, data producers will be compelled to support S-101 production and understand thoroughly the impacts these will have on end users of their data.

Roadmap for ongoing production.

- The conversion guidance developed relates solely to the initial development of a database capable of supporting S-101 ENC. Little practical advice exists for data producers in terms of ongoing support for production of data in both S-57 and S-101 forms simultaneously during the dual fuel transition period.
- Therefore, of particular relevance, and in pursuit of IHO Strategic Plan SPI 1.1.1 (“operationalized production”) is the development of advice for producers on how to implement infrastructure for such production, and to minimize rework for ongoing production of updates and new editions of ENCs in both forms.

Current thinking (from discussions in the ENC conversion subgroup, and from the workshops for the ECDIS Dual Fuel Governance Document in 2021) have proposed some broad conceptual models

relating to conversion and hybrid models for ongoing production. These are illustrated in the following diagrams.

The following are "conversion" based models.



Figure 1: "Conversion" based models of ongoing ENC production

A hybrid model, aggregating S-57 and S-101 catalogues to co-produce ENCs and their updates is shown in the following diagram.

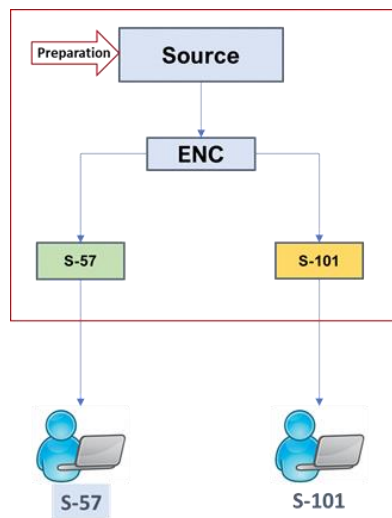


Figure 2: A Hybrid data model co-producing S-57 and S-101

Most member states will implement one of these models and will have specific needs based on their existing data holdings in order to make the transition to one of them. The project should address all variations of future production capabilities and seek to identify challenges each will bring. Resource estimation will be crucial for many stakeholders to make the transition to S-101 and support dual fuel so this is a particular area of focus for the project.

These models have progressed little since their definition and now member states are beginning to implement production it is vital they are tested more thoroughly and representative information is put in the public domain.

Project team (Please include details of all team members in Appendix 1)

Project governance:

Thomas Mellor, ENCWG Chairman

Hosting HO and logistical support:

Maritime Port and Authority of Singapore (MPA)

Team leaders:

Christian Mouden christian.mouden@shom.fr Head of S-101 development, Shom, ENCWG member

Jonathan Pritchard jonathan.pritchard@iictechnologies.com Senior Technical Manager at IIC Technologies, ENCWG member

Team members:

ENCWG S-57 to S-101 subgroup (IHO ENCWG Sec to supply full participation list if required)

Participating HOs and OEMs' Collaborators

As per registration for the intended Workshop

Collaborator's information:

S-57 to S-101 Converters

7Cs - Friedhelm Moggert-Kägeler, mo@sevens.com, Solutions Director, Maritime Spatial Data
Dkart - Inga Fjellanger, inga.Fjellanger@i4-insight.com,
ESRI - Tom De Puyt, tdepuyt@esri.com, Maritime Standards
Caris - Hugh Astle, Astle, Hugh.Astle@Teledyne.com, Senior Development Manager

S-100 Viewers

S-100P - Izzy Kim izzykim@korea.kr
NIWC - Miroslav Stamenkovich (Mikan), mikan.stamenkovich@navy.mil

Summary of project cost (Please provide detailed breakdown of budget estimates and description of costs in Appendix 3)

Refer to Appendix 3

Other source of funding

No other funding for the project has been sought.

Do you require a Workspace at IHO Lab? If so please provide:

Work area needed (m³):

1 meeting space to host Project Team

Declaration by applicants:

We, the Applicants, hereby declare that the information provided in this Application form, including the supporting documents attached hereto, are true and correct. We have read and understood the terms set out herein, including the Terms of Funding and we agree to be bound thereby.

