7th S-100 Working Group Test Strategy Meeting
IHO Secretariat, Monaco (September 23-26)
Draft Report

Chair: Julia Powell (USA - NOAA)
Vice Chair: Yong BAEK (Rep of Korea – KHOA)
Secretary: Anthony Pharaoh (IHO Secretariat)

Participant acronyms

NL	Nick LEMON	HA	Hugh ASTLE
EM	Eivind MONG	DG	David GRANT
MH	Mikko HOVI	RM	Raphael MALYANKAR
YKE	Yann KERAMOAL	EW	Edward Weaver
DZ	Daniel ZÜHR	HB	Holger BOTHIEN
RB	Rogier BROEKMAN	TdP	Tom DE PUYT
YB	Yong BAEK	EK	Edward KUWALEK
SL	Seojeong LEE	SS	Svein SKJAEVELAND
AA	Al ARMSTRONG	DK	Dongwoo KANG
JP	Julia POWELL	TR	Tom RICHARDSON
GS	Greg SEROKA	can	Alberto COSTA NEVES
DB	David BRAZIER	AK	Abri KAMPFER
HP	Hannu PEIPONEN	JW	Jeff WOOTTON
		AP	Anthony PHARAOH

1. Opening and Administrative Arrangements

The Chair opened the meeting and reported that although a number of S-100 proposals had been received, the primary focus of this meeting will be to conduct an in-depth review of S-98.

2. Approval of Joint Agenda

The meeting approved the agenda.

3. Matters Arising

Actions from TSM 6 Meeting

Action 1 (4.1) Submit a paper to the 4th S-100WG meeting outlining the issues relating to dataset compression. RS, DG. Completed.

Action 2 (4.2) Submit the MRN paper and proposals to the IALA e-nav and NIPWG meetings for their consideration and comments. Feedback to be sent to EM. EM. Completed.

Action 3 (4.4) Revise the model for alerts taking into account the TSM6 discussion (i.e. constrain the model to dataset alerts and use the portrayal model for triggering alerts). (DG/HP) Complete.

Action 4 (4.4) Set up a review group to consider what other "alert and indicator" type use cases are required for other product specifications. There is a need to determine what additional

requirements are needed (e.g. what spatial operators should to be taken into account). DG, BS, HA, HP. Overtaken by events.

Action 5 (4.5) Address the items raised in the paper 4.5 (Binding Specific Concepts) at the Registry workshop to take place in conjunction with the S-100WG4 meeting. (JW). Closed being done as part of the registry review.

Action 6 (4.7) Provide a demonstration of the new Registry application at the Registry workshop (preceding the S-100WG4 meeting). (YB) Complete.

Action 7 (4.1) Include information on the S-100 site about the approval process for Edition 1.0.0 Product Specifications. (TP) Complete.

Action 8 (5.2) Circulate the S-98 draft document for S-100WG comment after the DQWG feedback has been incorporated. Consider moving the PS template in S-100 Part 11 into the S-98 document. (Chair) Complete

Action 9 (6.3) Form a correspondence group (led by SPAWAR) to resolve the (text display) issues in recommendation 4 [DG, EK, HA, HB, HP, EM] OBE TSM7-5.4.

Action 10 (6.3) Implement the changes presented in paper S-100WG2-8.9 items 6-7 in S-101. Chair to remind the S-101PT of the issue presented in the paper. (Chair) Ongoing – Chair to follow up.

Action 11 (6.3) Submit change proposal form for recommendations 5 to 11 for consideration by the S-101PT. (SPAWAR). Complete.

Action 12 (6.3) Submit a change proposal for the issues identified in recommendation 13 relating to the need for a new interpolation method. SPAWAR Ongoing TSM7-5.3b Complete

Action 13 (6.3) Submit a change proposal form for recommendations 14 and 15. SPAWAR Completed (See papers 14: TSM7-5.3b 15: S-100WG4-4.8)

Action 14 (6.3) Revisit the test bed report for consideration by the S-101PT i.e. for the issue relating to recommendation 16. SPAWAR Completed

Action 15 (6.3) Form a correspondence group to study the issues identified in recommendation 17, and submit proposal for consideration at the next S-100WG meeting. [EK,EM,HB, HA,HP DG …] Complete

Action 16 (6.3) Write a paper outlining the issues in recommendation 18 and proposing a way forward (EM). Complete

Action 17 Submit a proposal to the S-101PT highlighting the issues identified in recommendation 20 relating to turning on / off viewing groups. Ongoing

Action 18 (6.3) Submit an information paper to NCWG reminding the WG of the requirements to complete the task relating to the S-101 symbols (see recommendation 21). (Chair) Ongoing

Action 19 (6.3) Write an information paper with recommendations on how to move the items described in recommendation 22 forward. (NOAA) Ongoing – paper needs to be revised.

