



13th Meeting of the Hydrographic Services and Standards Committee

Report of the ENC Maintenance WG

Agenda Item HSSC13-05.2A

HSSC-13, IHO Secretariat, Monaco + VTC, 3-7 May 2021



IHO

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS

International
Hydrographic
Organization

ENCWG Subgroups	Activities / Meetings	Achievements
S-52 & S-64 Clarifications	Completed via email	Published clarifications, S-52 PL Edition 4.0.(3), S-64 Edition 3.0.(3) Final approval of clarifications achieved during ENCWG VTC 19 th Feb 2021, now published to IHO website
S-63 Cyber Security	29 th Sep 2020 1 st Apr 2021	Creation of test data and questionnaire, distributed to OEMs and Data Servers 29 th November 2020
S-58 ENC Validation Checks edition 7	1 st Dec 2020 3 rd Feb 2021	Draft edition under review at ENCWG 6
S-57 to S-101 Conversion	7 th Sep 2020 3 rd Dec 2020 8 th Jan 2021 11 th Feb 2021 13 th Apr 2021 29 th Apr 2021	Draft UOC style document. Draft Edition 0.0.1 currently under review of Sub-Group



IHO

IHO S-52 PRESENTATION LIBRARY CLARIFICATIONS

International
Hydrographic
Organization

Background

Following the release of S-52 PL edition 4.0(.2) a number of small minor issues were identified by OEMs. These issues were mainly discrepancies linked to ECDIS chart 1 ENC files and their corresponding chart plots in the printed version of S-52 PL.

Changes

New machine readable DAI-file

New printed ECDIS chart 1 plots

Reproduced new ECDIS chart 1 ENC files

- New README.TXT

ENCWG Approval

The Sub WG produced a draft version of IHO S-52 Preslib 4.0(.3) for ENCWG approval. The documents were sent 18th Dec 2020 to all ENCWG members for comment. There were no comments or suggested changes from the group. The clarification edition is now published on the IHO website



IHO

S-64 ENC TEST DATASETS

International
Hydrographic
Organization

Background

Following the release of S-64 edition 3.0(.2) a number of small minor issues were identified by OEMs. These issues were mainly discrepancies linked to differences in the ENC files and their corresponding chart plots in the printed version of S-64. A number of other display issues in the plots were linked to incorrect data in the S-52 DAI file from the ECDIS used to capture the images.

Changes

New screen shots created from ECDIS with corrected DAI-file
Changes to datasets to match screenshot presentation

ENCWG Approval

The Sub WG produced a draft version of IHO S-64 3.0(.3) for ENCWG approval. The documents were sent 18th Dec 2020 to all ENCWG members for comment. There were no comments or suggested changes from the group. The clarification edition has been published on the IHO website.



IHO

S-58 EDITION 7 PROGRESS

International
Hydrographic
Organization

- Validation subgroup are using GitHub to manage issues/proposals raised by HOs and RENCs, this allow issues to be tracked and managed through to implementation of the standard.
- The nineteen proposals approved by the subgroup have resulted in twenty amendments to existing checks and thirteen new checks.

Existing Checks	New Checks for edition 7
1 Critical downgraded to Warning	5 Critical
1 Error upgraded to Critical	8 Error
1 Error downgraded to Warning	

- Subgroup will prepare a paper and redline version of S-58 for submission and approval at the next full ENCWG 6 meeting.
- Changes to the 'Critical' checks will result in amendments to the S-58 Test Datasets, an evaluation of the changes and required updates will be made to establish if special project funding is required.



IHO

S-57 TO S-101 CONVERSION

International
Hydrographic
Organization

Presentation

- “S-57 to S-101 Conversion Sub-Group” launched in July 2020.
- Co-chaired by Jonathan Pritchard (IIC Technologies) and Christian Mouden (France)
- 6 VTC meetings between 7th September 2020 and 29th April
- Participants:
 - HOs: Canada (CHS + HSO), Denmark, France, Germany, Netherlands, New-Zealand, NOAA, Norway, Sweden, UKHO,
 - Stakeholders: ESRI, IC-ENC, IIC Technologies, i4 Insight, Primar, SevenCs, Teledyne Caris,
 - IHO secretariat
- Github repository: <https://github.com/ihp-ohi/S-57-to-S-101-conversion-sub-WG>
- Good progress so far.

Goal

Elaborate a document to the attention of the hydrographic offices to help them prepare their S-57 data for conversion to S-101.



