

**3rd S-100 Working Group (S-100WG) Meeting
Singapore (10-13 April 2018)
Minutes**



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

Annexes:

- Annex A - Actions
- Annex B – Agenda
- Annex C – List of Participants
- Annex D – Proposed way forward for the discussion on the value of ‘other’ in the S100_DataFormat enumeration
- Annex E – Change Proposal for S-100 Edition 4.0.0 - Time

Action numbers are listed against each agenda item in these Minutes. Refer to Annex A for the list of actions.

WG Member abbreviations:

MC - Marcelo CARNEIRO - BR	PS - Per-Olof SEIRON - SE
LP - Lynn PATTERSON - CA	HE - Hans ENGBERG - SE
EM - Eivind MONG - CA	TB - Thomas BOVEY - UK
DS - Dongli Sun - CN	JLP - Julia POWELL - US
JWU - Jin WU - CN	RDL - R. David LEWALD - US
YD - Yulei DONG - CN	JC - Joshua CLAYTON - US
EH - Elizabeth HAHESSY - DK	JPH - Joseph PHILLIPS - US
RF - Richard FOWLE - DK	DB - Dong BANG - US
BC - Bruno CARDOSO - DK	DG - David GRANT - US
DJ - Darja JOKK - EST	AA - Al ARMSTRONG - US
MH - Mikko HOVI - FN	DB - David BRAZIER - US
CMo - Christian MOUDEN - FR	HP - Hannu PEIPONEN - IEC
JR - Jochen RITTERBUSCH - DE	DLD - Denise LADUE - IEHG
JV - Jana VETTER - DE	GS - Gumjun SON -
AaM - Abdul Aziz MUTTAQIM - IN	TR - Tom RICHARDSON - IC-ENC
AR - Akbar ROSTAMI - IR	EK - Edward KUWALEK - IIC
VP - Valentino PALMA - IT	JP - Jonathon PRITCHARD - IIC
CMa - Carlo MARCHI - IT	TN - Tomoya NAKAYAMA -
RSH - Ruri SHOJI - JP	SO - Sewoong OH - KRISO
TH - Tomonori HATTORI - JP	HB - Holger BOTHIEN - 7Seas
AM - Arno MEURINK - NE	KH - Kyosuke HATAKEYAMA -
VB - Verena BOSSELMANN - NZ	YJ - Yujun JEONG -
OF - Odd Aage FOERE - NO	NK - Namseon KANG -
GT - Guttorm TOMREN - NO	TdP - Tom DE PUYT - Esri
RSA - Robert SANDVIK - NO	SS - Svein SKJAEVELAND - PRIMAR
YB - Yong BAEK(Head) - ROK	BS - Bjorn SAESTAD - Navtor
THK - Tae Heon KIM - ROK	AP - Anthony PHARAOH - IHO Sec
IK - Iji KIM - ROK	JW - Jeff WOOTTON - IHO Sec
AL - Andrei LUCACI - ROM	
LD - Lucian DUTU - ROM	
FY - Federico YANGUAS - ES	

1. Opening and Administrative Arrangements

The S-100WG Chair Julia Powell welcomed participants to the meeting and invited Dr Parry Oei, Director of the Singapore Maritime Port Authority (MPA), to open the meeting. Dr Oei welcomed members to Singapore and proposed that the very good attendance of the meeting and the large number of technical documents was indicative of the importance of the work being carried out by the Working group. He reminded the meeting of the fast changing pace of navigation requirements and the need to keep abreast of technology.

The Chair provided a presentation on the current state of the tasks being undertaken by the WG and presented future milestones and goals.

The Secretary informed the meeting that, in terms of the WG's ToR's, it was necessary for the WG to elect a Chair and Vice-Chair at the first meeting following each ordinary session of the Assembly. He noted that the election would take place at the conclusion of the meeting and invited meeting members who wished to put their names forward for the election to do so.

2. Approval of Agenda

The meeting approved the agenda and agreed to move all reports from other WG's to later in the meeting in order to ensure S-100 proposals were completed first. Item 8.2 was removed as it duplicated 8.1.1.

3. Matters Arising and HSSC Working Group Reports

3.1 Approval of S-100WG2 Minutes

The Chair briefly reviewed the minutes of the second meeting and noted that they had previously been distributed and approved by the WG.

3.2 Review of S-100WG2 Actions

The Chair reviewed the list of actions:

- Action 1 – (Time expired)
- Action 2 – Guidance on cable information has been included in the DCEG. (Completed).
- Action 3 – Discuss code list modelling with IMO. (See paper 6.2.1 – Completed).
- Action 4 - Post the S-100 revision timeline on the IHO website. (Completed).
- Action 5 - Session oriented services. (Completed).
- Action 6 - Discuss with IALA who the authority is for the namespace "URN". (Completed).
- Action 7 - Develop a draft data structure for the S-100 Producer Code Register. (Completed).
- Action 8 - RENCs to further investigate the use of Producer Codes and file naming. (See paper S-100WG3-6.4 – Completed).
- Action 9 - Sub-WG to be formed to develop the necessary text for the proposed GFM... (Completed).
- Action 10 - Report on possible GML issue to NIPWG. (Completed).
- Action 11 - Apply changes as agreed from recommendations 2-5... (Completed).
- Action 12 - S-100 Change Proposal form to remove "Other" ... (See paper S-100WG3-4.2.5 – Completed).
- Action 13 - S-100 Change Proposal form to add an integer attribute... (Completed).
- Action 14 - S-100 Change Proposal form to add metadata... (Completed).

- Action 15 - Submit an S-100 Change Proposal form to modify the S-57 converter... (Completed).
- Action 16 - Sub-WG to be formed... "Recommended Changes to S-100 Portrayal". (Completed).
- Action 17 - Supply MS Word version of S-100 Part 9 to SPAWAR. (Completed).
- Action 18 - For the next edition of S-100, replace the "ISO/IEC 8211 ASCII" and... (Completed).
- Action 19 - Investigate how to implement the changes to the Registry... (See paper S-100WG3-6.2.2 – Ongoing).
- Action 20 - Liaise with OGC regarding RDF and the Semantic Web. (Ongoing).
- Action 21 - Develop draft guidelines for submission of proposals to the IHO GI Registry... (In progress. See paper S-100WG3-6.2.3).
- Action 22 - Develop ToRs for an IHO GI Registry Project Team for consideration of the S-100WG. (See paper S-100WG3-6.2.1 – Completed).
- Action 23 - Sub-WG to be formed to review the content of the IHO GI Registry. (See paper S-100WG3-6.2.1 - Completed).
- Action 24 - Develop guidelines for the use of Codelist type attributes... (Ongoing).
- Action 25 - Conduct a review of S-99 and produce a new edition based on... (Ongoing).
- Action 26 - Contact S-100WG Project Team leads to determine who will need access to the FCB. (Ongoing).
- Action 27 - Review the S-101FC Edition 0.9.0 and provide feedback to KHOA. (Completed).
- Action 28 - Produce a new edition of the S-101 DCEG taking into account... (Completed).
- Action 29 - Review the draft Interoperability Catalogue model, schemas and a draft... (Time expired).
- Action 30 - Establish a new online resource for making available and maintaining all... (Ongoing).
- Action 31 - Review the draft Test Bed Framework document... (Time expired).
- Action 32 - Complete the Data Protection documentation for inclusion in S-100. (Ongoing).
- Action 33 - Set up an online repository similar to the one established by IALA for... (Completed).
- Action 34 - Draft S-100 Part 9B extension with specification for the Lua scripting... (Completed).
- Action 35 - Draft S-100 Lua Scripting; to support the development of Alarms... (Ongoing).
- Action 36 - Define the process of managing roles and feature associations... (Ongoing).
- Action 37 - Include functionality for managing the creation of the roles and feature... (Ongoing).
- Action 38 - Include proposed test cases for the initial S-100 conversion tool... (Ongoing).
- Action 39 - Compile a clean Baseline DCEG Edition 0.0.2 document and post... (Completed).
- Action 40 - Develop the documentation describing the Lua Portrayal Conditional... (Completed).
- Action 41 - Draft the necessary text to make provision for the generic display of... (Ongoing).
- Action 42 - When building the next iteration of the Portrayal Catalogue, take into account the need for a context parameter to handle over / under radar. (Ongoing).
- Action 43 - Establish Sub-PT to develop S-101 validation checks. (Completed).
- Action 44 - 11.5 Include additional guidance in the S-101 DCEG for the provision of... (Completed).
- Action 45 - Draft a recommendation paper for... (See paper S-100WG3-6.4 – Completed)
- Action 46 - Establish a Sub-WG under the S-101PT to carry out a study... (Completed – Study ongoing).