Action 20 (6.3) Sort out a central location were all catalogue files will be location for download. (Chair, IHO Sec) Completed – Now located on the registry

Action 21 (7.9) S-124PT to request HSSC to agree on the split in scopes of the current S-412 PS into additional PS's and request additional S numbers for the two additional PS's. (JoeP) Complete

4. S-98 Interoperability

4.1 Front of Bridge/Back of Bridge

RM introduced the paper. Chair proposed a decision is need on which data products should be considered for inclusion of "front-of bridge" / "back of bridge" classification. She also invited comment on the definitions of terms like FoB, BoB. Need to solicited wider stakeholder input on the list of products considered FoB (as per steps in the paper).

Following a discussion, the meeting agreed that the terms "Front of Bridge" and "Back of Bridge" were not the appropriate terms. NL confirmed that these are not standard terms used within IMO. HP reminded that the BoB ECDIS is intended to be a backup – if the primary systems breaks down, the backup system becomes the FoB system. He also noted that some PS will be simple overlays that will not need complex S-98 portrayal rules. Chair proposed that the meeting should focus on the products that need to "interleave" with each other, for example S-102 data replacing the bathymetry in an S-101 product. The rest could be treated as simple overlays. Issues of portrayal clashes should be dealt by S-97 or S-100 and not S-98.

EM noted that S-124 Ed 1.0.0 is expected to be completed by the end of 2020 – will have an impact for S-98 and the FoB/BoB ongoing discussion. It was agreed that there should be a mature document to submit to S-100WG5 meeting – with output going to HSSC12.

It was agreed that the list in the recommendations in the paper should be used for testing as a starting point. S-101, S-102 and S-104 should be the primary PS's for initial interoperability. EK proposed that some of the problems can be dealt with by predefining display plane allocations for different PSs. HB - how to determine this for PS's that have not yet been developed – he suggested that this should be handled by the interoperability catalogue. There was general agreement that the interop catalogue proposal should be perused. The meeting agreed to wait until Edition 1.0 of S-98 to be published and there is sufficient test data.

4.2 Architectural vision of S-100 products in S-98 [Keramoal]

YK proposed that although S-98 describes technical concepts of interoperability, there is a need further improvement. There is a need to get feedback from test beds, on how S-100 products are to be used in S-100 ECDIS for route planning and monitoring. Further work is needed to develop an S-100 implementation strategy and examine use cases of S-100 products.

He recommended that a dedicated sub-working group be established to produce a functional analysis of related S-100 products (from the mariner perspective) and to define the operating principles governing S-100 ECDIS. The group should also attempt to monitor whether S-100 products and S-98 are consistent with the overall vision of the implementation strategy of S-100.

EM – noted that the concept of having a global interoperability catalogue was not implementable. He proposed that there would likely only be a need to have a regional approach.

Action: establish a sub-working group to produce a functional analysis of related products (from the mariner perspective) in order to define the operating principles governing S-100 ECDIS and to ensure that S-100 products and S-98 are consistent with the overall vision of the implementation strategy for S-100.

4.3 Architectural Display of S-100 related products. [NIPWG]

RM proposed that, consideration should be given to harmonising the architectural infrastructure descriptions, of 100 based products specifications (under IHO remit). This should be done as soon as possible. He presented the outcomes of a pilot project conducted in 2018 and noted that additional work is needed.

Action: recommend that S-124 is a simple overlay. S-129 overlay principle overlay.

4.4 S100 Portrayal Harmonization Project

YB reported on an ENC colours and symbols study conducted by KHOA. The main aim of the study is to develop guidelines for harmonizing the portrayal of S-101 ENC data in order to improve safety-of-navigation. He proposed that only levels 1, 2 and 3 be considered at this stage. The options for re-scoping of S-98 were agreed.