Work base document: Shared “S-57 remodelled Spreadsheet” on Google Docs

WG In Progress - S-57 Removed_Remodelled Items.xlsx

S-101PT decision: Not required in S-101, marine infrastructure areas no longer exist, and are prohibited (Index 5-442).

Existing Secretariat Remodelling spreadsheet

Header, and

- Requires Data Preparation**
- Requires Cartographic (i.e. Manual) Input**
- Requires Dataset Configuration**
- Comment (short – for longer comments use a github issue)**

Grouping of Remodelling items

- Group 1
- Attribute Transformation
- Lights
- Aids
- Meta
- Associations
- CATZOC
- Bridges

Link to GitHub

S-57 features, ARE						S-101PT decision: Not required in S-101, marine infrastructure areas no longer exist, and are prohibited (Index 5-442).									
S-57 Acronym	Value	Not in S-101	Remodelled in S-101	Remodelled To	Comments	Requires Data Preparation	Requires Cartographic	Requires Dataset Configuration	Comment	Category of Conversion	Existing S-58 text applies	UDC Section	S-101->S-57 conversion Notes	ID	Issue
GENERAL NOTES:															
1. For enumerative values not allowed in S-101 the S-101PT used S-58 Check 2000 as the principle reference in its deliberations. Other criteria used were determination of a 'default' state where the value is self-evident and would not add any additional information relevant to safe navigation and protection of the marine environment (for instance UnderwaterAweRock / natureOfSurface = 9 (rock)); values that are illegal for the specific feature (for instance lights features, attribute colour = 2 (black)); and values specifically included for application to a single or selected set of features (for instance natureOfConstruction values 4 (hard surface) and 5 (uncovered) specifically intended for the Road feature).															
2. Features excluded by geometric primitive are generally based on the particular combination of feature/geometric primitive not displaying in ECDS. This was discussed at length by the (former) Digital Information Working Group (DINGWG) and it was confirmed that these were the primary reason for these combinations to be excluded.															
3. Where possible, optional encoding/conversion is identified where the removal of an enum value results in S-101 mandatory attribute having no value.															
4. Instances where names of items (mainly enumerated) have been removed in S-101 (for instance, to remove 'values' and 'options') but the mapping remains the same have not been included in this table.															
FEATURES															
NOTE: [A], [L], and [P] denotes features not included by designated area, line or point geometric primitive only.															
11 BRIDGE (P)	X	S-101PT decision: Not required in S-101, marine infrastructure areas no longer exist, and are prohibited (Index 5-442). water (note also that BRIDGE of type point is included in an area)													
C_AASGR	X	ArchipelagicSealane, Bridge, DredgingOperation, FairwaysSystem, RangeGroup, MovingFront, RangeSystem; TrafficSeparatorsScheme; TwoWayRoute													
C_CASSIO	X	These features are required to be associated with the corresponding feature associations (refer to S-5101 ENC).													
D_AMCON (P)	X	S-101PT decision: Not required in S-101, marine infrastructure areas no longer exist, and are prohibited (Index 5-442). water (note also that some encoding/conversion is not displayed in ECDS). NOTE: Suggest that the feature should be converted in S-101 to a line.													
D_DOCARE (L)	X	NOTE: Docarea is a Group 1 feature in S-101, therefore underlying Group 1 features must be amended to bound the Docarea feature to prevent overlapping coverage of Group 1 features when converting from S-57 to S-101.													
D_DOCARE	X	S-101PT decision: Not required in S-101, noting that GRDORN of type point does not display in ECDS.													
G_GRDORN (P)	X	S-101PT decision: Not required in S-101 – marine incineration areas no longer exist, and are prohibited (Index 5-4- B-443).													
I_ICNAME	X														
L_LIGHTS	X	Only where the attributes SECTRI, SECTR2 and OIENT are not present; or where CATUT # 6 or 7. See individual attribute instances in this table, for additional modelling of features and attributes for LIGHTS. Only applies to flat stacks onshore platforms (ORSPFL).													
M_UNMARK	CATLNUK = 6	X	Flarestack (boilover type attribute).												
M_ACCY	X	QualityOfCofferedHydrometricData													
M_COVR	X	DataCoverage													
M_ESCL	X	Where an S-57 ENC contains M_ESCL object(s), the DataCoverage feature in S-101 is a concatenation of M_COVR and M_ESCL. See M_ESCL below for geometry and M_COVR / SCALE below for position of the DataCoverage feature in the dataset.													
M_HPRB	X	NOTE: The elements M_ESCL and M_COVR object(s) with attribute CATLNUK = 1 (coverage available) must be used in S-101 to create the geometry for complete, non-overlapping coverage of DataCoverage features in the area of the dataset containing data.													
M_HPRB	X	S-101PT decision: Not required in S-101 – S-101 ENC must be spatially related to the WGS84 datum. It is also prohibited in S-57 ENC (refer S-57 Appendix B.1, clause 3).													
M_NPUB	X	Refer to attribute entries below associated with M_NPUB. NOTE: While the solutions included below will allow information captured in S-57 object class M_NPUB to be converted to features in S-101 ENC, this information should be reviewed for possible deletion and inclusion in other E-1000 based Product Specifications.													
M_PROD	X	S-101PT decision: Not required in S-101.													
P_PIPARE	X	One-to-one mapping of attributes between PIPARE and SubmarinePipelineArea, unless described otherwise below.													
P_PIPSOL (P)	X	S-101PT decision: Not required in S-101, noting that PIPSOL of type point does not display in ECDS. NOTE: Suggest that PIPSOL of type point encoded in areas of bathymetry should convert to an Obstruction feature in S-101. If on land should convert to a Landmark feature.													
P_PONTON	X	NOTE: Pontoon is not a Group 1 feature in S-101, therefore surrounding Group 1 features must be amended to provide complete coverage of Group 1 features when converting from S-57 to S-101.													
R_RECTRIC (A)	X	S-101PT decision: Not required in S-101. NOTE: Suggest that RECTRIC of type area convert to a RecommendedTiePointLinePart or a TwoWayRoute feature in S-101.													