- Action 47 - NATO GMWG to be invited to submit their proposals to the Register... (Ongoing).
- Action 48 - Investigate the proposal to make Mooring Buoy a new feature... (See paper S-100WG3-6.2.1 – Ongoing).
- Action 49 - MS to review their ENC ancillary picture files... (Completed).
- Action 50 - Submit a paper to the DQWG to discuss the definition of the enumerated values for attribute Quality of Horizontal Measurement. (Ongoing).

3.3 HSSC9 Report

The Chair provided a brief report on the activities / outcomes of the 9th HSSC meeting (Ottawa - Canada, 6-10 Nov 2017) that needed to be considered by the WG. Due to the change in dates for the next (and subsequent) HSSC meetings, the S-100WG production schedule had been revised. This had also had an impact on the completion schedules for the submission of documents for HSSC endorsement. The Chair presented the revised publication schedule which will be submitted to the next HSSC meeting.

3.4 HSSC Actions

HSSC9/03 - ENCWG and S-100WG to monitor any possible impact of the work on the agreed e-Navigation outputs on ECDIS related standards and S-100... (Ongoing).

HSSC9/04 - Investigate if S-101 ENCs will meet the current IMO Performance Standards so there is no need to consider proposing amendments to the IMO. (For HSSC 10 and S-101PT3).

HSSC9/09 - S-99 - Operational Procedures for the Organization and Management... (Completed).

HSSC9/10 - S-99 - Consider how to incorporate generic interoperability into future editions of S-100 (See S-100WG3 Agenda item 5 – Ongoing).

HSSC9/11 - IHO Sec. to revamp the S-100 page of the IHO website to include a repository for different product specifications under development. (See also www.s100.iho.int – Completed).

HSSC9/13 - S-100WG/S-121PT to submit Ed. 1.0.0 of S-121 for endorsement by HSSC. (For HSSC 10).

HSSC9/15 - HSSC approved the adoption the IALA Marine Resource Identifier. (Completed).

HSSC9/16 - S-100WG/DQWG to consider at their next meeting how the development of a “minimum” standard for data... (For HSSC 10).

HSSC9/18 - S-100WG to further develop and finalize the Test Bed Platform and associated guidelines to be used by developers of S-100 based products. (For HSSC-11).

HSSC9/27 - S-100WG/NIPWG to further develop amendments to IHO Resolution 2/2007 in accordance with... (Ongoing).

HSSC9/47 - HSSC tasked the S-100WG/ENCWG to continue monitoring the development of guidance on cyber security. (To be submitted to HSSC-10).

HSSC9/48 - IEC to consider the possibility of presenting the typical timetable to develop a new major revision of ECDIS at the next S-100WG meeting. (Ongoing)

HSSC9/59 - S-100WG/ENCWG to submit a proposal... establishing G-series documents. (Completed).

3.5 ENCWG Report.

The Chair reported that no report had been submitted. The next ENCWG meeting was scheduled to take place during the week following the S-100WG3 meeting.

3.6 NCWG Report

The report was presented by the NCWG Chair. Edition 4.7.0 of IHO Publication S-4 – *Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO* had been published in July 2017. Edition 4.8.0 has been submitted to HSSC10 for approval to proceed to IHO Member States for endorsement; there are no impacts on S-100 or S-100 based Product Specifications in development resulting from the changes in Edition 4.8.0. The NCWG Chair reported that it was expected that new Editions of the IHO adopted language versions of INT1, produced by France, Germany and Spain, would be published during 2018. Edition 3.1.0 of IHO Publication S-11 Part A – *Guidance for the Preparation and Maintenance of International (INT) Chart and ENC Schemes* had been published in June 2017. Other topics under discussion by the NCWG include the future of the paper chart; new symbols required for S-101; and “rule-based” cartography.

There were no decisions or actions for the S-100WG from this report.

3.7 NIPWG Activities

CMA reported that the NIPWG had held its 4th and 5th meetings in May 2017 and March 2018. The WG have made contributions to the e-Navigation project, and had also made progress with several Product Specifications. Work on S-122 - Marine Protected Areas, and S-123 – Radio Services, were outsourced and will be presented to the HSSC10 meeting. Further work on S-125 – Navigational Service, and S-126 – Physical Environment, is on hold. The work on S-127 – Traffic Management, has also been outsourced and is to be completed by 2018. NIPWG have developed a matrix showing the relationship between NPUB feature types and the product specifications which use them.

The meeting noted the paper.

3.8 DQWG Report

No report provided.

3.9 Report from WNWWS-SC/S-124PT

EM (S-124PT Chair) reported that the S-124 Product Specification is intended for navigational warnings and is a technical component of e-Navigation and the modernization of GMDSS projects. Following a paper encoding exercise, the S-124 model has been modified. The SMT Validation and SMART Navigation projects are being used to test the model. Some of the changes include the use of MRN and GUIDs; and the ability for short legends to be displayed in ECDIS. There are still issues to be sorted out such as portrayal and backward compatibility however the SMART Navigation project and the STM Validation project have agreed to run the tests on the model and to report the results to the S-124 CG.

The meeting noted the S-124 report.

4. S-100 Edition 4.0.0 Proposals

4.1 Feature Catalogue Alignment to Spatial Model

HB proposed that clarifications to align the Feature Catalogue with the rest of S-100; and to remove arcByCenterPoint and circleByCenterPoint geometric primitives, should be considered for S-100 Edition 4.0.0. These geometric primitives are included in the current version of S-100 Part 5 however they are actually not geometric primitives but specializations of a line primitive. HB recommended that they should also be removed from the model of the Feature Catalogue.

The meeting approved the changes to the UML diagram and table 5-A-20 and agreed that they should be changed to GM_OrientableCurve as this is the base class for linear geometry. The meeting also agreed that the value GM_Surface should be changed to GM_OrientableSurface (**Action 15**).

4.2 Metadata Proposals

EM reported that the changes to the S-100 exchange sets and discovery metadata had been submitted as a result of S-124 and NIPWG requirements. He proposed that additional guidance was needed to ensure conformity between all S-100 based product specifications that will produce exchange sets. This should include rules that allow mandatory metadata to be nill-able. Furthermore he proposed that S-100 specific metadata should be optional.

The meeting noted the report.

4.2.1 Metadata and ISO 19115

EM reported that as a result of revisions to the 19115 metadata standard, and changes required for the implementation of services or the use of a transactional mode of data exchange (instead of conventional exchange sets), extensions will be required to S-100 section 4a (metadata). HB expressed some reservations and proposed that XML is not a dataset encoding. "DataFormat" is too generic a term to use for the dataset encoding. This proposal was not accepted for inclusion in Edition 4.0.0. Following a long discussion the proposal on digital signatures was not accepted as is. EM was invited to rewrite the proposal based on the discussion of mandatory status of digital signatures as implemented at the S-100 and PS levels.

The meeting noted the paper and approved the metadata (19115) changes, with the exception of those items noted above (**Actions 16 and 17**).

4.2.2 Add number to S100_ProductSpecification

DG noted that the proposed extension to add an integer attribute number to "S100_ProductSpecification" was required in order to allow an unambiguous specification of S-100 product types. HB agreed to the principle of using a unique identifier but noted that it must be implemented in the same way everywhere. It was agreed that the value (metadata field) needs to be further work and this would be done during the course of the meeting (final text to be provided to JW) (**Actions 18 and 19**).