4.5 Portrayal Harmonization in S-98 [Powell]

EM proposed that in order to harmonize the presentation of S-100 data products within ECDIS, a framework of conventions must be provided for the developers of Product Specification. He noted that a lesson from the sea trials is that only 2-3 layers will ever be turned on at a time. This needs to be considered by prod spec developers developing data for used in ECDIS. Proposed three main options for pick reports; leave the harmonization to OEMs; provide some guidance or define machine readable pick report configurations.

The meeting noted the paper and agreed that it should be circulated for wider review and submitted as an S-100WG5 input paper. It provides a starting point for ECDIS portrayal harmonization.

4.6 (Agenda item withdrawn)

No paper submitted

4.7 De-Scoping and Reorganizing S-98 – a proposal [Powell]

RM noted that concerns have been raised about S-98 - proposed that it should be “de-scoped” and refocused to concentrate on the initial intention of interoperability in ECDIS.

Concern was raised that putting parts of S-98 in S-100 will open the door for other products to also be included. This may have an impact on ECDIS type approval. EK proposed that it would be better to have a very generic, abstract description in S-100 on “harmonization of ECDIS portrayal” It could include a references S-98 as the solution that has been developed for ECDIS; and the catalogue.

The meeting decided to adopt option 1 (i.e. S-98 to be a multi-part document). The use cases will be an Annex to S-98, as will any ECDIS specific features.

Action: Prepare a revised part for S-100 to include the functional overview and use cases for S-98 for preparation of Edition 1. (Chair)

4.8 Interoperability functional principles [Keramoal]

YK reminded the meeting that HSSC11 had tasked the TSM to work on the back-of-bridge/front-of-bridge concepts, and provide inputs for the S-100 Implementation Strategy. He noted multiple use cases that must be undertaken as part of the navigational process. There include gathering information and planning for the voyage as well as voyage monitoring to ensure that the vessel

course is in accordance with its voyage plan. Noted – amendments to the passage plane may be required for extraneous factors – weather etc …

He proposed that the PS's used in an S-101 ECDIS could be broken into 2 categories - those showing static geo-information and those containing more dynamic information. He noted that priority should be given to determining how those S-100 products that will be used predominantly in the FoB should interact together in an ECDIS.

AK suggested that although FoB and BoB were IMO terms, they were not appropriate for the integration and use of S-100 products in ECDIS.

YK noted that S-129 is an important PS for vessel monitoring, and proposed that the TSM focus on its use in ECDIS with together S-101. He also proposed that the TSM needs to investigate the legal liability issues regarding S-102, S-129, especially in relation to S-101 and possibly other PS's, noting that all FoB S-100 products should interoperate consistently within an ECDIS. This also pertains to the consistent portrayal of these within ECDIS. He noted that a primary goal should be to simplify the tasks on the ships bridge.

4.9 Interoperability - S-100 products and ECDIS- White paper (reference only) [Powell]

The Chair reported on the draft Interoperability Catalogue – Functional Principals document which

RM noted that if the document becomes a formal IHO publication, it might be included as Annex A to S-98. The document provides a framework for the specification of rules governing the interaction of data products in a machine-readable format. RM proposed that "Terms and Abbreviations" and "References" sections need to be added.

The meeting noted the draft document.

5. S-100 Technical Proposals for preliminary consideration [Powell]

5.1 S-101 Display Scale – NOAA [Powell]

Chair noted that NOAA is in the process of re-scheming their ENC suite based on binary scales. Noted in S-101 each coverage feature is assigned maximum and minimum scale values from the list defined in the product specification. After a long discussion it was agreed that more comprehensive proposals should be developed and submitted to the S-100WG5 meeting for discussion.

Action: Submit comprehensive proposal on the structure and use of binary display scales for consideration at the S-100WG5 meeting. [USA]

5.2 Alerts and Indications [Grant]

DG reported on the current status of the development machine readable alerts and indicators catalogue which will be an extension to the portrayal model. He noted that S-100 portrayal currently does make provision for displaying a derived line (such as safety depth contour on an S-102 coverage feature) and will need to be addressed at some stage. Changes to the Alerts Catalogue will require changes in the Portrayal Catalogue. Although this may be a drawback, it outweighs the advantages of harmonizing portrayal and alerts conditional procedures.