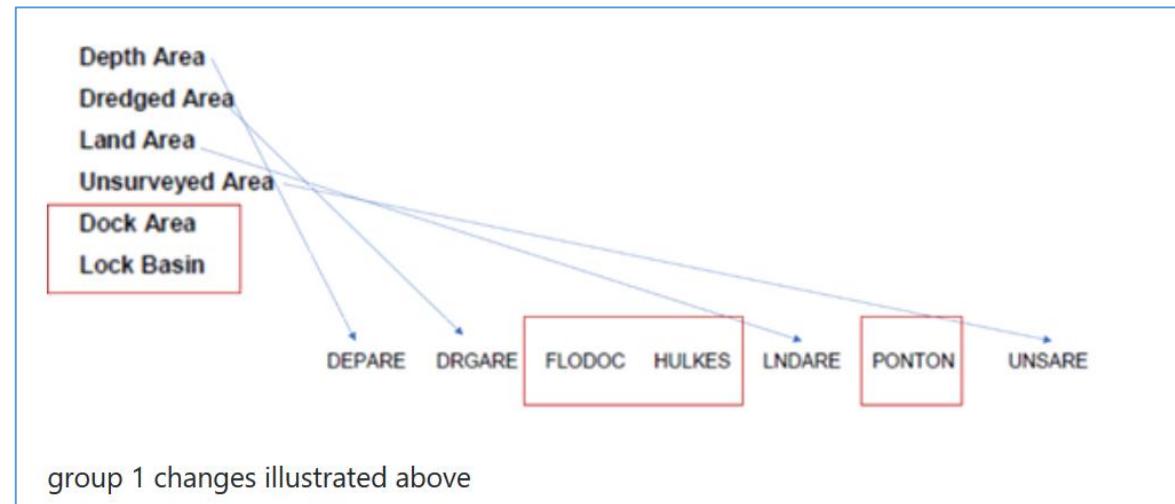
IHO S-57 TO S-101 CONVERSION

International
Hydrographic
Organization

On the Github:

- Meeting reports
- Issues:

Conversion of M_CSCL #7 opened on 24 Feb by kusala9
Bridges #6 opened on 10 Feb by kusala9
Discussion of INFORM transformations #4 opened on 8 Jan by kusala9
Discussion of InTheWater attribute. #3 opened on 8 Jan by kusala9
Creation of Association Features. #2 opened on 5 Jan by kusala9
Group 1 changes #1 opened on 14 Dec 2020 by kusala9



- Test data sets
 - Group 1
 - Bridges



Final document

- Same structure than the S-57 Use of the Object Catalogue (UOC)
- Recorded in IHO publications as an Annex to the UOC?
- Maintenance regime to be decided
- Will have to be aligned with successive S-101 FC and DCEG editions
- Edition 0.0.1 currently under review

S-57 to S-101 Conversion Guidance

Edition 0.0.1 – April 2021



International Hydrographic Organization

Published by the International Hydrographic Organization
40 quai Antoine 1er Prince de Monaco 06200
Tel: (377) 93.10.61.00
Fax: (377) 93.10.61.40
www.ihog.int

Christian Mouden, SHOM
Agree there is a need for guidance on Scales, Coverages, scheming, but we must agree (probably at higher level than this sub-group) where this needs to be added. We must also be careful to avoid duplication (and possible inconsistencies).