4.2.3 Corrections for S100 Support File Discovery Metadata

DG presented the proposed clarification to correct the description of otherDataTypeDescription and to update descriptions to match Part 4a (corresponding change to be made in Part 11 Appendix D). The meeting noted the paper and accepted the proposal for inclusion in Edition 4.0.0 (**Action 20**).

4.2.4 Metadata-S100WG2 Items Interop and S-122

DG proposed that the following extensions had been proposed in light of changes to the 19115 standards and to cater metadata requirements for the S-122 PS.

Proposed extension (1) (Figure 4a-D-4) to add XML to S100 Data format was not agreed (see 4.2.1 above).

Proposed extension (2) to make vertical datum and sounding datum optional was agreed.

Proposed extensions (3) to add metadataFileIdentifier, metadataPointOfContact, metadataDateStamp, metadataLanguage to S100_DatasetDiscoveryMetadata were agreed.

Proposed extension (4) to add “interoperabilityCatalogue” to enumeration was agreed.

Proposed extension (5) to add new enumerations S100_DigitalSignature, S100_ProtectionScheme had already been agreed at S100WG2.

Proposed extension (6) to change attributes digitalSignature, digitalSignatureValue was agreed.

Proposed extension (7) to make attributes digitalSignatureReference, digitalSignatureValue optional (0..1) was not agreed (see 4.2.1 above and Action 17).

Proposed extension (8) to add ZIP and RAR to S100_exchangeCatalogue.algorithmMethod had already been agreed at S100WG2.

(Action 21).

4.2.5 Remove Other from S100 DataFormat

DG reported on the proposed corrections to Parts 4a (i.e. to remove “Other”) and from the UML diagram, Part 12 (12.4.3) and Part 10a (8211 binary sentence). Following a long discussion, the meeting agreed that the proposal as it was presented was generally supported, however further work was required (EM).

EM presented a proposed way forward for this proposal on the final day of the meeting (Annex D). It was agreed that this was a good starting point, with further work to be done for a consolidated proposal for S-100 Edition 5.

(Actions 22 and 23).

4.2.6 Exchange sets and discovery metadata

EM noted that S-100 Part 4a-D is well suited for ENC production, but less so for many of the product specifications under development. He proposed that there is a need for a common set of rules outlining how to extend metadata in S-100 based product specifications to ensure the greatest possible uniformity. He proposed that mandatory metadata attributes that are profiled from ISO should be made nill-able, while all S-100 specific metadata attributes should be changed to optional. Further guidance should be added to S-100 to establish a common approach to extend the predefined S-100 metadata.

The meeting agreed in principle with the proposal. A redline copy including the changes based on the meeting discussion is to be prepared by EM and provided to JW for inclusion in S-100 Edition 4.0.0
(Action 24).

4.2.6.1 Exchange sets and discovery metadata

See discussion in item 4.2.6 above.

4.2.6.2 Exchange sets and discovery metadata – Appendix 1

See discussion in item 4.2.6 above.

4.3 bSpline

EM reported that the GML profile defined in S-100 Edition 3.0 does not satisfy the needs of the WMO, and proposed extensions to the S-100 GML profile to include spline curve options and a curve fitting method. The use of spline curve geometries also reduces the GML file size. DG questioned whether the proposal was attempting to find an encoding solution for a portrayal problem. After discussion, it was agreed to include the proposal, but to also include a caution that bSpline is not to be used for depth contours, or features that must be portrayed accurately and/or are navigationally significant.

The meeting noted the paper and approved the proposal (**Actions 25, 26, 27 and 28**).

4.4 GML Clarifications

EM reported that the additions to curve interpolation are needed for encoding splines and blended curves (as proposed in paper 4.3). The proposed new sections on conventions for GML datasets provides additional guidance for developers. DG reported that the proposed clarification addresses SPAWAR's concerns with the GML encoding. The meeting noted the paper and agreed the proposed changes for inclusion in Edition 4.0.0 (**Action 29**).

4.5.1 Portrayal Proposals LUA

DG presented the proposal to include the new Part 9a, defining additions and changes necessary to implement portrayal using the Lua scripting language described in S-100 Part 50 (Scripting – see Agenda 4.5.2). HP noted that the proposal addressed Furuno's concerns. HB noted that he agreed with the proposal in principal but would like to see an implementation. DG stated that SPAWAR will deliver an S-101 Portrayal Catalogue that is compliant with this version of Part 9A, as an implementation example. The meeting noted the paper and accepted the proposal for inclusion in Edition 4.0.0 (**Action 30**).

4.5.2 Scripting Language Extension

DG presented the proposal to include a new "Scripting" section (Part 50) in S-100 Edition 4.0.0 that defines a standard mechanism for including scripting support in S-100 based products. He noted that SPAWAR are working on an implementation version, which has resulted in a few minor changes. They will also look at the implementation requirements for bSpline (discussed under Agenda item 4.3). The meeting noted the paper and agreed with the proposal, noting that the new Part will be renumbered to Part 13 (**Actions 31 and 32**).

4.6 Data Protection

RS reported that, although significant progress had been made on a new Data Protection Part of S-100, further work was required to complete the requirements for S-100 and relevant product specifications. A Sub-WG was convened in the margins of the meeting, to continue the work. It was agreed that an additional meeting was required to complete the work. The new Part of S-100 will be numbered Part 15 (**Actions 33 and 34**).

4.7 Online communication Extension.

The Chair noted that IALA had presented a proposal to the last S-100WG meeting and after discussion IALA had been invited to submit a proposal for inclusion in S-100 Edition 4.0.0.

4.7.1 Liaison Note to IHO S-100 WG and IHO NIPWG on S-100 on-line Data Exchange

EM reported that IALA proposed the addition of a new Part to S-100 on streaming and session-based data. This is required for the Inter-VTS Exchange Format and various services as defined in the e-Navigation Maritime Service Specification. He invited the meeting to consider papers 4.7.2 and 4.7.3 regarding S-100 online data exchange. HP proposed that even with S-57 ECDIS, there has already been a form of data streaming. YB proposed that the new section may have an impact on the interoperability specification in the future.

4.7.2. C65-11.4.3.3 Change Proposal S-100

Change proposal form outlining the scope of changes required to make provision for real time data exchange and online services for acquiring, processing, analysing, accessing, and presenting data was accepted. It was noted that the document will require reformatting and clearer UML model diagrams.

4.7.3 S-100 – Part XX Online Communication

The meeting approved the proposal for inclusion in S-100 Edition 4.0.0, as Section 14 **(Action 35)**.

4.8 Correction for Part 5 Feature Use Type

DG noted that the attribute "featureUseType needs to be corrected in S-100 Ed 3.0.0 to include the correct Type. The meeting approved the correction for inclusion in S-100 Edition 4.0.0 **(Action 36)**.

4.9 Time Reference in S-100

EM reported that, following a review of M-3, the NIPWG proposed to the HSC that Resolution 7/2009 needed to be updated to reflect the needs of nautical publications requirements; and proposed an amended version of the Resolution. NIPWG also proposed that the method used for encoding time in S-100 should be clarified to reflect this change. The NCWG Chair subsequently prepared a formal S-100 change proposal (Annex E), and the meeting approved this proposal for inclusion in S-100 Edition 4.0.0 **(Action 37)**.

4.10 HDF5 Encoding (S-100 Edition 4.0.0 - Part 10c)

EM introduced the updated version of Part 10c which includes some constraints to the HDF5 base model and extensions to the metadata and other S-100 specific customizations. S-100 Edition 3.0 has a general notion for imagery and gridded data but leaves the details to product specification authors. He propped that there is a need for generic guidance in S-100. The meeting approved the updated Part 10c for inclusion in Edition 4.0.0 **(Action 38)**.