Noted that the following actions remain to complete development of an S-100 alerts model, update the required infrastructure, and provide an initial S-101 alert capability. Full proposal to be submitted to the S-100WG5 meeting. It needs to consider how to portray a safety depth contour from a navigational (S-102) coverage. Will a change be required in S-100?

Action: Complete the alerts model and documentation for presentation, discussion and acceptance at S-100WG5

Action: Part 9 needs to be extended to derive a line from a coverage

Action: someone need to make the mapping between the alert and the feature type.

Action: investigate what needs to be added to the portrayal catalogue builder to cater for building the alerts and indicator catalogue (a user story). [NIWC]

5.3 Various S-100 Change Requests [Grant]

The Chair noted that due to a shortage of time, not all change proposals could be considered. Those that were not considered should be submitted to the next full S-100WG meeting.

5.4 Capability Gaps in the S100 Portrayal Model [Grant]

Paper looks at the S-52 model and what is missing for S-101 (what are the gaps). Recommend that S-100 be modifies to support dependent symbol visibility S-52 date dependency, dynamic portrayal (including time series),

Action: submit a proposal on how to close the capability gaps in the S-100 portrayal model (for discussion/acceptance at the S-100WG5 meeting) and for inclusion in S-100 Edition. [NIWC, HB, HP]

Action: Determine next actions for addressing dynamic portrayal. And provide feedback on the recommended changes

5.5 Data Quality [Broekman]

RB reported on the application of vertical uncertainty of depth data. Noted that if uncertainties are available in S-102, they will be applied. If an area is a maintained or dredged depth, can uncertainty be takes as 0 m? (100% guarantee of maintenance).

RB questioned whether it should be allow that a fixed value can be entered by a Hydrographic Office for historic full coverage data, where the uncertainty is no longer available, but there is no 100% guarantee that the reported depths are the shallowest?

5.6 Inconsistencies relating to HDF5 implementation [Bothein]

HB noted that the paper had been developed as a result of their trying to implement S-102 and HDF in particular – problems that they have encountered. He recommended to;
- Correct and/or clarify S-100 Part 10c to remove inconsistencies and limitations. Agreed by the meeting.

- Correct S-102 in order to bring it to full compliance with the main standard. Agreed by the meeting.

The meeting noted the paper endorsed the proposal to invite expert review of initial editions of standards / editions before they are published and test beds are carried out.

Meeting agreed that a small task group should be formed to investigate how to portray a safety depth contour from a navigational (S-102) coverage. Should identify what changes are required in S-

100. US to incorporate corrections required for S-102 in their response to IHO CL35 so that they can be included in S-102. See associated actions.

Action establish a small expert group to propose the necessary changes based on testing results presented in the paper.

Action: Input a comment sheet that includes the S-102 comment and propose the agreed changes as part of their input (closing date 3 October).

Proposed a way to improve standards – to introduce an expert review process.

5.7 Machine Readability of Display Plane Ordering [Grant]

DG reported that the stacking order of display planes cannot be determined algorithmically relative to RADAR relative to other displayPlanes. He recommend using this attribute within the portrayal catalogue to specify the stacking order. This change resolves the issues presented and supports full machine readability for display planes provided within a portrayal catalogue. EK noted that there are two possible options – this is one of them. The meeting noted the report and agreed that NIWC should develop a full proposal for S-100WG 5 meeting.

Action: Prepare change forms to implement Machine Readability of Display Plane Ordering and present to the next S-100 Working Group meeting. NIWC - one proposal for S-100 and one for S-98.

5.8 Validation of Portrayal Inputs [Grant]

DG reported that e primary mechanism in the portrayal model for modifying the portrayal output is via changes to context parameters.

Recommended Changes to the Portrayal Register Model – although no changes are recommended at present, S100_PR_ContextParameter could be extended in the future to indicate the types of constraints that are allowed, or to constrain the constraints that can be provided.