Name of Applicant:

ENCWG - ENC STANDARDS MAINTENANCE WORKING GROUP

Thomas Mellor, UKHO, ENCWG Chair

Christian Mouden, Shom, S-57 to S-101 Project Lead

Jon Pritchard, IIC, S-57 to S-101 Project Lead

Date: 28 June 2023

PROJECT TEAM AND MEMBERS**United Kingdom Hydrographic Office**

A)	Name	Thomas Mellor
B)	Designation	Project lead
C)	Education / Professional Qualifications	IHO ENCWG Chairman, BSc Surveying & Mapping Science, CMarTech, FIMarEST
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PROJECT SCHEDULE

A) Detailed project work plan			
Phase	Activity	Time required	Resources
1	<p style="text-align: center;">Work preparation - Specifications</p> <ul style="list-style-type: none"> • Shared workspace organization schema for collaboration (data and results). • Contact the converter and visualisation and validation tools providers for their interest in participating in the project this includes agreement on the licence terms (cost, duration, etc.). • Infrastructure to be set up for hosting the various tools. • Specification of the test datasets (geographical area, S-57 objects, etc.). • Prepare a draft of the document that will contain the results of the conversions and the proposals for edition 2.0 of the “S-57 to S-101 conversion guidance”. • It is recommended to split the test datasets in line with the S-57 UOC chapters (groupings to be defined) and to take account of the recommendations in the conversion document (S-64 and S-101 test datasets can also be examples). • Test data sets will have to be pass to S-58 validation checks (validation reports to be stored). • Prepare training materials covering S-100 framework, S-101 production overviews and key conceptual principles of source data conversion. 	1 month	Project team Lead and Members / IHO Lab (possibly with the support of the IHO Conversion sub-group)
2	<p style="text-align: center;">Test datasets creation</p> <ul style="list-style-type: none"> • Creation of test datasets in line with the specifications. • Review of the datasets by the project team. • Individual cells to test each element in the guidance documents. Establish groupings and note features/attributes. • S-58 validation of ENCs supplied to the project. • All test datasets created must also pass S-58 tests. 	2 months	Project team + Participating HOs / IHO Lab

<p>3</p>	<p style="text-align: center;">Conversion</p> <ul style="list-style-type: none"> • The first phase of the conversions will be based on edition 1.0.2 of the S-101 Feature Catalogue and DCEG. • Convert test datasets with the various tools available for the project. • Analyse of each conversion log file. • Validate S-101 content with the tools available. • Analysis of results against the conversion document. • Detail and calculate the amount of manual effort required to “finalise” S-101 datasets (“finalise” includes cross-validation of S-57 and S-101 and assessment whether they are navigationally equivalent). • Report recommendations on possible conversion tool improvements, S-101 validation checks and guidance document improvements. • Consider how automation of incremental updates and ongoing co-production of S-57 and S-101 can best be achieved within the boundaries of the conversion guidance document and the S-101 DCEG. • Re-compile S-57 source data based on the rules in the guidance document and proceed with a second conversion and check the results. 	<p>6 months</p>	<p>Project team + Participating HOs</p>
<p>4</p>	<p style="text-align: center;">Results</p> <ul style="list-style-type: none"> • Review the recommendations based on the conversions and apply necessary changes to the guidance document (in view of edition 2.0.0). • Liaise with the conversion tool providers to modify their software based on the recommendations. 	<p>1 month</p>	<p>Project team + Participating HOs and ENCWG</p>

SUMMARY OF PROJECT COSTS (To Indicate Cash or In-Kind)

GBP to EUR = 1.16 as of 08 June 2023

Qualifying Project Costs		Cost of Item €	Collaborator Contribution (If Any) €K
Category*	Details of Items		
Staffing (Please provide itemised details and budget breakdown)	Conduct of 13-days Workshop + 1 Trainer	€26,000 (cash)	Request to IHO Lab
	Participating HOs travel cost etc	Self-funded	NA
Equipment (Please provide itemised details and budget breakdown)	Standard Laptops to run tests (for loan to participants, if required)	€30 per set x 10 €300 (in-kind)	Request to MPA
	Software licenses for participants for: - S-101 production - S-57 to S-101 conversion	TBC	Request to IHO Lab
Other Operating Expenditure (Please provide itemised details and budget breakdown)	Hosting venue, event logistics, refreshments etc	€8,800 (in-kind)	Request to MPA
Total		€26,000 (cash)	Request to IHO Lab
		€9,100 (in-kind)	Request to MPA

*The Cost of Item indicated shall include any Collaborator Contribution(s) obtained for the same item.

*The Governing Board needs to discuss what are the qualifying expenses eligible for co-funding.