4.11 Registry Part 2a

YB reported on the progress made on the extension to the “new” Registry. The Change proposal submitted by KHOA that included the addition of a new Concept Register was noted by the meeting as a “work in progress”, with additional input to be provided by the Registry manager (JW) **(Action 39)**.

5. S-100 Interoperability

5.1 S-98 Interoperability Specification for S-100

JLP introduced the draft edition of the Interoperability Specification for Navigation Systems. She noted that HSSC9 had approved the assignment of the S-98 number for the document. The new document describes the structure, usage, and rules for development of interoperability catalogues that can be used by systems to guide the simultaneous use and display of two or more S-100 based data products.

CMA proposed that there is a need to get stakeholder feedback on what sort of information should be portrayed on the display under different conditions. RF noted that there will have to be some consultation with IMO as part of the testing and evaluation process. The meeting noted the paper and endorsed the proposed path to publication (**Action 40**).

5.2 Report on S-100 Interoperability Workshop

YB reported that KHOA-NOAA had conducted an interoperability workshop in Daejeon, Republic of Korea, during August 2017 in order to validate the Interoperability Catalogue (IC) and test the resulting portrayal using the KHOA S-100 Viewer.

The meeting noted the paper and agreed that the maintenance and further development of the Interoperability Catalogue Builder should be included in the S-100WG Work Plan (**Action 41**).

5.3 Guidance for Product Specification Developers

The Chair introduced the new guideline documents for creating an S-100 Product Specification. Part A covers the content that should be included, and Part B covers the process to be followed while developing a PS. The documents will be submitted to the next HSSC meeting for information and approval of an S-number.

5.4 Comments on S-98 Interoperability Specification (France)

CMo proposed that a review of the principles in the Interoperability Specification should be undertaken before the draft specification is passed to HSSC for approval. He noted that one of the key requirements of e-Navigation is to provide the mariner with a harmonized presentation of information coming from different registered services. He highlighted some of the fuzzy logic principles in S-98 Edition 0.2 that would need to be further developed, and proposed that it is essential to clarify certain principles beyond their technical description. The meeting noted the paper and agreed that S-98 needs further development before being submitted for HSSC approval. Further discussion is required on whether to remove Levels 3 and 4.

6. S-100 General Topics

6.1 S-100 Test Bed Framework

Refer to agenda item 8.

6.2 IHO Secretariat GI Registry Activities

6.2.1 Summary of Activities in the IHO GI Registry

JW provided a summary of the activities of the IHO GI Registry, and the progress made since the last S-100WG meeting. He reported that the new Registry (being developed by KHOA) included new Feature Concept, Enumerate/Codelist, Product Specification and Data Producer Code Registers. He

reminded the meeting of S-100WG2 action 22 to develop terms of reference for the IHO GI Registry Project Team. These had been provided for the WGs approval. He also informed the meeting of the proposal to hold a Registry Workshop in conjunction with the next S-100WG meeting.

The meeting noted the report, approved the Registry Project Teams ToRs and endorsed the convening of a Registry Workshop during the next S-100WG meeting (**Action 42**).

6.2.2 Proposed Structure of the IHO GI Registry

JW reported on the revised structure on the new Registry application, and highlighted the new Concept Register which is required in a multi domain environment, and reported that there had been some discussions about linking items in the Concept Register with items in the IHO Hydrographic Dictionary. He noted there is also a need to manage Codelists and lists of enumerated values, which is the reason for the suggested implementation of a Codelist/Enumerate Register(s). The changes to the Registry structure will significantly impact on S-99, and will also impact on S-100 Parts 2 and 2a (refer to Agenda 4.11). He invited WG to provide feedback on these changes / new items, and to note the intention to hold a workshop at the S-100WG4 meeting.

The meeting endorsed the continued development of the “new” Registry infrastructure.

6.2.3 Registry Proposal Guidelines

JW reminded the meeting of the S-100WG2 action 21 to develop guidelines for submission of proposals to the IHO GI Registry. The intention of the document is to provide guidance for Submitting Organizations, Domain Control Bodies and the Register Manager.

The meeting approved the numbering of the document as a new Annex to S-99 (Annex A) and the holding of a Registry Workshop in conjunction with the next S-100WG meeting (**Action 43**).

6.2.4 Review of IHO GI Registry Content

JW reported on outcome of the initial review of the content of IHO GI Registry carried out in 2017, and feedback from the Sub-WG on this review. He reported that there was general inconsistency throughout the Feature Concept Dictionary Register (FCD) Register in regard to structuring of item names, definitions, source references, camelCase and remarks. He also reported on the significant number of repeated concepts in the FCD Register due to the current structure of the Register, some of which had not been assigned to a domain. He stated that guidance will have to be developed on the use of name spaces and their application for domains, which is a new concept for the Registry that is currently being researched. There were also many instances of disparities between item names and their definitions as well as incorrect INT1/S-4 references that will have to be resolved.

JW suggested that the sub-group responsible for advancing the review of the FCD Register content should be the IHO GI Registry Project Team. The meeting did not agree, citing that the Project Team is responsible for the overall development and structure of the Registry under the S-100WG, and a different skill set is required for the content review. It was decided that the review of the FCD Register content would be advanced by a separate Sub-Working Group (members: JW (lead), YB, RM, EM, IEHG, WMO – refer also to S-100WG2 Agenda 9.5 and S-100WG2 Action 23).

The meeting noted progress made with reviewing the Register content and approved the continuation of this work by a dedicated Content Review Sub-WG.

6.2.5 Register Item Review Spreadsheet

JW presented the spread sheet summarizing the results from the FCD Register content review reported on in item 6.2.4. He pointed out that the results were classified using the draft Registry Conventions and Guidelines document (refer Agenda 6.2.3), which had not yet had any conventions approved. There were no substantive comments.

6.3 S-100 Product Specification Guidebook

The Chair reported on the S-100 Product Specification Guide documents that were included as documents 5.3.1 (Guidance for PS Developers Part A – Content) and 5.3.2 (Guidance for PS Developers Part B – Execution). She noted that they would be submitted to the HSSC10 meeting for comment, with the aim of submitting a final draft to HSSC11 for endorsement. The meeting noted the documents. There was general agreement that they would be very beneficial and the guidance should be included as an S-1XX series guidance document.

6.4 Producer Codes and Naming Convention

SS noted that S-100WG2 action 8 tasked PRIMAR and IC-ENC to further investigate the use of Producer Codes and file naming conventions for S-101 use. Furthermore, they were invited to draft a recommendation paper on file naming convention, taking into consideration problems associated with ENC update limitations. HB proposed that only the first 2 fields (i.e. Product Specification number and Producer Code) are required and it should be left to the product specification developer to define the additional “optional” requirements.

The meeting agreed that for S-101 (and the S-1xx series) **the Product specification number (e.g. 101, 102) should be the mandatory 1st field in the file naming convention and the Producer Code should be retained as the mandatory 2nd field in the file naming convention (Actions 44 and 45).**

6.5 S-101 Support file management

The meeting agreed to defer the paper to the S-101PT3 meeting (June 2018).

6.6 S-101 Validation Checks

RF reported on behalf of BC noting that before commencing with the S-101 tests, a review of the current S-58 checks was carried out in order to determine which checks could be adopted as is; which should be changed; and which should be deleted. It was noted that checks that related to the data structure could be included in a generic set of S-100 tests to be applied to all Product Specifications. More specific checks would then be developed for each individual Product Specification.

EM proposed that generic validation checks developed for S-102, S-122 and S-124 could assist with the further development of the generic S-100 checks. CMa suggested that the DQWG Data Quality Checklist should be referenced for consideration of check categories (conformance, completeness etc...) **(Action 46).**

6.7 Progress on KHOA S-100 Infrastructure Development

6.7.1 S-100 GI registry 3.0 edition

YB provided a presentation on the new Registry application being developed by KHOA. The new application can be accessed from the IHO GI Registry Home page and includes several new features such as a Concept Register, Product Specification Register and Producer Code Register. The meeting acknowledged that progress made with the new Registry allocation.