Action: prepare change proposal to implement the "S100_PR_ContextParameter" proposal for consideration at the S-100WG5 meeting [NIWC]

5.9 Issues with the Part 9-7 Data Input Schema [Grant]

DG reported on data input schema issues part 9-7 and noted that products that use xslt must extend 9.7 data input schema. He noted that this was currently not being done. The meeting agreed the proposal a team will be formed to undertake recommendations 1 and 4 – to be presented to S-100WG5. Recommendations 2 and 3 – NIWC was invited to submit change proposals for next S-100WG meeting. (See associated action).

Action – investing implementing the recommendations 1 to 4 in NIWC paper. for Recom 2 and 3 - submit change proposal for next meeting. Rec 1 – 4 may be proposed at a later time frame as separate papers. TSM7-5.9 [T-Caris Seven seas, KHOA, NIWC].

5.10 Miscellaneous Revisions [Grant]

The Chair noted that due to a shortage of time, not all change proposals could be considered. Those that were not considered should be submitted to the next full S-100WG meeting.

5.11 Proposed Corrections S-100 Metadata [Brazier]

DB reported that S-100 includes metadata descriptions in the document parts. There multiple instances of attributes being incorrectly located within the S-100 metadata schema that needs to be corrected. The meeting agreed that S100_ExchangeCatalogue attributes 'replacedData' and 'dataReplacement' should be relocated under S100_DatasetDiscoveryMetadata.

Action: Submit a formal change proposal for relocating metadata to their correct location as described in paper 5.11. [DB and Chair]

5.12 Exchange catalogue multiple products structure [Skjaeveland]

SS proposed that a mechanism for including multiple product types in one exchange catalogue is required. Proposed that the name of the file should be "CATALOG.XML", and it should carry all necessary information for all S-1xx product types within the catalogue. Furthermore, a directory structure identifying how dataset files, support files and catalogues should be organized should be defined.

The meeting accepted the proposed changes. HB stated that the schema should be published in a public place.

Action: submit a change proposal for the changes to the exchange catalogue presented in paper 5.12 [PRIMAR]

5.13 S-1xx and cancellation strategies [Skjaeveland]

SS reported that current product specifications have different approaches to dataset cancel strategy and Primar have proposed a process of cancelling datasets so that they can be withdrawing from use. He noted that S-100 may need to provide more specific information on cancel data mechanisms and broader study was necessary.

The meeting agreed that S-100 needs to be expanded to include general guidance for dataset cancellation. US to include a comment for datasets cancellation for S-102.

Action: develop general guidance on managing dataset cancellation and dataset withdrawal for inclusion in S-100.

5.14A Proposal - Scope Comprising parts [Skjaeveland]

Change proposal was accepted – for inclusion in Edition 5.0.0

5.14B Proposal - Scope Remove Annex 1 [Skjaeveland]

Change proposal was accepted – for inclusion in Edition 5.0.0

5.14C Proposal - Appendix 2a-A [Skjaeveland]

Change proposals accepted in principle.

5.14D Proposal - Appendix 4a-D – Catalogue Identifier [Skjaeveland]

Change proposals accepted in principle.

5.14E Proposal - Appendix 4a-D - Appendix 4a-D filePath [Skjaeveland]

Change proposals accepted in principle.

Change proposals accepted in principle.

5.14F Proposal - Appendix 4a-D S100 Protection Scheme [Skjaeveland]

Change proposals accepted in principle.

5.15 S-100 Part 15 Enhancements [Sandvic]

RS reported that Primar have identified a range of issues where a clarification and possibly test data can be improve the readability and understanding of the S-100 data protection scheme. The meeting agreed the recommendations presented in the paper and to keep the digital signatures separate. IHO Sec (JW) to provide RS with a clean Word copy of S-100 Part 15. Primar to prepare a full proposals for S-100WG5 consideration. (See associated action). NL noted that this will be of interest to the cyber security work being undertaken within IMO.

Action: Submit issues identified in paper TSM 5.15 (dealing with enhancements to S-100 Part 15) as a proposal for consideration at the next S-100WG meeting [Primar, IC-ENC, IIC-(JP)]

Draft a proposal for the recommendations

5.16 Signature and Certificate [Skjaeveland]

SS reported on the exchange and encoding of Data Server Certificates and dataset digital signatures. He requested that the meeting discuss the issues presented, and decide whether they should be forwarded to S100WG5 for further consideration / approval. The meeting agreed with the items presented in the documents and invited Primar to provide a formal proposal to S-100WG5.

