



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

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PRINCIPAL ACTIVITIES AND ACHIEVEMENTS

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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



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IHO S-52 PRESENTATION LIBRARY CLARIFICATIONS

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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



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S-64 ENC TEST DATASETS

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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.



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S-58 EDITION 7 PROGRESS

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- 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.



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S-57 TO S-101 CONVERSION

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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/iho-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.



IHO S-57 TO S-101 CONVERSION

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

WG In Progress - S-57_Removed_Remodelled Items

S-57 Acronym	Value	Not in S-101	Remodelled in S-101	Remodelled To	Comments	Conversion Processor	Requires Data Preparation	Requires Cartographic Input	Requires Dataset Configuration	Comment	Category of Conversion	Existing S-57 test applies	UOC Section	S-101-to-S-57 conversion Notes	id	Issue	
<p>GENERAL NOTES:</p> <p>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 UnderwaterBoulder / 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 surfaced) and 5 (unsurfaced) specifically intended for the Road feature).</p> <p>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 Peritonal Working Group (DIPWG) and it was confirmed that there was no requirement for these combinations to symbolize.</p> <p>3. Where possible, optional encoding/conversion is identified where a removal of an enumerative value results in a S-101 mandatory attribute having no value.</p> <p>4. Instances where names of items (mainly enumeratives) have been removed in S-101 (for instance, to remove "aliases" and acronyms) but the mapping remains the same have not been included in this table.</p> <p>FEATURES:</p> <p>NOTE: [A], [L], and [P] denotes features not included by designated area, line or point geometric primitive only.</p>																	
BRIDGE (P)		X			S-101PT decision: Not required in S-101 water feature also that BRIDGE of type type point is included in an		X				Dropped(Primitive)						
C_ASGR			X	ArchaeologicStructure, Bridge, DeepWaterRoute, FairwaySystem, IslandGroup, MooringPost, RangeSystem, TrafficSeparationScheme, FacilityBuoy	These features are required to be associated with feature associations (refer to S-101 DC)		X				Associations					Github	
C_ASSO			X	Refer to DCOG Section 25.			X				Associations						
DAMCON (P)		X			S-101PT decision: Not required in S-101 water feature also that some existing not display in ECDS. NOTE: Suggest should be converted in S-101 to a Land						Dropped(Primitive)						
DERARE (L)		X									Dropped(Primitive)						
DOCARE			X	DeckArea	NOTE: DeckArea is a Group 1 feature in S-101, therefore underlying Group 1 features must be amended to bound the DeckArea feature to prevent overlapping coverage of Group 1 features when converting from S-57 to S-101.		X		X	Features which are NOT Group 1 features in S-57 but which ARE Group 1 in S-101 can be converted automatically if (1) An appropriate topologically correct Surface Geometry is available for use and (2) if the producer is prepared to accept the definition of a feature to act as the underlying Group 1 feature. For instance, if the producer is content to replace all DOCARE with underlying UnsurveyedArea then the S-57 cell should be prepared with an UNSURV consistent with the DOCARE which can be replaced with DOCARE during the conversion process.	Group 1						Github
GRDRN (P)		X			S-101PT decision: Not required in S-101, noting that GRDRN of type point does not display in ECDS.						Dropped(Primitive)						
ICNARE		X			S-101PT decision: Not required in S-101 - marine indication areas no longer exist, and are prohibited per S-4 - B-448.3).						Dropped(Deleted)						
LIGHTS			X	LightsAidRound	Only where the attributes SECTR1, SECTR2 and ORIENT are not present or where CATUT ≠ 6 or 7. Set individual attribute instances in this table, for additional remodeling of features and attributes for LIGHTS. Only applies to fixed aids on offshore platforms (OFFSP).						Lights						21
LNDRMK	CATLAK = 6		X	LineMark (boolean type attribute)							AttributeTransformation						
M_ACCY			X	QualityOfNonBathymetricData							Meta						22
M_COVR			X	DataCoverage	Where an S-57 ENC contains M_CSCL object(s), the DataCoverage feature in S-101 is a concatenation of M_COVR and M_CSCL. See M_CSCL below for geometry and M_CSCL / CSCL below for population of the mandatory attribute maximumDisplayScale.						Meta						
M_CSCL			X	DataCoverage	NOTE: The geometry of M_CSCL and M_COVR object(s) with attribute CATCOV = 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.						Meta						
M_HDAT		X			S-101PT decision: Not required in S-101 - S-101 ENCs must be spatially related to the WGS84 datum. It is prohibited in S-57 ENC (refer to S-57 Appendix 6.1, clause 3.2).						Dropped(Deleted)						
M_HDPA		X			S-101PT decision: Not required in S-101.						Dropped(Deleted)						
M_NPUB		X			Refer to attribute entries below associated with M_NPUB. NOTE: While the solutions included below will allow information captured in the S-57 object class M_NPUB to be converted to features in S-101 ENCs, this information should be reviewed for possible deletion and inclusion in other S-101 based Product Specifications.		X				Meta						
M_PROD		X			S-101PT decision: Not required in S-101.						Dropped(Deleted)						
PHARE			X	SubmarinePipelineArea	One-to-one mapping of attributes between PHARE and SubmarinePipelineArea, unless described otherwise below.						AttributeTransformation						
PPSQOL (P)		X			S-101PT decision: Not required in S-101, noting that PPSQOL of type point does not display in ECDS. NOTE: Suggest that PPSQOL of type point encoded in areas of bathymetry should convert to an Obstruction feature in S-101, if an land should convert to a Landmark feature.			X			Dropped(Deleted)						
PONTON			X	Pontoon	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.						Group 1						
RECTRC (A)		X			S-101PT decision: Not required in S-101. NOTE: Suggest that RECTRC of type area convert to a RecommendedTrafficLanePart or a TwoWayRoute feature in S-101.			X		See notes. Requires decision by data producer.	Dropped(Deleted)						