6.7.2 Feature Catalogue Builder

YB noted that developers of product specifications can now download Feature Catalogue Builder (FCB) and use it on their local machines. He reported that further work needed to be done to determine how to register feature associations. HB proposed that associations should be part of the Feature Catalogue only and do not need to be registered. YB stated that a mechanism is needed to first create the roles and this will be followed by associations which should be derived from the Registry. The chair invited WG members to provide their comments/advice directly to YB.

6.7.3 Portrayal Catalogue Builder

YB reported that KHOA have built a Portrayal Catalogue Builder (PCB) application which is similar to the Feature Catalogue Builder application. The Portrayal Catalogue Builder application is designed to produce a Portrayal Catalogue which contains drawing instructions for feature types included in the Feature Catalogue. The meeting noted the report. The Chair noted that the KHO PCB may be utilized for the initial S-101 Portrayal Catalogue.

6.7.4 DCEG Builder

YB reported on and demonstrated the DCEG Builder, which has been developed by KHOA to ensure consistency between a Product Specification Data Classification and Encoding Guide and its associated Feature Catalogue. He noted that the DCEG Builder generates the feature/attribute tables that are included in a Product Specification directly from the Feature Catalogue, thus ensuring consistency. The meeting noted the report.

6.8 Harmonization Issues on S-10X SVG Symbols

YB reported that the IEHG were producing SVG symbols for their S-401 Product Specification and had encountered some portrayal issues. Following a discussion, it was concluded that the issue related to inconsistent colours is due to these colours having not yet been proposed to the Portrayal Register. The problem is likely only applicable for symbols unique to IEHG. DG proposed that there needs to be a mechanism to switch between Colour Style Sheets (CSSs) to provide the required colour pallets. IEHG were invited to align their SVG symbols with the S-100 profile and register their CSSs for their symbols (**Actions 47 and 48**).

6.9.1 DQWG Letter 2/2018 - Methodology for the display of quality information

SS (on behalf of the DQWG Chair) reported that the HSSC9 meeting has assigned a task to the DQWG to develop conditional visualization methodology for the quality of bathymetric data in liaison with the NCWG, NIPWG, ENCWG and the S-101PT. The work carried out by the DQWG so far is presented in papers DQWG13-15, 13-16 and 13-17, for discussion in Agenda item 6.9.2 below.

6.9.2 DQWG14-08A - Methodology for the display of quality information

SS (on behalf of the DQWG Chair) presented the paper on conditional visualization methodology for the quality of bathymetric data, noting that the paper had been sent to other WG Chairs for comment. HP noted that it was critical to get the ECDIS user's views, and CMa expressed concerned that the paper had not been discussed yet by the full DQWG. The Chair invited the meeting to provide comment on the paper and noted that no action would be taken until further feedback has been provided from the DQWG (**Action 49**).

6.10 Creation of S-101 Datasets and Lessons Learned

SO reported that KHOA has created a prototype S-101 ENC for Busan Port using the S-57 to S-101 converter. He highlighted some of the major issues which included data coverage; feature types which need editing after converting; items that required editing due to deleted features and attributes; and issues with cautionary notes and collection features. This raised the question as to whether HOs would be likely to migrate their ENC portfolio to S-101 if the data conversion process required significant human intervention and was therefore time consuming.

HA proposed that there is a need to distinguish between multiple coverage areas (same scale) and multiple scales. HB requested that the datasets be made available for testing purposes. YB was tasked to investigate whether this is possible. The Chair invited the RENC members to investigate their ENC portfolios to determine the maximum number of M_CSCL features in S-57 ENCs (**Actions 50, 51 and 52**).

7. S-100 Project Team Reports and Proposals

7.1 S-102

DB reported that the S-102PT had convened a meeting prior to the main S-100WG3 meeting to finalise Edition 2.0 of the S-102 Product Specification. It is anticipated that the new edition will be ready for endorsement by the next HSSC meeting followed by circulation to MS for approval.

7.1.1 S-102 GDAL Compliance Considerations

Paper withdrawn – item covered under 7.1.

7.2 S-121

The Chair reported on behalf of Jonathan Pritchard, on the progress of the S-121 Product Specification on Maritime Boundaries and Limits.

AA suggested to include some information on roles, rights and responsibilities for situational awareness of the mariner. The meeting agreed that the draft PS should be submitted to the HSSC10 meeting by the Chair, for endorsement (**Actions 53 and 54**).

7.3 S-129

No paper submitted. The Chair provided a brief update on the status on behalf of the PT Chair, who was not able to attend the meeting. No comments from the floor (**Action 55**).

7.4 S-101 – Way Forward

The Chair reported that Al Armstrong had taken over as Chair of the S-101PT, and the PT would hold their next meeting in Monaco, during June. Completion of a draft Edition 1.0 is scheduled for December 2018. This release will include the DCEG, and Feature Catalogue. Completion of an Edition 1.0 Portrayal Catalogue may not be completed within this time frame. CMO reported that the issues raised by the ECDIS Display Sub-WG (under ENCWG) will need to be addressed.

New symbols for S-101, taking into account new guidance in S-4 and new/revised modelling from S-57 in S-101, will also need to be developed. The NCWG Chair reported that this has been tasked to the NCWG, and will likely not be completed for S-101 Edition 1.0.0.

The timeline for the development of S-101 from Edition 1.0.0 (test and evaluation version) to projected Edition 3.0.0 (operational release) was discussed, with the meeting agreeing to a new version of the Product Specification every 2 years (**Action 56**).

8. S-100 Test Bed Reports

8.1 Report of 2017 KHOA S-100 Sea Trial

YB provided a video report on the KHOA test bed project which was highly commended by the meeting. LP enquired whether the video could be made publically available – YB to investigate (see Agenda item 6.10 and Action 52). HP reported that, although the report was highly commendable, there was still a lot of ECDIS functionality missing. Once these have been included, it will be possible to get a much better idea of the S-100 dataset interoperability issues. Following requests for access to the test datasets, YB reported that it should be possible to make these available, with the exception of the S-102 datasets. CMO proposed that S-101 portrayal needs to be completely reviewed to align it with modern technology (i.e. large format, high resolution flat screens).

8.1.1 KHOA S-100 Testbed Project

See 8.1 above.

8.2 Report on improvement of S-100 viewer

No paper submitted – no report.

8.3 Progress report - S-100 Exchange Catalogue Editor

SO reported that the S-100 Exchange Catalogue Editor had been developed as part of a technical cooperation project between KHOA and NOAA in order to support the S-100 test bed projects. Exchange Catalogue makes reference to the ISO 19139 schema package. The editor was used to develop and test cases using S-101 ENC, S-122 MPA, S-123 MRS, and S-201 AtoN Exchange sets and it is planned to use the Editor for the next S-100 test bed project. He invited S-100 members to review the mandatory attributes and the folder structure for exchange sets and provide any comments / feedback.

HB proposed that the structure should be kept simple and should be same for all products in the exchange set (i.e. the folder structure should be keep very generic at the S-100 Exchange Set level). There was general agreement that further guidance was needed in the documentation to ensure conformity (**Actions 57, 58 and 59**).

8.4 Demo of No-go area with S-102 and S-104 Data Sets

SO reported that KHOA had produced S-102 Bathymetric Surface and S-104 Water Level datasets to test their prototype go / no-go area portrayal. He noted that S-129 PT (UKCM) application schema also includes “no go” area as a feature types which will need further consideration.

DB reported that S-102 will transition to use the colour scheme defined for S-52 and therefore recommended that KHOA should not make too much effort on portrayal at this stage.

8.5 SPAWAR S-100 Test Bed Project

DG reported that as part of their S-100 test beds, a number of issues had been identified. They have identified S-101 Lua portrayal issues relating to IEC 61174 selectors. HP proposed that the display of

selector names used, probably needs to be updated to reflect the latest edition of S-52 (i.e. Pres Lib Edition 4).

