**Report of the ENC STANDARDS MAINTENANCE WORKING GROUP**

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| ***Submitted by:*** | Thomas Mellor, Chairman |
| ***Related Documents:*** | S-52, S-57, S-58, S-63, S-64, S-101 |
| ***Related Projects:*** | NA |

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| ***Chair:*** | Thomas Mellor, UK |
| ***Vice-Chair:*** | Richard Fowle, DK |
| ***Secretary:*** | Yong Baek, IHO |
| ***Member States:*** | Argentina, Australia, Belgium, Brazil, Canada, Chile, Denmark, Equator, Egypt, Estonia, Finland, France, Germany, India, Indonesia, Italy, Japan, Korea (Republic of), Netherlands, New Zealand, Norway, Portugal, Russia, Singapore, South Africa, Spain, Sweden, Ukraine, United Kingdom, United States of America |
| ***Expert Contributor Organisations:*** | The International Centre for ENCs (IC-ENC), PRIMAR Stavanger, Carnival, C-map, Teledyne-Caris, ESRI, Furuno, IEHG, IIC Technologies, KRISO, KHRA, Nautical Dimensions, Navico, NAVTOR, Nipon Sogo, PC Marine, SevenCs, Wartsila, 7Cs |

**Meetings Held During Reporting Period**

ENCWG interim VTC meeting 19th February 2021

**Planned Meetings**

ENCWG 6 VTC 15th to 17th June 2021

ENCWG 7/S-101 PT October/November 2022

**Work Program**

**IHO S-52 Presentation Library Clarifications**

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.

Main changes to create edition PL 4.0.3

* New machine-readable DAI-file
* New printed ECDIS chart 1 plots
* Reproduced new ECDIS chart 1 ENC files
* New README.TXT

The Sub WG produced a draft version of IHO S-52 Presentation library 4.0.3 for ENCWG approval December 2020. 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 was published on the IHO website after final approval at the ENCWG VTC 19th Feb

**IHO S-64 ENC Test Datasets Clarifications**

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.

Main changes to create edition 3.0.3

* New screen shots created from ECDIS with corrected DAI-file
* Changes to test datasets to match screenshot presentation within the test instruction manual

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 was published on the IHO website after final approval at the ENCWG VTC 19th Feb.

**IHO S-63 Cyber Security**

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

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

To date there have been responses from 16 OEMs and 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. Many companies join the S-63 security scheme but fail to create commercially available display systems.

* **Preliminary Results, Observations**

There has been a mixed response to the survey but my initial observation as Chair is there seems to be an underlying reluctance to invest in a fix for S-63 when S-100 transition is so close. Given the time required to develop and approve IHO standards, data severs build signing services and OEMs modify software and rollout ECDIS upgrades. There is also the issue of competing pressure on OEM resources which are required for development of DF ECDIS. The nature of IHO standards development and maintenance coupled with 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. Whilst a technological solution to solving this issue would be preferable, we could still potentially reduce the cyber threat through good bridge team policies and procedures.

* **Example responses**

*To apply this revision to ECDIS in the past costs a lot of money with time, so I think it's unrealistic. A shipowner will pay an expense finally, but it's difficult to get understanding. It's because a shipowner doesn't think there is a big merit in this revision.*

*We believe that CATALOG.031 and SERIAL.ENC should not have to be signed. This in order to retain our ability to generate exchange sets on board vessels.*

*We think it's good because it inherits the existing mechanism and file format. Since all files are digitally signed, we believe that it can be satisfied with cyber security issues. It is considered that an additional definition is required for the new edition for what to do if authentication fails in any of the files. For minimizing the impact on ECDIS users, it is not mandatory to respond to existing ships.*

S-63 subgroup will meet in late March 2021 to review responses and attempt to formulate a common position. CIRM ECDIS work group met 18th Feb 2021 to discuss this issue and to establish their common position. They will feed this back to IHO ENCWG with proposed recommendations.

**IHO S-58 edition 7**

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.

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| **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.

It should also be noted that the changes to the ‘Critical’ checks will result in amendments to the S-58 Test Datasets.