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



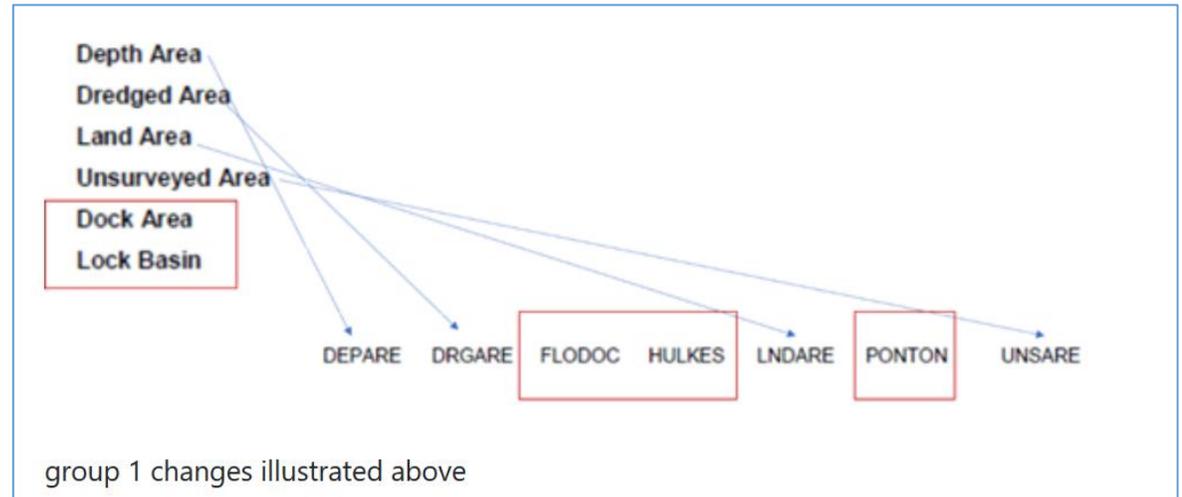
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S-57 TO S-101 CONVERSION

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



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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

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

S-57 to S-101 Conversion Guidance
Edition 0.0.1 – April 2021

2.1.7 Cells
As for S-57, the coordinate multiplication factor for latitude and longitude coordinates in S-101 is 10000000 (10⁷). The value in the Coordinate Multiplication Factor [COMF] subfield of the Data Set Parameter [DSPM] field in S-57 is reflected in the "Coordinate Multiplication Factor for X-coordinate" [CMFX] and "Coordinate Multiplication Factor for Y-coordinate" [CMFY] subfields of the "Dataset Structure Information" [DSSI] field for the S-101 dataset.

2.1.8 Seamless ENC coverage
The rules regarding ENC coverage (overlaps and gaps in data coverage) remain unchanged for S-101.

2.1.8.1 Feature Object Identifiers
New Feature Object Identifiers (FOID) will be assigned to all S-57 objects during conversion to S-101 features. It is expected that the assigning of new FOIDs within a dataset during conversion will follow the same rules as in S-57 (that is, each feature must have a unique FOID however multiple parts of an individual real-world feature within the cell may have the same FOID). However, assigning the same FOID to identify instances of the same real-world feature in different maximum display scale ENC datasets is not possible during automatic conversion. Data Producers that wish to retain this relationship will be required to manually amend these instances.

2.1.8.2 180° Meridian of Longitude
The rule prohibiting datasets from crossing the 180° meridian remain unchanged for S-101.

2.2 Data quality description

2.2.1 Production information
The Producing Authority provided in the "Producing Agency" [AGEN] subfield of the "Data Set Identification" [DSID] field is populated in the mandatory producingAgency field of the Dataset Discovery Metadata for the S-101 dataset.

Comments:
Christian Mouden, SHOM: Agree there is a need for guidance on Scales, Coverages, scheming, but we must agree (probably a 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: PR: Are we sure? This is not a good news in regard with DE production and maintenance of 2 products from a single data base.
Teh Stand: Need to confirm that this will be the case.
Teh Stand: JP: Not sure 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 probably be defined across all features as an attribute which will diminish the use of foId as a unique identifier in the dataset. From a users' perspective I'm not sure whether it makes a difference though?
Teh Stand: PR: This would be a nightmare!



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S-63 CYBER SECURITY

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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



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S-63 QUESTIONNAIRE RESULTS

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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.



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S-63 RECOMMENDATION

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- 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.



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MASTER SLAVE

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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 use 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.



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FUTURE WORK PROGRAMME

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- 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**



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ACTIONS REQUESTED FROM HSSC

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- 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**