Paper for Consideration by S-100WG

S-164 / S-98 Summary

Submitted by:	S-164 / S-98 Sub Working Group
Executive Summary:	An update on progress developing S-164 and S-98 Annex C
Related Documents:	S-100
Related Projects:	S-100, S-101, S-128

Introduction / Background

This paper summarises the progress to date, and current significant issues outstanding with, both S-164 and S-98. The S-164 / S-98 sub working group has met every month (except April/May) since January 2023 and has a good attendance and inputs from many participants. The initial efforts have focused on capturing issues (often originating from other working groups) requiring substantial discussion and/or outputs, and the preparation of an initial set of exchange sets with test datasets.

There is an alignment between the (GitHub based) S-164 / S-98 and S-101 Test datasets and portrayal working groups which is now working well, with the capacity to deliver improvements to test datasets as revisions are made to product specifications and associated catalogues. Additionally, a number of changes have been proposed from NIPWG and more are anticipated from TWCWG in the near future..

The approach has been taken to produce exchange sets with intermediate versions of product specifications where possible, and then to continually revise them as required changes are made, in line with S-164/S-98 and product specification revisions. A list of changes and enhancements required to datasets is now in progress to be implemented for S-164's completion.

Analysis/Discussion

The path to completion for S-98 Annex C and S-164 will follow the timelines of other product specifications comprising Phase 1. The S-101 product specification will be approved, and then test datasets revised to edition 2.0.0 before they can be incorporated into S-164. It is planned to produce editions of S-164 and S-98 Annex C, together with exchange sets for submission to HSSC (version number to be defined) and these are likely to implement v1.2 of the S-101 product specification, and will be submitted alongside plans for their update to the live version once published.

It is likely that S-164 will require a number of changes and enhancements once an initial ("live") version is published. The biggest impact on it is not the revision of its component product specifications but the uncertainty generated by the sparsity of live implementations of S-100 by testbeds and OEMs. The S-164 subgroup is well supported by a small number of testbeds and OEMs (who provide invaluable feedback) and the vast majority of useful, relevant and focused information comes from them.

As more OEMs implement S-100 more feedback and changes should be expected and these will require both discussion, dialogue and resolution (often with changes) in the S-164/S-98 forum. It should be expected that the S-164/S-98 subgroup will have a lifespan far exceeding the existing HSSC deadline.

Revisions to S-98 Annex C

One important aspects of the S-98 revision is the exact process and requirement for "approval" or endorsement by S-100WG of its changes. S-98 Annex C is significant because it provides "guidance" on how implementers should implement IMO required functionality (i.e. how IHO implements within its standards certain mandatory IMO

functionality). So, many of its provisions are normative because the underlying requirement itself is mandatory. However, S-98 Annex C also contains much text which is informative in nature, describing how the different S-100 elements meet mandatory requirements. The approval process for S-98 Annex C needs to take into account both these aspects. The sub working group therefore presents, for transparency, as complete a picture as possible of its activities and will also seek explicit S-100 WG approval for changes to S-98 Annex C when:

1. They represent a change in scope of the document
2. Changes will modify how IMO requirements should be met by an implementer
3. Changes have an impact on product specifications and data encoding

The S-164/S-98 sub working group should also be able to re-draft Annex C without seeking approval for corrections or clarifications. Furthermore, changes which are required because of updates to product specifications should not need explicit S-100WG approval.

It is also worth noting that a number of issues are being progressed within other subWG's, particularly S-101 PT, S-101 Portrayal subWG and TWCWG. These will have an impact on S-164 and S-98 but no drafts can be written until formal endorsement of proposals within those subgroups have been accepted, in these cases S-100WG will not approve such proposals.

With this clarification in mind on how S-98 Annex C is managed, the following issues are presented to S-100WG for discussion and/or endorsement to enable the new revision of S-98 to be prepared. It is intended that this revision will be reviewed by the group early in 2024 and will form the basis for the formal submission to HSSC in 2024.