**IHO S-57 data conversion to IHO S-101**

Development of S-57 style Use of the Object Catalogue for ENC (UOC) with guidance for HOs on how ENC features can be enhanced to support automated conversion to S-101. Group are focused on edge cases and special considerations. This document is some way off publication, but group are making good progress. The group are yet to decide on where this information should reside, but it is possible it could be added to S-65 ENC production Guidance as another annex.

Edge Cases

• Geometric primitives which have changed/dropped

• Changes to enumerations / meanings

• New/Dropped features

• Relationships/Associations

Special considerations

• Hazards / Alerts features

• Where portrayal may be different

• Where manual intervention may be required

• Adaptation to Producer’s encoding

Future work will be in collaboration with the IHO-Singapore Innovation and Technology Laboratory on testing the document supports the automated conversion of S-57 data to S-101.

**Progress on HSSC Action Items**

Master/Slave, following HSSC 12 the ENCWG Chair proposed a set of wording to accompany the download of S-57 and S-58, this has now been added to the IHO webpages as an accompanying 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.*

**Conclusions and Recommended Actions**

I am very pleased to report that despite the ongoing global crisis caused by the COVID 19 pandemic the ENCWG have maintained a high level of engagement and managed to progress many critical work items.

**Action Required of HSSC**

The HSSC is invited to:

1. endorse the activities of the ENCWG
2. approve the co-ordination with IHO-Singapore Innovation and Technology Laboratory regarding ENC conversion

**Annex A ENCWG WORK PLAN 2020-2021**

**Tasks**

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| --- | --- |
| A | Maintain S-52 “Specifications for Chart Content and Display Aspects of ECDIS” and its associated “Presentation Library” (IHO Task 2.4.1) |
| B | Maintain S-57 “IHO Transfer Standard for Digital Hydrographic Data”, including ENC Product Specification (IHO Task 2.4.2) |
| C | Maintain S-58 “Recommended ENC validation checks” (IHO Task 2.4.3) |
| D | Maintain S-61 “Product Specification for Raster Navigational Charts” (IHO Task 2.4.4) |
| E | Maintain S-64 “IHO Test Data Sets for ECDIS” (IHO Task 2.4.6) |
| F | Maintain S-65 “ENC Production, Maintenance and Distribution Guidance” (IHO Task 2.4.7) |
| G | Assess the impact of other IHO standards on S-52 display specifications (IHO Task 2.4.1) |
| H | Liaise with the NIPWG and the NCWG (IHO Task 2.1) |
| I | Maintain the ENC production and portrayal sections of the IHO website (IHO Task 2.4) |
| J | Conduct the 2020 and 2021 meetings of ENCWG and its sub-group(s) and project team(s) (IHO Task 2.1) |
| K | Maintain S-66 “Facts about electronic charts and carriage requirements – (IHO Task 2.4.8) |
| L | Maintain S-63 “IHO Data Protection Scheme” (IHO Task 2.4.5) |