Action: Submit a proposal to S-100WG5 highlighting the issues on Signature and Certificate (see paper 5.16) for consideration by S-100WG5.

5.17 Potential Changes to S-100 HDF5 for S-104 [Greg Seroka]

GS reported on gaps that they had found with their implementation of HDF5 format. He proposed recommended changes that will allow for HDF5 files to include all the required information for water level time series data (in an efficient and easily readable format). This will also benefit other S-XXX products that use HDF5 time series data (e.g. S-111). The meeting noted the report and invited the WG to submit a change proposal to the next S-100WG for consideration. No changes for points 1 and 2. Point 3 – change to Part 8 required, and point4 will need to be coordinated with S-102 PT.

Action: submit a change proposal proposing amendments to HDF5 encoding as described in paper S-100TSM 5.17 (inclusion in S-100 Ed 5) [TCWLWG]

5.19 Gap analysis for S-100 Exchange set model

EM reported on limitations in the S-100 Edition 4.0.0 Exchange Set data model and noted that, ten gaps that had been discovered. These need to be studied and resolved. It was agreed that exchange and discovery metadata will be moved to a separate part in S-100.

Action; report the exchange set gaps to the full S-100WG with a view to forming a correspondence group to work on creating a new S-100 part that will include proposals in paper TSM_5.19 (for Edition 6). It was agreed to get the minor proposals in paper 5.12 and 5.13 for inclusion in Edition 5.0.0 [SS, EM, DG, RM, EK, KHOA, NOA NAVO, IC-ENC]

6. S-100 Test Bed Reports [Powell]

6.1 KHOA Test Bed Project [Baek]

YB reported on the ECDIS sea trials that took place on the 27th of August 2019. Included delegates from USA, UK, and the CHS. The trials included data conforming to 10 different PS's and covered seven test scenarios. The test also included the S-100 interoperability catalogue. The project output was recommendations on the interoperability of data and the harmonization of portrayal. The meeting commended KHOA for the lessons learned from the test bed.

6.2 Test Bed Project

YB provided a presentation on the interoperability catalogue. There was discussion about the need for suppression of layers and S-101 contours being visible on top of S-102 data.

6.3 S-100 Interoperability Catalogue

YB provided a presentation on the interoperability catalogue. He noted that there were issues with S-101 depth contours being displayed over S-102 data when the datasets were interleaved. Suggested that contours should be suppressed, not interleaved out. The main issue with suppression is that features are suppressed in the whole display, not just in the area of S-102 data.

EM proposed that there should not be a requirement to display all available datasets for different PSs at the same time and the interoperability catalogue should be able to distinguish the combinations of products to display in any particular "mode". He noted that NIPWG will be proposing an alternative method of portraying overlapping products to the next S-100WG meeting.

7. S-100 Related Business

7.1A Updates to IMO Performance Standard [Powell]

The Chair noted that the IMO Performance Standards need to be reviewed to determine what changes are required in order to cater for S-101 ENCs (and other Prod Specs). AK stressed that we cannot say the S-101 will outright replace S-57, and noted that the WG should not focus too much on other PSs that may be used in ECDIS. The primary product required for safe navigation is the ENC (S-101). HP proposed that S-57 compliance and S-100 compliance should be treated independently. EM noted that S-124 should be included in this consideration. It was noted that these issues should be reported to C3 meeting.

Action: Update the paper on ECDIS Performance Standards to reflect the meeting discussions and submit to D-Tech for updating HSSC report to C.3.

7.1B ECDIS/ENC Standards Dependency for SOLAS

TP reported that the paper had been drafter for another group meeting. As it covered the same subject as paper 7.1A, it was submitted for consideration. He invited the chair to use any relevant content as part of the action item for 7.1A.

7.2 Updated MRN Guidance [Mong/Malyankar]

7.3 IEHG S100 related questions [Powell]

JP reported on the IEHG work on symbols and noted that they had some questions for S-100WG.

Overlapping symbols - HB proposed that there was no guidance in S-100 on how to implement this, but it could be implemented as a hover function within the system (i.e. by the OEM). More information was required.

TdP will be attending the IEHG meeting and will request more information about the issue. Chair – suggested to discuss how to deal with common symbols and Letters and numbers in conditional symbols with NIWC (DG) – they have worked in this. If the S-57 lookup tables are required, contact TP. On the questions of AIS Symbols, it was suggested to contact IALA for more info.