Summary of progress

S-164

1. S-164 has adopted a (purely) exchange set model, as specified in the initial draft.
2. An automated process for creation of exchange sets has made re-issuing of exchange sets easy. Additionally, the S-101-Test-Datasets repository can now be directly accessed, so when new datasets are issued they can be incorporated easily.
3. A set of keys, certificates and signatures is now created to produce the Part 17 and Part 15 elements required. This has been used to generate the current set of exchange sets.
4. The focus is now on data content within the S-164 test datasets, and a list of requirements is in progress, covering all the Phase 1 products in scope. Although most of the datasets are produced, a significant number will need revisions to fully exercise the required aspects of the portrayal model, and revisions will then need further work as significant issues such as data loading and version mapping are agreed.
5. It is not clear how the upgrade from 1.2 to 2.0 of S-101 will be handled, if edits have to be reworked this could potentially be a significant effort (hence the timelines presented earlier in this section).
6. A timeline has been drafted covering S-164 development from November to HSSC, which takes into account S-101 development and each of the groups of exchange sets required in the final version.
7. An updated version of S-164 will be produced, which incorporates all up to date changes, complete with TDS manual, ready for subWG review and approval prior to submission to HSSC. The draft will be circulated to subWG during the Feb 2024 S-101PT meeting. They will also be available for review/acceptance by S-100WG TSM (March 2024), then sent to HSSC for endorsement.

S-98

1. A number of issues have been raised against S-98 Annex C, in fact the vast majority of issues concern S-98 Annex C, not the main body of S-98.
2. Many of these are being progressed in other subWG, mostly S-101PT.

3. S-98 will mostly document the end result of accepted proposals which specify how mandatory IMO requirements are to be implemented on the ECDIS. Bearing in mind the previous section on revisions to S-98 Annex C, most of the updates to S-98 Annex C are unlikely to require explicit approval from S-100WG but, in the interests of transparency many of those have been documented in the progress report presented at the S-100WG meeting.
4. Many of the papers submitted to S-100WG will also have an impact on S-98 Annex C (and S-164)
5. In addition, two proposals are presented for explicit S-100WG approval. These concern:
   a. A change in scope to include a separate appendix to Annex C defining "validation" (or "compatibility", language to be agreed upon) tests between different product specifications. This is discussed and proposed in a separate S-100WG paper.
   b. A change in scope to include the portrayal specifications for Manual Updating and Editing. This has been agreed by the S-164/S-98 subWG but would require resources to prepare and, due to the novel nature of the solution is presented for approval by S-100WG. This is described in more detail in Annex A to this paper.
6. Incorporation of agreed changes to S-98 Annex C are in progress. As more changes are agreed, they will also be incorporated. An initial draft will be presented to the working group by the end of 2023 for review and wider distribution at S-101PT and S-100TSM.

A number of other items where a significant amount of dialogue and development are required, and where there is a sizeable impact on implementers are listed below:

Data Quality Portrayal and alerts & indications:

This is a big issue because it is both an IMO requirement (albeit a new one) and one which can not easily be satisfied purely within the capabilities of the S-100 portrayal model. IMO requires that user can select to include accuracy for all features which are part of the IMO required alerts and indications. IMO has left all details how to do this for IHO to define. A number of possibilities exist for implementing the requirements and will entail either :

1. Extending the S-100 portrayal model
2. Extra encoding
3. Bespoke OEM implementation

"Loading Strategy"[1]
This is currently being progressed by S-101PT. A number of issues and options exist within this subject, and once resolved will require some documentation in S-98 Annex C and representative test datasets within S-164 . There is also a possibility of relocating the entire section from the S-101 product specification to S-98 Annex C for the benefit of implementers.

The final aspect is how the agreed algorithm is implemented in terms of dual fuel portrayal. A lack of dual fuel implementations hampers the testing of this aspect of the S-100 ECDIS and is likely to form an ongoing requirement for S-164 to provide implementers with representative test datasets.

