S-100 Test Strategy Meeting 4 + Portrayal Focus Group
BSH Rostock, Germany (13th – 16th September, 2016)
Report

Chair: Julia Powell
Vice Chair: Yong Baek
Acting Secretary: Anthony Pharaoh

Annex A: Agenda
Annex B: Participants
Annex C: Actions

Welcome

The chair Julia Powell welcomed participants and thanked BSH for hosting the meeting. She thanked Jens Schroeder-Fuerstenberg for organizing the meeting and welcomed his participation in the meeting as chair if the NIPWG.

3.   S-100 Interoperability Specification Review

3.1   Update on S-412 Weather Specification

Joe Philips reported that features reviewed by JCOM ready to be put into the Registry – 37 features and 126 attributes. Have used Features / attributes where possible. Have defined some complex attributes. Some historical terminology/definition issues to be sorted out (e.g. beau force).

Portrayal catalogue – everything must be approved by JCOM – ETSS. Help from UNH and Brazilian HO. Need to take account of WMO manual which present different options for portrayal which present some challenges. Digital forecasting presenting new challenges for many countries. Help from KHOA with the generation of SVG symbols.

Plans for the future? A number of symbols currently under review. Reported that they have been having problems imputing features and objects in the on registry application.

They are currently looking into interoperability testing and will be discussing how the S-101 viewer can be expanded to include whether overlays. Need to take account of symbol scaling and temporal issues.

The proposed data encoding formats – GML, HDF5, 8211 – but leaning towards GML. The WG are looking at gridded products for the future.

Hope to have the final draft Product Specification completed by 2018. HB proposed that there should be sufficient attributes to make provision for time dependency of datasets and unique objects. It should not be up to the system to work this out. There need to be a business rule to ensure that there are not conflicting weather overlays.

WMO were requested to split their datasets over the 180 degree meridian. HB - the issue really has to do with large objects that cover the 180 deg line that require loxodromic lines.

It was decided to keep Weather Overlay datasets to the same rule as for S-100 – i.e. to split datasets along the 180 deg meridian.

3.2   Update on NIPWG Specifications

Jens Schroder-Furstenburg reported that NIPWG is developing several Product Specifications; Marine Protected Areas and Radio Services Product Specifications have recently been revised. The traffic Management PS is progressing and it is planned to implement the MPA into the traffic management PS as part of the future work. There is also an MPA Data Capture and Encoding Guide document under development.

A draft Application Scheme has been completed. Portrayal is being progressed but it depends on the S-100 portrayal catalogue work. NIPWG is working with NCWG to develop symbols. It is proposed to have a workshop next year on portrayal development.

Radio services. An application schema draft has been completed, and the WG is undertaking a mapping to other PS'.

Traffic Management. A draft application schema completed and test datasets have been produced.

S-128 - Catalogue of nautical products PS has been produced and a draft version is available. Currently similar to what we have in S-63 – but extends into other products.   This work may be useful for identifying interoperability issues. It includes mostly product and service metadata.

The WG are experiencing issues with data quality – a paper has been drafted on this and is available on the NIPWG3 page.

The WG is waiting for S-100 Edition 3 which includes extension required by NIPWG. The following issues had been identified:

- DEPCNT03 can draw safety contour when VALDCO is equal to SAFETY_CONTOUR but duplicates what DEPAREA03 is doing. It draws dashed line if quality is low. It calls SACON01 which is not yet implemented.

- OBSTRN06 and 7 needs to be reviewed. Need to consider what is included if no sounding is present.

- LIGHTS05 Broken into separate logic to match new Light Features in S-101 - needs to be reviewed.

- SLCON04 draft provided 2015 PC – needs review against preslib 4 – low accuracy tests to be added.

- QUAPOS01 – to be done soon.
- QUALINE01 – draft in progress.
- DEPVAL02 – should become obsolete with the introduction of new attribute providing safe value over a wheck.

- RESTRN01 and RESCSP02 – handeled within the object class

- RSARE01 – this is ok

SNDFRM04 and SOUNDG02 needs a change in the model.

SPWAR would prefer the augmented geometry. Decision was to use augmented geometry – remove the clause in S-100 prohibiting augmented geometries. Agreed that all IDs must be unique.