**Work items**

| **Work item** | **Title** | **Priority** H-high M-medium L-low | **Next milestone** | **Start**  **Date** | **End**  **Date** | **Status** P-planned O-ongoing C-completed S-Superseded | **Contact Person(s)** | **Related Pubs / Standard** | **Remarks** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A.1 | Maintain S-52 - Specifications for Chart Content and Display Aspects of ECDIS | H | Next meeting |  | Permanent | O | Chair/Sec ENCWG | S-57 |  |
| A.2 | Resolve any problems or errors identified in the current editions of S-52 Presentation Library and S-64 ENC Test Datasets | H |  |  | Permanent | O | Chair/Sec ENCWG | S-57, S-64 | Generally OEMs going through type approval with ECDIS will identify areas for clarification or correction |
| A.3 | Investigate ENC display issues in ECDIS | H |  | Mar-17 | Mar-19 | P | Christian Mouden | S-53, S-57 (UoC) | recommend close work item |
| A.4 | With respect to the implementation of S-52 PL4.0; monitor the Paris and Tokyo MoU CIC on Safety of Navigation and take appropriate action where necessary | M | Next meeting |  | 2019 | C | Chair ENCWG |  | recommend close work item |
| A.5 | Monitor and assist the ECDIS S-mode work which will be an agenda item at NCSR5 |  |  |  | 2019 | C | Chair ENCWG |  | recommend close work item |
| B.1 | Maintain S-57 “IHO Transfer Standard for Digital Hydrographic Data, including ENC Product  Specification” | H |  |  | Permanent | O | Chair/Sec ENCWG | S-52, S-58 |  |
| B.2 | Resolve any problems or errors identified in the current edition of S-57 | H |  |  | Permanent | O | Chair ENCWG | S-57 |  |
| B.3 | Produce T&P paper for PSC See K.2 | M | 2017 | 2018 |  | C | Chair ENCWG |  | Complete – Recommend remove item |
| B.4 | Maintain the ENC portrayal sections of the IHO website. | M |  |  | Permanent | O | Chair/Sec ENCWG |  |  |
| B.5 | S-57 to S-101 Conversion. Improving encoding rules with additional attribution to support automated conversion tools | H |  | Oct 2020 |  | O | Christian Mouden  Jonathan Pritchard | S-57 UOC | New work item added, approved by HSSC 12 |
| C.1 | Resolve any problems or errors identified in the current edition of S-58 | H |  |  | Permanent | O | Richard Fowle |  |  |
| C.2 | Monitor the implementation of the new edition of S-58 and keep the recommended checks up to date | H |  | Oct-2020 |  | O | Richard Fowle | S-57 | New work item, HSSC 12 approved NE of S-58 |
| ~~C.3~~ | ~~1. Restructure S-58 to provide a more logical means of data validation.~~  ~~2. Investigate how the new version of S-58 can be used to implement a minimum validation standard for all ENCs.~~ | ~~H~~ |  | ~~2012~~ | ~~2017~~ | ~~C~~ | ~~Richard Fowle~~ |  | ~~Task Completed~~ |
| E.1 | Resolve any problems or errors identified in the current edition of S-64 | H |  |  | Permanent | O | Chair/Sec ENCWG |  |  |
| F.1 | Monitor and assess proposals for amending S-65 | L |  |  | Permanent | O | Chair/Sec ENCWG |  |  |
| G.1 | Liaise with IEC TC80 to ensure that future editions of IEC 61174 are compatible with standards maintained by ENCWG | M |  |  | Permanent | O | Chair/Sec ENCWG | S-52, IEC 61174 |  |
| H.1 | Liaise with the NIPWG and the NCWG | H |  |  | Permanent | O |  |  |  |
| I.1 | Maintain the ENC production and portrayal sections of the IHO website, and support FAQ and Encoding Bulletins | H |  |  | Permanent | O | Chair / IHO Sec |  |  |
| K.1 | Maintain S-66 Publication |  |  |  | Permanent | O | Chair / IHO Sec |  |  |
| K.2 | Prepare a single educative IHO authoritative document addressing the issue of “equivalent” T&P NMs for ENCs, in view of its distribution to HOs, Port State Control authorities and mariners after approval. (See B.3) | M |  |  |  | C | Chair and NCWG Chair |  | recommend close work item completed @ ENCWG 4 |
| M.1 | Maintain and monitor the existing S-63 Data Protection Scheme | M |  | 2016 | Permanent | O | Chair, RENCs, Industry and IHO Sec. | S-63 |  |
| M.2 | Assessment of S-63 impact study and potential production of a new edition of S-63. | H |  | 2019 | 2021 | O | Chair, RENCs, Industry and IHO Sec. | S-63 |  |

**Meetings** (Task J)

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| **Date** | **Location** | **Activity** |
| 14 – 18 March 2016 | Tokyo, Japan | ENCWG-1 |
| 20-22 March 2017 | Genoa, Italy | ENCWG-2 |
| 16-18 April 2018 | Wollongong, Australia | ENCWG-3 |
| 10-12 June 2019 | Monaco | ENCWG-4 |
| 15 - 16 July 2020 | VTC | ENCWG-5 |

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