Version Mapping of datasets to feature, portrayal and interoperability catalogues.
This is still a recurring issue, with ambiguities and no clearly documented methodology for establishing the compatibility (or lack thereof) between datasets and feature, portrayal and interoperability catalogues.

Other Issues.
A number of other minor issues worthy of note are listed below. These all have attendant GitHub issues but have associated dependencies in other groups or issues and are thus difficult to close currently:

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[1] It is acknowledged there is considerable debate over use of the term "loading", This refers to the selection of features for drawing.

1. A definitive list of fata formats to be supported by S-100 ECDIS
2. Complex portrayal of pick reports (dependent on input papers from NIPWG)
3. S-128 development and baselining (noting the recent publication of edition 1.1 for testing.
4. S-102, S-104 test datasets (in progress)
5. Multiple Language representation (noting developments at last S-101PT).
6. UpdateInformation (testing in progress)
7. Chart 1 development and technical solution.

Conclusions

S-164 and S-98 Annex C reflect the conclusions of a large number of working groups, project teams and discussions between them. In order to incorporate updates and operational versions of these standards in datasets and exchange sets a complex set of dependencies has emerged. These are in progress and the significant ones have been raised in this summary of progress.

Recommendations

It is recommended that S-100WG approve continuation of effort in the development of S-164 and S-98 Annex C and the path to completion of new drafts and test datasets/exchange sets for HSSC. It is also recommended that S-100WG acknowledges the likely long-term requirement for the sub working group's existence for ongoing maintenance of S-164 / S-98 Annex C to support S-100 ECDIS implementation. Longer term strategies should be considered early to make best use of resources.

Action Required of S-100WG

S-100WG is asked to:

1. Consider the background and content raised in this paper and contribute to any resolution of the highlighted issues where appropriate.
2. Approve the extension of S-98 Annex C to include portrayal specifications for Manual Editing/Updating
3. Endorse the plan for publication of revised versions of S-164 and S-98 Annex C for HSSC Approval in 2024

Annex A Manual Updating and Editing.

An initial paper was presented by Chartworld to the S-164 / S-98 sub working group:

https://iho.int/uploads/user/Services%20and%20Standards/S-100WG/S-164SG/S164SG5-06_2023_EN_ManualUpdates%20S98_JUN2023_AV27062023.pdf

This describes a number of significant issues with the implementation of Manual Editing/Updating in the context of S-100 on the ECDIS. The decision was taken within the working group (after a number of breakout meetings on the topic) to implement Manual Updating/Editing differently to S-52. The proposed solution is to use a pre-defined portrayal for manual updates/editing and to describe them using the accepted S-100 portrayal language, e.g. symbols, linestyles, portrayal and feature catalogues. A set of symbols have been proposed alongside a simple feature model to drive them, with a small example shown in the table below:

Depth (Point)

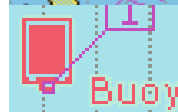**Underwater (Point)**

Wreck (Point)
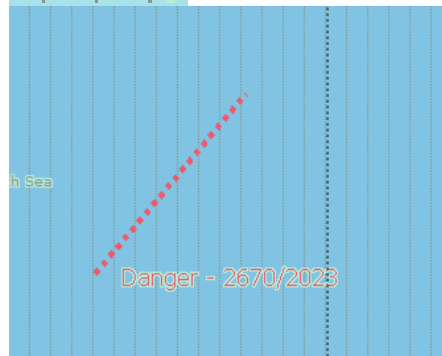
Obstruction (Point)
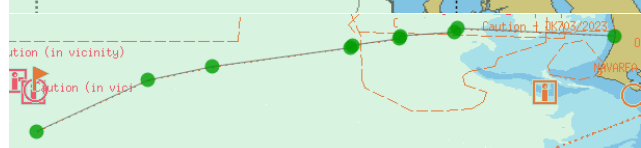
Beacon (Point)

Buoy (Point)

Danger (Curve)

Cable (Curve)

Other (Curve)

Inclusion of these elements is proposed in S-98 Annex C, as Appendix C-5 and with the associated feature/portrayal catalogue being made available for OEMs.