7.4 Establishment of a Codelist Register [Wootton]

JW reported that the proposal came out of the A-100 / Arlborg workshop meeting. He proposed that a Codelist register be included in the IHO GI Registry and recommended that register also be established for complex attributes. He requested that the new registers be included into the IHO during the first half of 2020.

AA commended JW on the paper – offered to provide feedback.

7.5 S-100 Showcase presentation for Council [Powell]

JP reported that because this is a closed meeting several MS will report on the work that they are working on. OEM will be invited to present on their developments. Also noted that there will be a half day stakeholders forum at the next HSSC meeting.

7.6 Quality of Bathymetric Data (QoBD) and ECDIS performance

RB reported on a proposed method to carry out automated downgrading of QoBD in areas where category of temporal variation is likely to change. In order to support this functionality, two new QoBD attributes (temporal validity and lowest QoBD category) will be required. He invited the members to test both functions identified in the paper and present any outcomes to the upcoming DQWG meeting.

KHOA reported that they had also carried out test using the method and had looked at both triggering alarms from the uncertainty as well as portrayal.

DG noted that they had done some tests with this, noted that they has also tested adding an association to an object with uncertainty information.

It was agreed that more work was need by the DQWG before it could be implemented in S-101.

7.7 Creation of S-122 for German waters

DZ reported on the development of the S-122 MPA Product Specification. He noted that Germany completed their MPA data set which is available for use. Although BSH does not provide information on MPA in their navigational products, regulations affecting the safety of navigation have been incorporated in the BSH portfolio of nautical products, such as charts and nautical publications.

The MPA data base structure can be used for implementing other GML based S-100 compliant products specifications. Results of the work show that further data model harmonisation with S-101 could be beneficial and should be considered if MPA data sets will be integrated into ECDIS.

7.8 Visualization of Quality of Bathymetric Data

RB reported on a test case study to examine how to improve the visualization of the quality of bathymetric data. The study looked at obstructions, underwater rocks and wrecks as they relate to CATZOC, and the visual results of applying horizontal uncertainties. The meeting noted the report.

7.9 Report from S-124 Correspondence Group

EM that discussions with mariners – conclusion was that NtM information should remain on the ECDIS. Views were expressed that this would cause undue clutter on the screen. EM – presented methods of reducing clutter on NtoM information – including aggregating objects. He noted that data set is not best suited for more real-time data transmission – there is a need to look at this – XML / GML are quite big – json may be smaller. DG - the size of the data once it has been compressed for satellite transmission should be considered – the encoding format may not be an issue if it compresses well.

7.10 S-111 - Surface Currents Report GS

GS reported that since the publications of Edition 1.0.0 in December 2018, OEM's have reported that the portrayal of dusk and night colours too bright. The PT are currently looking at how to implement uncertainty and data quality. The PT will continue responding feedback provided by OEMs and are working on the development of an XML exchange datasets and data quality software.

Questioned whether there will be a formal review process for data quality for S-1xx product specifications. Presented streamline examples.

8. Any Other Business [Powell]

9. Review of Meeting Actions [Powell]

10. Date and Venue of Next Meeting

Next TSM meeting will be held at …..

11. Close of Meeting

The Chair thanked all the meeting members for their contribution to the meeting, and the IHO Secretariat for hosting the meeting.