S-57/S-101 TRAINING AND CONVERSION WORKSHOP BY IIC TECHNOLOGIES

Background and workshop objectives

A. Training Workshop

Provision of support for a training workshop on ENC production to be held at the IHO-Singapore Lab, including:

1. Initial S-100/S-101 training and workshop for IHO participants including preparation of training materials.
2. Coordination of third-party software tools to be used during the workshop for installation and configuration by IHO Lab staff. Liaison with IHO Lab staff.
3. Preparation of outputs, collating workshop experiences and initial recommendations in respect of updates and practical guidance for member states for dual fuel production.

Refer to Appendix 4A: Training Workshop Description and Quotation for more details.

B. Conversion Workshop

Provision of support for a conversion workshop on ENC conversion to be held at the IHO-Singapore Lab, including:

1. Coordination of third-party software tools to be used during the workshop for installation and configuration by IHO Lab staff. Liaison with IHO Lab staff.
2. Coordination, training and guidance for conversion workshop with participants.
3. Preparation of outputs, collating workshop experiences and recommendations. These will cover:
 4. Recommendations for the IHO Conversion Document
 5. Initial recommendations in respect of updates and practical guidance for member states for dual fuel production
 6. S-57 to S-101 conversion proposals and its place within a dual fuel production system.

Refer to Appendix 4B: Conversion Workshop Description and Quotation for more details.

Travel, Accommodation, Subsistence

Costs quoted excludes travel, accommodation and expenses for IIC personnel. These will be submitted for pre-approval and charged at cost.

Preliminary estimation is 3,500 GBP, approximately 4,060 EUR.

Other cost components

Tools to be made available by third parties for the project and would be an additional cost if required.

Training Workshop Description and Quotation

Description of Training Workshop

1. Initial training for S-101 ENC encoding and production aimed at existing S-57 compilers with little experience of S-101 production. This workshop will provide an overview of S-101 encoding, and introduce the main elements of S-100 required for production of valid ENCs. The main characteristics of S-100 will be used in a practical format, emphasising hands-on training in groups.

2. Training will use multiple third-party tools to provide an overview of current state of art software support. The training is vendor neutral but will show how S-100 has been implemented and how different software tools integrate within the framework.

Training Workshop Quotation

DESCRIPTION	UNIT PRICE (GBP)	TOTAL (GBP)	UNIT PRICE (EUR)	TOTAL (EUR)
Training workshop and outputs 5 days comprise of: • Workshop preparation 2 days • Training workshop (Item 2) 3 days	6,000.00	6,000.00	6,960.00	6,960.00
SUBTOTAL	-	6,000.00	-	6,960.00
VAT (if applicable)	-	1,200.00	-	1,392.00
GRAND TOTAL	-	7,200.00	-	8,352.00

Conversion Workshop Description and Quotation

Description of Conversion Workshop

1. This workshop aims to investigate S-57 to S-101 conversion. It will be attended by representatives of member states wishing to understand how such conversion practices should be developed, and by existing experts in ENC compilation who are able to.

2. The workshop is suitable for more experienced participants and will test the contents of the IHO ENC conversion document. This workshop will analyse, convert and document COTS software tools aimed at initial conversion of ENC data. Within their respective groups, participants will prepare, convert, analyse and report conversion of ENC data from S-57 to S-101. It is intended that participants bring their own ENCs to the workshop for preparation and conversion in order to gain maximum benefits and to tailor results to their individual encoding practices.

3. Following the conversion workshop, a summary report for the ENC conversion sub working group of the IHO will be prepared, containing recommendations and observations for the next release of the IHO conversion document. The aim is for the report compiled to examine:

- a. Initial conversion from the perspective of the existing conversion document draft,
- b. Guidance for member states on how co-production, including updates and validation can be practically achieved using production tools,
- c. S-101 to S-57 conversion as a possible tool for implementing dual fuel production systems.

Conversion Workshop Quotation

DESCRIPTION	UNIT PRICE (GBP)	TOTAL (GBP)	UNIT PRICE (EUR)	TOTAL (EUR)
Conversion workshop and outputs	9,600.00	9,600.00	11,136.00	11,136.00
8 days comprise of:				
• Workshop preparation 1 days				
• Conversion Workshop (Item 2) 5 days				
• Preparation of outputs (Item 3) 2 days				
SUBTOTAL	-	9,600.00	-	11,136.00
VAT (if applicable)	-	1,920.00	-	2,227.20
GRAND TOTAL	-	11,520.00	-	13,363.20