He reported that updates and clarifications to GML encoding had improved dataset conformance to S-100 and anticipated that their next viewer may support GML datasets. He concluded however that gridded products using HDF5 needed further refinement.

He noted that their goal is to deliver a fully operational LUA Portrayal Catalogue before the next Test Strategy Meeting.

The meeting agreed to add Lua to S100_SupportFileFormat and the Chair invited SPAWAR to provide proposals on all their S-100 related recommendations for inclusion in S-100 Edition 4.0 (**Action 60**).

9. External Liaison Reports

9.1 ISO

No report.

9.2 OGC

No report.

9.3 IEC

9.3.1 Cyber Security and Authentication Issues

HP reported that IMO has set generic guidelines to manage maritime cyber risk. Due to a lack of standardization industry members have created their own private rules for combatting cyber security threats. He proposed that this had become a matter of urgency, and the next full edition 4.0.0 of S-100 should include guidance for those developing S-10X based product specifications.

The Chair noted that it is intended to include the draft section on Security in the next edition of S-100.

9.3.2 Information about S 421 Route Plan Exchange

HP reported that the RTZ route exchange format (specified in IEC 61174 Annex S Ed 4) will be transformed into an S-100 product by IEC TC80 for use in e-Navigation. The S-412 Product Specification will also get the IEC number 63173, and a FDIS should be completed for comments & voting in 2020. The chair invited the S-412 drafting group to submit any updates that may be required for S-100 to the WG for inclusion of S-100 Edition 5.

9.3.3 Preconditions of IEC to consider inclusion of S 100 into ECDIS standard

HP informed the meeting that in 2010, IEC published document 62376 for Electronic Chart Systems (ECS). This is the equivalent of 61174 for ECDIS. He noted that for the development of a similar standard for an S-100 based ECDIS, there are some additional items (e.g. cyber security, risk management, software quality assurance etc...) that would need to be taken into consideration. He proposed that the 9 phase test program developed by the S-100WG should be a precondition for IEC to be in a position to publish the S-100 compliant version of the ECDIS standard. He invited the meeting to consider the proposed draft check list of items required for SOLAS class ECDIS. The Chair agreed to investigate how the proposed items can be integrated into the Test Bed documentation (**Action 61**).

9.4 IEHG

DLD reported that the Inland ENC Harmonization Group have made some progress with their S-401 Product Specification. Their goal is to base the Product Specification on S-101 as much as possible to ensure a high degree of compatibility. The Chair expressed appreciation to IEHG for their cooperation, in their I-ENC Product Specification development activities.

9.5 WMO - JCOMM

JPH reported on the progress with the S-411 and S-412 Product Specifications being developed by WMO/JCOMM. He noted that they had requested the inclusion of the b-Spline geometric primitive in S-100 Edition 4.0.0. This will enable the group to transmit weather information far more efficiently. Following a discussion on the data encoding methods, it was agreed that it was possible to have two encodings in a single Product Specification. It was also agreed that text should be included in S-100 Edition 4.0.0 indicating that b-Spline should not be used for depth curves (or any other linear navigationally significant features) – refer to Agenda item 4.3 and Action 26.

10. Any Other Business

10.1 Proposal for G Series Documents

The Chair reported that this was an item discussed at the 9th HSSC meeting. HSSC invited the S-100 and ENC Working Groups to develop a paper for discussion at the next HSSC meeting on the adoption of a new class of G (guidance) documents. The proposal will be submitted to the HSSC10 meeting.

10.2 S-100 Working Group Elections

The IHO Secretariat reported that, following every normal Assembly, Committees and Working Groups are obliged to carry out an election for office bearers. As the only nominations for Chair and Vice Chair were the incumbent members, Julia Powell (USA) and Yong Baek (Rep of Korea) were re-elected as Chair and Vice Chair by acclamation.

11. Review of Meeting Actions

The meeting reviewed the list of actions which are included as Annex A.

12. Date and Venue of Next Meeting

Following an invitation from Denmark, it was agreed that the 4th S-100 WG meeting will take place in Aalborg, Denmark during the last week in February 2019.

13. Close of Meeting

The Chair thanked the Singapore Maritime Port Authority for hosting the meeting and for their warm hospitality. She thanked all Working Group members for their participation and excellent contributions and wished all a safe trip home.

List of Actions

S-100WG3 – Singapore (10-13 April 2018)				
Action Items				
No.	Item	Action	Who	Status
01	3.2	S-100WG2 Action 20: Liaise with OGC regarding RDF and the Semantic Web.	JP	Ongoing
02	3.2	S-100WG2 Action 24: Develop guidelines for the use of Codelist type attributes for inclusion in the IHO GI Registry proposal guidelines; and consider additional guidance for the S-100 document.	JW	Ongoing
03	3.2	S-100WG2 Action 25: Conduct a review of S-99 and produce a new edition based on the accrued practical experience with the Registry and related decisions made at S-100WG2.	JW	Ongoing
04	3.2	S-100WG2 Action 26: Contact S-100WG Project Team leads to determine who will need access to the FCB.	Chair	Ongoing
05	3.2	S-100WG2 Action 30: Establish a new online resource for making available and maintaining all S-100 based test resources including Test Data Sets and Catalogue files (including all historical versions).	Chair	Ongoing
06	3.2	S-100WG2 Action 32: Complete the Data Protection documentation for inclusion in S-100. (Finalise the specification – include guidance for implementers, and consider third part users. Provide further guidance on the use of the serial.txt and products.txt – taking into account the IMO requirement).	JP (lead)	Ongoing
07	3.2	S-100WG2 Action 35: Draft a new part for S-100 Lua Scripting; to support the development of Alarms and Indications, interoperability, and other script based extensions to the main functionality described in S-100.	SPAWAR	Ongoing
08	3.2	S-100WG2 Action 36: Define the process of managing roles and feature associations to be used during the creation of a Feature Catalogue, and produce guidance on this process - to be included in S-99.	KHOA	Ongoing
09	3.2	S-100WG2 Action 37: Include functionality for managing the creation of the roles and feature associations to be included in a Feature Catalogue in the next iteration of the S-100 FCB.	KHOA / IHO Sec.	Ongoing
10	3.2	S-100WG2 Action 38: Include proposed test cases for the initial S-100 conversion tool in the test case document.	Chair	Ongoing

11	3.2	S-100WG2 Action 41: Draft the necessary text to make provision for the generic (S-100 conformant) display of RADAR overlay information. This should include the addition of a RADAR_OVERLAY portrayal context parameter to the S-101 Portrayal Catalogue. (The portrayal rules will have to be modified accordingly).	SPAWAR	Ongoing
12	3.2	S-100WG2 Action 42: When building the next iteration of the Portrayal Catalogue, take into account the need for a context parameter to handle over / under radar.	SPAWAR / KHOA	Ongoing
13	3.2	S-100WG2 Action 47: NATO GMWG to be invited to submit their proposals (A, B and C) to the Register manager.	JW	Ongoing
14	3.2	S-100WG2 Action 50: Submit a paper to the DQWG to discuss the definition of the enumerated values for attribute Quality of Horizontal Measurement.	CMo	Ongoing
15	4.1	Remove arcByCenterPoint and circleByCenterPoint from the list of geometric primitives in model of the Feature Catalogue. Also remove from the Feature Catalogue Builder. Change UML diagram as well as to the table 5-A-20.	JW / KHOA	Complete (S-100)
16	4.2.1	Include the metadata redline document, provided with proposal 4.2.1, into S-100 Edition 4.0.0	JW	Complete
17	4.2.1	Rework the digital signature proposal based on the discussion of mandatory status of digital signatures as implemented at the S-100 and PS levels	EM	For S-100 Ed. 5
18	4.2.2	Further develop, and resubmit the proposal to add an integer type attribute <i>Number</i> to S100_ProductSpecification.	EK, HB, DG, EM	Complete
19	4.2.2	Add final agreed new attribute <i>Number</i> to S100_ProductSpecification at Appendix 4a-D (UML and corresponding table).	JW	Complete
20	4.2.3	Amend <i>S100_SupportFileDiscoveryMetadata:otherDataType</i> and <i>S100_SupportFileDiscoveryMetadata:dataTypeDescription</i> descriptions as proposed in paper 4.2.3.	JW	Complete
21	4.2.4	Concerning metadata proposals (paper 4.2.4 items 2,3,4,5,6,8), an updated redline copy is to be forward to TSSO for inclusion in S-100 Edition 4. (EM, JW).	EM, JW	Complete
22	4.2.5	Apply amended proposal as presented for <i>S100_DataFormat</i> for S-100 Edition 4.0.0.	JW	Complete