Decision - There needs to be a unique portrayal ID for portrayal – S-101 should not define what should be used. It should be left up to the application to determine what it will use. It was agreed that part 9 needs clarification to describe this.

DG noted that some of the context procedures are missing from the portrayal specification – scale bars, scale min /max. Is there a need for an S- 52 light? It was agreed that it should be in S-100. These should go in a separate document.

Need to look at the data coverage and loading and unloading specification. Does this really need to be machine readable? Decided to consider this with the interoperability model work.

3.3   Update on S-411 Sea Ice [???]

Jurgen …..

3.4   S-100 Product Interoperability Analysis

Ed Kuwalek reported on the ECDIS Interoperability Catalogue work had been funded by NOAA and the first three phases had been completed. The main task for phase 1 was as interoperability analysis. He noted that this was presented to the March S-100 meeting. Very good feedback was received and this was included in a report distributed in May 2016.

The work for phase 2 included the development of UML models + XML schemas + some extra work.

EK noted that the ENC will now only be part of a much broader echo system. JP noted the principle for turning layers on / off should be regulatory neutral. ED – the spec will not stipulate which layers must be turned off / on – it just provides the options to do so.

Levels 1,2,3 mostly associated with switching on / off layers. Level 3 and 4 are much more complicated, and include the selection of feature instances from different products, and replacement of features using unique identifiers.

HP noted that the model must take account of the mariners needs and should not present selections that are too complex.

HB – the spec needs to consider use cases where there is a dataset that falls within a bigger dataset?

DG – scale needs to be taken into account when deciding which layers of features should be interweaved. This may require a refined level of specification at the prod spec level. Jurgen noted that they were doing level 4 interoperability with the ICE product specification.

Discussion about hybrid features and what would trigger their portrayal – especially under varying circumstances.

HP – proposed that global replacement of features should be level 2 and not level 4.

The "significant features" requirement was questioned and it was proposed to remove this concept as there are better mechanisms to implement this function.

The specification defines display planes – which include different sets of features.

Discussion on viewing groups – it was agreed that viewing group should be removed from S-101 (this is an S- 57 artefact that will be replaced with "Display planes" which should be more flexible for multiple products in the ECDIS.

After lengthy discussion, it was agreed that the framework was too complex and needed to be simplified. KI proposed that and the specification is for use in E-Navigation products, and not only for ECDIS.

On the question of whether to replace S100_IC_Feature groups with viewing group, it was decided to not implement this, but rather to develop information papers presenting both sides of the argument – for discussion at the next meeting.

HB proposed that, considering the discussion regarding levels 1 and 2, and the requirement to further develop these concepts, there is little value to further discuss levels 3 and 4. He proposed that we need to further consider the overall model taking into account portrayal and which levels will be pre-processed and which will require post processed. EK noted that the development team did not want to interfere with the portrayal design, but noted that the pre-processing requirement would need to be considered as well as the proposed implementation of the Lua proposal.

HP noted that S-Mode has to do with harmonising ECDIS interfaces and is outside the scope of the interoperability specification.

After further discussion, it was proposed to not have any pre-processing, and limit the interoperability to selection / grouping of post process portrayal elements.

Final conclusion: Start with defining level 1 interoperability (i.e. interleaving layers) and look into more complex feature level interleaving as stage 2 and consider whether there is a need for more complex interoperability requirements later.

Action: EK to produce a simplified version of the design document which only includes level 1 and 2 for discussion at the next S-100 meeting.

Question for discussion. Should level 1 be a global priority list or should it be broken down into product, feature, attribute and geometry?

It was agreed that the second option (look at the drawing instruction – and sort (post process) on drawing instructions) was better.

There are two main concepts for consideration and the WG should choose one for further development;
1 Described the display feature attribute geometry combinations
2 Describe the display in themes of post process display plane interleaving.

DG – proposed that both requirements will be needed to be modelled. HB - need to understand the fundamental differences between the two options. Pre-processing is more like filtering and should be an option to improve efficiency/speed. Post processing is reordering the portrayal content.

Decision: It was agreed that both options should be modelled.