Teh Stand
JP: Not sure if I understand this completely. Are we saying you can't use the same FOID in two different datasets (i.e. cells) or coverage features in the same dataset? I don't believe FOID has changed. MRN will probably be defined across all features as an attribute which means that each feature will have a unique identifier in the dataset. From my perspective I'm not sure whether it makes a difference though!

Teh Stand
Need to confirm that this will be the case.

Teh Stand
PR: Are we sure? This is not a good news in regard with DIF production and maintenance of 2 products from a single database.

Teh Stand
TS: This would be a nightmare!

S-XX
April 2021
Edition 0.0.1

IHO-SG Innovation and Technology Laboratory

To ensure the recommendations documented can aid automation and improve conversion it is recommend that the IHO-SG Innovation and Technology Laboratory test this guidance



IHO

S-63 CYBER SECURITY

International
Hydrographic
Organization

Background

S-63 Sub group tasked with developing potential solution to close cyber security vulnerability. Group proposed the digital signing of all exchange set files and creation of a new SIGNATURES.XML file located in the INFO folder. Solution would have no impact on existing ECDIS as they would not read the new file.

Test Data and Questionnaire

To quantify the impact on Data Servers and ECDIS OEMs test data based on the proposed solution was developed. The test data was sent 29th Nov 2020 along with a questionnaire to capture respondents views. Responses to be received at the IHO by 29th Jan 2021



IHO

S-63 QUESTIONNAIRE RESULTS

International
Hydrographic
Organization

Responses

- 16 OEMs
- 10 Data Servers

369 registered IHO security scheme participants, many emails failed to deliver, contacts held at IHO incorrect or out of date. IHO are attempting to establish contacts with companies where emails failed to deliver.

Preliminary Results, Observations

Mixed responses, my initial observation is there seems to be an underlying reluctance to invest in S-63 fix when S-100 transition is so close. Given the time required to develop and approve IHO standards, data servers build signing services and OEMs modify software and rollout ECDIS upgrades. Pressure on resources required for development of DF ECDIS. The nature of IHO standards development and maintenance and the closed architecture of ECDIS make it difficult to respond to the rapidly evolving and continued threat of cyber attack which require repeated software upgrades.



IHO

S-63 RECOMMENDATION

International
Hydrographic
Organization

- ENCWG have proposed to address the issue IHO create an IHO ECDIS cyber security guideline.
- The impact of making any change to S-63 at this stage in its life cycle would cause significant cost and disruption to the shipping industry for an issue which had a very low risk associated.
- S-100 encryption will address this issue and given the problem can be mitigated in the short term by manual processes this would be the most pragmatic solution.



IHO

MASTER SLAVE

International
Hydrographic
Organization

IHO Standards and Specifications download page updated to incorporate the following note;

The IHO standard S-57 contains the outdated terms, Master and Slave. These terms were widely used within computing when the standard was first published. However, the IHO have recognised these terms are no longer acceptable, and all future IHO standards will no longer reference them. For backwards compatibility and to avoid any unintended consequences the IHO will not update the current edition of S-57 to modify any of the language used.



IHO

FUTURE WORK PROGRAMME

International
Hydrographic
Organization

- 1. Work with IHO-SG lab to test and validate S-57 to S-101 encoding guidelines**
- 2. Create IHO ENC Cyber Security Guidelines**
- 3. S-58 edition 7 ENC Validation Checks**



IHO

ACTIONS REQUESTED FROM HSSC

International
Hydrographic
Organization

- 1. Endorse the activities of the ENCWG**
- 2. Approve the submission of the S-57 to S-101 conversion testing to IHO-Singapore Innovation and Technology Laboratory**
- 3. Agree to the creation of IHO ECDIS Cyber Security Guideline to manage risk when using ENC data**