23	4.2.5	Further develop the proposal for the values of <i>S100-DataFormat</i> , also taking into consideration the inclusion of S-100 compliance levels, for a more consolidated proposal for S-100 Edition 5.	EM, HP, HB, DG	<i>For S-100 Ed. 5</i>
24	4.2.6	Prepare redline to agree with the changes to S-100 Part 4a proposed in paper 4.2.6; and incorporate in S-100 Edition 4.0.0.	EM, JW	Complete
25	4.3	Include extra guidance on the interpolation method for bSline (for projection onto a spheroid).	EM	Complete
26	4.3	Include text to indicate that bSline should not be used for depth curves (or any other linear navigationally significant features).	EM	Complete
27	4.3	Request the DQWG to check quality aspect related to the dSpline issue.	Chair	
28	4.3	Draft new guidance on the interpolation of the spatial on the spheroid for S-100 Part 7.	HB	<i>For S-100 Ed. 5</i>
29	4.4	GML Clarifications to be incorporated in the Part 10b redline; and incorporated in S-100 Edition 4.0.0.	EM, JW	Complete
30	4.5.1	Prepare new S-100 Part 9a (Lua Portrayal) redline; and incorporate in S-100 Edition 4.0.0.	DG, JW	Complete
31	4.5.2	Prepare new S-100 Part 13 (Scripting) redline; and incorporate in S-100 Edition 4.0.0.	DG, JW	Complete
32	4.5.2	SPAWAR to investigate how to implement a catalogue for ECDIS alerts and indications (see old action)	SPAWAR, HB, HP	<i>For S-100 Ed. 5</i>
33	4.6	Complete development and prepare redline for new S-100 Part 15 (Data Protection), including holding a Data Protection Workshop in conjunction with S-101PT3 meeting (June 2018).	RS, HB, HP, AP	Complete
34	4.6	Incorporate new S-100 Part 15 (Data Protection) redline in S-100 Edition 4.0.0.	JW	Complete
35	4.7	Prepare new S-100 Part 14 (Online Data Exchange) redline; and incorporate in S-100 Edition 4.0.0.	EM, JW	Complete
36	4.8	Apply proposal as presented for attribute <i>featureUseType</i> for S-100 Edition 4.0.0.	JW	Complete
37	4.9	Apply proposal as presented for data type <i>Time</i> , as prepared at S-100WG3 (refer Minutes Annex E) for S-100 Edition 4.0.0.	JW	Complete
38	4.10	Include updated Part 10c (HDF5 Data Format) as presented at S-100WG3 in S-100 Edition 4.0.0.	EM, JW	Complete

39	4.11	Continue to update the Registry model for the Concept register (and other extensions) – for possible review at the next TSM.	KHOA, JW	<i>For S-100 Ed. 5</i>
40	5.1	Report to HSSC the revised publication timeline for S-98.	Chair	Complete
41	5.2	Add the development of the Interoperability Catalogue Builder to the S-100WG Work Plan.	Chair	
42	6.2.1	Invite appropriate Working Groups and Project Teams to appoint members to participate in the work of the GI Registry Project Team; and to participate in the Registry Workshop to be held in conjunction with S-100WG4.	JW	
43	6.2.3	Inform HSSC10 meeting, about the activity to develop the Registry Guideline document (Annex A to S-99) as part of the S-100 report to the HSSC.	Chair	Complete
44	6.4	Include guidance on file naming conventions (based on paper 6.4) in the PS Guide book, taking into account the comments made during the meeting.	Chair	
45	6.4	Amend S-101 Product Specification Main document to reflect the recommendations in the paper and the decisions of the S-100WG.	JW	Complete
46	6.6	Develop a generic set of validation tests that can be used as the basis in the development of all S-100 based Product Specifications.	BC (lead), HB, JLP, TR, SS, JW	
47	6.8	Invite IEHG to harmonise their portrayal (colour tokens, style sheets and IE specific symbols) with those in the new Registry.	DLD	
48	6.8	Include portrayal Colour Style Sheets (CSSs) in the Registry and include explanatory text in S-99.	KHOA, JW	
49	6.9.2	Submit paper 6.9.2 (Methodology for the display of quality information) to the S-101 PT meeting (June 2018) and the DQWG meeting (January 2019).	DQWG Chair	
50	6.10	Submit paper 6.10 to the S-101PT (June) meeting for further consideration.	SO	
51	6.10	Investigate the extent of large numbers of data coverage's within HO's ENC's – to report back to the June S-101PT3 meeting.	ICENC, PRIMAR	Complete
52	6.10	Enquire whether the KHOA S-1xx datasets can be made available for testing.	KHOA	

53	7.2	S-100WG to review and comment on the first edition of the S-121 standard and to feedback comments in time for the documents to be updated prior to HSSC submission in May 2018.	All	Time expired
54	7.2	Request a MLB domain for Maritime boundaries at the HSSC10 meeting.	Chair	Complete
55	7.3	Request a UKCPT domain for Under Keel Clearance Management at the HSSC10 meeting.	Chair	Complete
56	7.4	Change the S-100 revision timeline for new editions to every 2 years	Chair	Complete
57	8.3	Change the catalogue filename example for S-100 Edition 4 (S-100 Part 4a, Appendix 4a-D – exchangeCatalogueName).	Chair	
58	8.3	Send email to all WG PT developers to inform them that catalogue file will be called “catalogue.xml”.	Chair	
59	8.3	Include content about product catalogue structure in the guideline document.	Chair	
60	8.5	Provide proposals on S-100 related recommendations for inclusion in S-100 Edition 4.0.0 redline.	SPAWAR	Complete
61	9.3.3	Examine whether the draft checklist developed by IEC can be included in the S-100 Testbed documentation.	Chair	

Agenda

Document Number Prefix	Agenda Item	Agenda Item / Document Title	
1. Opening and Administrative Arrangements			[Powell]
S100WG3	1.1	List of Documents	
S100WG3	1.2	List of Members and List of Participants	
S100WG3	1.3	S-100WG ToRs	
S100WG3	1.4	S-100WG - Work Plan and Future Meetings	
2. Approval of Agenda			[Powell]
S100WG3	2.1	Agenda	
3. Matters Arising and HSSC Working Group Reports			[Powell]
S100WG3	3.1	Approval of S-100WG2 Minutes	[Powell]
S100WG3	3.2	Review of S-100WG2 Actions	[Powell]
S100WG3	3.3	HSSC9 Report	[Powell]
S100WG3	3.4	HSSC Actions	[Powell]
S100WG3	3.5	ENCWG Report	[]
S100WG3	3.6	NCWG Report	[Hovi]
S100WG3	3.7	NIPWG Activities	[NIPWG]
S100WG3	3.8	DQWG Report	[]
S100WG3	3.9	Report from WWNWS-SC/S-124PT	[Mong]
4. S-100 Edition 4.0.0 Proposals			[Powell]
S100WG3	4.1	Feature Catalogue Alignment to Spatial Model	[Bothien]
S100WG3	4.2	Metadata Proposals	[Mong]
S100WG3	4.2.1	Metadata and ISO 19115 [Malyankar]	
S100WG3	4.2.2	Add number to S100_ProductSpecification [Grant]	
S100WG3	4.2.3	Corrections for S100 Support File Discovery Metadata	
S100WG3	4.2.4	Metadata-S100WG2 Items Interop and S-122	
S100WG3	4.2.5	Remove Other from S100_DataFormat	
S100WG3	4.2.6	Exchange sets and discovery metadata - paper	[Mong]
S100WG3	4.2.6.1	Exchange sets and discovery metadata - proposal	[Mong]
S100WG3	4.2.6.2	Exchange sets and discovery metadata – Appendix 1	[Mong]
S100WG3	4.3	bSpline	[Mong]
S100WG3	4.4	GML Clarifications	[Malyankar]
S100WG3	4.5.1	Portrayal Proposals LUA	[SPAWAR]
S100WG3	4.5.2	Scripting Language Extension	[SPAWAR]
S100WG3	4.6	Data Protection	[Powell]
S100WG3	4.7	Online communication Extension	[IALA]