Annex A

Agenda

Document Number Prefix	Agenda Item	Agenda Item / Document Title
1. Opening and Administrative Arrangements		[Powell]
S100WGTSM7	01A	List of Documents
S100WGTSM7	01B	List of Participants
2. Approval of Joint Agenda		[Powell]
S100WGTSM7	02A	Agenda
S100WGTSM7	02B	Actions from TSM 6 Meeting [Powell]
3. Matters Arising		[Powell]
4. S-98 Interoperability		[Powell]
S100WGTSM7	4.1	Front of Bridge/Back of Bridge [Powell]
S100WGTSM7	4.2	Architectural vision of S-100 products in S-98 reference HSSC11-04.8A [Keramoal]
S100WGTSM7	4.3	Architectural Display of S-100 related products reference HSSC11-05.3D [NIPWG]
S100WGTSM7	4.4	S100 Portrayal Harmonization Project [KHOA]
S100WGTSM7	4.5	Portrayal Harmonization in S-98 [Powell]
S100WGTSM7	4.6	[]
S100WGTSM7	4.7	De-Scoping and Reorganizing S-98 – a proposal [Powell]
S100WGTSM7	4.8	Interoperability functional principles [Keramoal]
S100WGTSM7	4.9	Interoperability - S-100 products and ECDIS- White paper (reference only) [Powell]
5. S-100 Technical Proposals for preliminary consideration		[Powell]
S100WGTSM7	5.1	S-101 Display Scale - NOAA [Powell]
S100WGTSM7	5.2	Alerts and Indications [Grant]
S100WGTSM7	5.3	Various S-100 Change Requests [Grant]
S100WGTSM7	5.4	Capability Gaps in the S100 Portrayal Model [Grant]
S100WGTSM7	5.5	Data Quality [Broekman]
S100WGTSM7	5.6	Inconsistencies relating to HDF5 implementation [Bothein]
S100WGTSM7	5.7	Machine Readability of Display Plane Ordering [Grant]
S100WGTSM7	5.8	Validation of Portrayal Inputs [Grant]
S100WGTSM7	5.9	Issues with the Part 9-7 Data Input Schema [Grant]
S100WGTSM7	5.10	Miscellaneous Revisions [Grant]
S100WGTSM7	5.11	Proposed Corrections S-100 Metadata [Brazier]
S100WGTSM7	5.12	Exchange catalogue multiple products structure [Skjaeveland]
S100WGTSM7	5.13	S-1xx and cancellation strategies [Skjaeveland]
S100WGTSM7	5.14A	Proposal - Scope Comprising parts [Skjaeveland]
S100WGTSM7	5.14B	Proposal - Scope Remove Annex 1 [Skjaeveland]
S100WGTSM7	5.14C	Proposal - Appendix 2a-A [Skjaeveland]
S100WGTSM7	5.14D	Proposal - Appendix 4a-D – Catalogue Identifier [Skjaeveland]

S100WGTSM7	5.14E	Proposal - Appendix 4a-D - Appendix 4a-D filePath	[Skjaeveland]
S100WGTSM7	5.14F	Proposal - Appendix 4a-D S100 Protection Scheme	[Skjaeveland]
S100WGTSM7	5.15	S-100 Part 15 Enhancements	[Skjaeveland]
S100WGTSM7	5.16	Signature and Certificate	[Skjaeveland]
S100WGTSM7	5.17	Potential Changes to S-100 HDF5 for S-104	[Seroka]
S100WGTSM7	5.18	S100L2/2019 – Miscellaneous Revisions	[Malyankar]
S100WGTSM7	5.19	Gap analysis for S-100 Exchange set model	[Baek]
6. S-100 Test Bed Reports			[Powell]
S100WGTSM7	6.1	KHOA Sea Trial Project	[Baek]
S100WGTSM7	6.2	Test Bed Project - Viewer Update	[Baek]
S100WGTSM7	6.3	S-100 Interoperability Catalogue	[Baek]
7. S-100 Related Business			[Powell]
S100WGTSM7	7.1A	Updates to IMO Performance Standard	[Powell]
S100WGTSM7	7.1B	ECDIS/ENC Standards Dependency for SOLAS	[Pharoah]
S100WGTSM7	7.2	Updated MRN Guidance	[Mong/Malyankar]
S100WGTSM7	7.3	IEHG S100 related questions	[Powell]
S100WGTSM7	7.4	Establishment of a Codelist Register	[Wootton]
S100WGTSM7	7.5	S-100 Showcase presentation for Council	[Powell]
S100WGTSM7	7.6	Quality of Bathymetric Data (QoBD) and ECDIS performance	[]
S100WGTSM7	7.7	Creation of S-122 for German waters	[]
S100WGTSM7	7.8	Visualization of Quality of Bathymetric Data	[Broekman]
S100WGTSM7	7.9		[]
8. Any Other Business			[Powell]
S100WGTSM7	8.1		[]
9. Review of Meeting Actions			[Powell]
10. Date and Venue of Next Meeting			[Powell]
11. Close of Meeting			[Powell]

Annex B

List of Participants

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