S100WG3	4.8	Correction for Part 5 Feature Use Type	[SPAWAR]
S100WG3	4.9	Time Reference in S-100	[NIPWG]
S100WG3	4.10	HDF5 Encoding (Ed 4 - Part 10c)	[Powell/Mong]
S100WG3	4.11	Registry Part 2a	[Baek]
5. S-100 Interoperability			[Powell]
S100WG3	5.1	S-98 Interoperability Specification for S-100	[Powell]
S100WG3	5.2	Report on S-100 Interoperability Workshop	[Baek]
S100WG3	5.3	Guidance for Prod Spec Developers	[]
S100WG3	5.4	Comments on S-98 (Interop Spec) by France	[Mouden]
6. S-100 General Topics			[Powell]
S100WG3	6.1	S-100 Test Bed Framework	[Powell]
S100WG3	6.2	IHO Secretariat GI Registry Activities	[]
S100WG3	6.2.1	- Summary of Activities in the IHO GI Registry	[Wootton]
S100WG3	6.2.2	- Proposed Structure of the IHO GI Registry	[Wootton]
S100WG3	6.2.3	- Registry Proposal Guidelines	[Wootton]
S100WG3	6.2.4	- Review of IHO GI Registry Content	[Wootton]
S100WG3	6.2.5	- Register Item Review	[Wootton]
S100WG3	6.3	S-100 Product Specification Guidebook	[Powell]
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S100WG3	6.5	S-101 Support file management	[Skjæveland]
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S100WG3	6.7	Progress on KHOA S-100 Infrastructure Development	[]
S100WG3	6.7.1	- S-100 GI registry 3.0 edition	[Baek]
S100WG3	6.7.2	- Feature Catalogue Builder	[Baek]
S100WG3	6.7.3	- Portrayal Catalogue Builder	[Baek]
S100WG3	6.7.4	- DCEG Builder	[Baek]
S100WG3	6.8	Harmonization Issues on S-10X SVG Symbols	[Baek]
S100WG3	6.9.1	DQWG Letter 2/2018 - Methodology for the display of quality information	[]
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S100WG3	6.10	Creation of S-101 Datasets and Lessons Learned	[Baek]
7. S-100 Project Team Reports and Proposals			[Powell]
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S100WG3	7.1.1	- S-102 GDAL Compliance Considerations	[De Puyt]
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S100WG3	8.2	Report on improvement of S-100 viewer	[KHOA]
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9. External Liaison Reports			[Powell]
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S100WG3	9.3.3	Preconditions of IEC to consider inclusion of S 100 into ECDIS standard	[Peiponen]
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10. Any Other Business			[Powell]
S100WG3	10.1	Proposal for G Series documents	[Powell]
S100WG3	10.2	S-100 Working Group Elections	[IHO Sec]
11. Review of Meeting Actions			[Powell]
12. Date and Venue of Next Meeting			[Powell]
13. Close of Meeting			[Powell]

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Proposed way forward for the discussion on the value of 'other' in the S100_DataFormat enumeration.

Summary; Other is renamed to undefined, and a remark is added to the remarks column stating 'encoding is defined in the product specification*'. A note is added under the S100_DataFormat table which states '* use of undefined means the data product and product specification is not intended for an S-100 compliant system'.

S100_DataFormat

Role Name	Name	Description	Mult	Type	Remarks
Class	S100_DataFormat	The encoding format	-	-	-
Value	ISO/IEC 8211		-	-	-
Value	GML		-	-	-
Value	HDF5				
Value	undefined		-	encoding is defined in the product specification*	-

*Use product specification specific encoding means the data product and product specification is not intended for an IHO S-100 compliant system.

There is also a need for a definition of what a S-100 compliant system is, and the following wording is proposed;

IHO S-100 compliant - Product Specification contains object model which is available as feature catalogue from IHO S-100 GI registry and the product specification specifies which of the encoding methods defined in S-100 Part 10 is used.

Moreover, there is a recognition that some form of compliancy level will be needed for systems that intend to use S-100-based data, and the following wording is proposed as a starting point for such a concept.

S-100 compliance levels

1. IHO S-100 object model compliant

Product Specification contains object model which is available as feature catalogue from IHO S-100 GI registry

2. IHO S-100 compliant

As level 1 plus product specification specifies which of the encoding methods defined in S-100 Part 10 is used

3. IHO S-100 and IMO harmonized display compliant

As level 2 plus product specification includes portrayal catalogue available from IHO S-100 GI registry

Note: See IMO MSC.xxx(99) Guidelines for the harmonized display of navigation information received via communications equipment

For information. IMO NCSR-5, Feb 2018, completed drafting of Guidelines for the harmonized display of navigation information received via communications equipment. Next step is approval and publication by IMO MSC-99, May 2018. The “xxx” in the number of IMO resolution will be available after approval by MSC-99.

Regarding proposals S-100WG3-4.2.4 and 4.2.5 it is proposed that the proposals are accepted with the exception of the discussion on the inclusion of XML, and removal of the value Other being rejected in favour of this proposal. The authors of this proposal, Hannu Peiponen (IEC TC80 chair/Furuno Finland), Holger Bothien (SevenCs), David Grant (SPAWAR) and Eivind Mong (IALA/Canadian Coast Guard) have agreed to keep working on the compliance level proposal with an aim of generating a full proposal for S-100 Edition 5.0.0.

Change Proposal for S-100 Edition 4.0.0 - Time.**S-100 Edition 3.0.0 Part 1 - 4.5.2 Table 1-2**

Time

A time is given by an hour, minute and second. Character encoding of a time is a string that follows the local time (complete representation, basic format) format defined in ISO8601.

Time zone according to UTC is optional.

EXAMPLE 183059 or 183059+0100 or 183059Z

The complete representation of the time of 27 minutes and 46 seconds past 15 hours locally in Geneva (in winter one hour ahead of UTC), and in New York (in winter five hours behind UTC), together with the indication of the difference between the time scale of local time and UTC, are used as examples.

Geneva: 152746+0100

New York: 152746-0500

Proposed change for S-100 Edition 4.0.0 Part 1 - 4.5.2 Table 1-2

Time

A time is given by an hour, minute and second in the 24-hour clock system. Character encoding of a time shall be a complete representation of the basic format as defined in ISO 8601. Complete representation means that hours, minutes and seconds shall be used. Basic format means that separating characters are omitted.

Time is preferably expressed as Universal Time Coordinated (UTC).

EXAMPLE 183059Z

Time may be expressed as a Local Time with a given offset to UTC.

EXAMPLE 183059+0100

Time may be expressed as a Local Time without a specified offset to UTC.

EXAMPLE 183059

The complete representation of the time of 27 minutes and 46 seconds past 15 hours locally in Geneva (in winter one hour ahead of UTC), and in New York (in winter five hours behind UTC), together with the indication of the difference between the time scale of local time and UTC, are used as examples.

Geneva: 152746+0100

New York: 152746-0500

The service hours for a service, that is available all year in an area where Daylight Saving Hour affects the offset to UTC could be expressed as Local Time without specified offset.

Opening: 074500

Closing: 161500