Action EK to provide new interoperability options to Chair. Chair to distribute to WG members with comment sheet soliciting comments – for further discussion at the next S-100WG meeting.

3.5   S-100 and the IMO Performance Standard

The Chair noted that this is an outstanding action from HSSC7 that looks at the regulatory aspects (ECDIS Recipe) and associated organizations IHO,IMO, IEC, …. relating to the IMO MSC232 (82) – minimum requirements needed for ECDIS.

HP noted that reception of MSI on-board ships is a mandatory requirement for carriage requirements. Any other method of getting MSI info must be, at least equivalent to the current GMDSS method being used.

Proposed options – change S-100 number back to S-57 (e.g. Ed 4) – the IHO would then just need to use the Edition number in force.   (This was considered to be viable option).

Noting that IMO only references S-57, S-52 and S-63.
Change S-57 references to S-101 (X), change the footnote and change the footnote and add a new clause. It was estimated that this could take about 5 years.

Changes will also need to be made to IEC 61174 and a new edition of S-64 would be required for S-101(X) testing and type approval.

Way forward – start preparing the new text for IMO – and start preparing all the necessary testing documents.

HP reminded the meeting that for e-navigation nothing will be mandatory until implementation and testing is complete. IHO should consider proposing developments to IMO once they have been operational and proven.

Harmonization group on data modelling. This was the original group that wrote the ECDIS minimum performance specifications. Proposed that a white paper on the way forward - needs to be developed if this is formed.

KI proposed that an equivalent of 232 should be proposed for e-navigation which references S-100 as the underlying framework. This would have to be proposed by a Member State to IMO MSD.   HP – we will need to develop a new suites of tests (equivalent of S-64).
Recommend that a stakeholders group meeting should be held at the HSSC9 meeting to consider the way forward.

Action: S-100WG chair propose to hold a Stakeholders event at the HSSC9 meeting.

3.6   Update on S-104 Water Level Information for Surface Navigation Product Specification   [Powell]

3.7   S-100 Draft Interoperability Catalogue [Powell]

4.   S-100 Portrayal Issues
[Powell]

4.1A   S-101 CSP to XSLT Review [Powell/Kuwalek/Astle]

JP provided a review of the portrayal development that has taken place so far which included the decision made at the previous Hamburg meeting and the XSLT work undertaken there.

HA provided a presentation on the XSLT work done so far. DG noted that the schemas in S-100 section 9 were product specific and there was a need to include a generic schema which would be the basis product specific schemas.

Proposed that composite curves (CompositeCurve) should be abandoned – they may save some space, but they make portrayal very complex.

DEPARE03 - SAFECON02 - used to turn contour depth into contour label symbols to be changed to present soundings as text instead of symbols. We would have to develop a custom font. Current symbols are ugly, but there will be issues of consistency and placement if fonts are used.   HP noted that with the introduction svg symbols, the sounding symbols will be improved.

Decision – stay with symbols, but improve the sounding symbols.

Can land features or presentation suppression be handled with priorities? Safety contour should not be used for alarms and indicators – only depth areas should be used for this. This was agreed by the meeting.

What should happen when safe water shares border of cell. Is a test needed to test if safe water continues in the next cell?

Proposal to avoid the use of CompositeCurv in the model to simplify the portrayal logic. Problem is that composite curves references are recursive i.e one cc references another cc which references another cc. This was agreed by the meeting.

4.1B   S-101 CSP to XSLT Draft

????

4.2A   Portrayal Register Interfaces [Powell]

Julia reported that the portrayal register model has been updated and new tables have been created.   KHOA have agreed to develop portrayal interfaces for the new model and tables.

Draft priorities table was reviewed (paper 4.2A) and agreed in principle. Hugh noted that the PCB stores the portray rules – the graphics / svgs are stored as blobs. Looking at the model – they are all register item – and should not have a big impact the PCB. What we need is a pattern process to load the entities. All the svg symbols must be compliant to the schemas which are in the portrayal register.   There is no mechanism for loading / approving the schemas. HA proposed that we should review the viewing group in conjunction with the interoperability work.

SPAWA noted that there is no viewing group for text in S-101 and there is a need to decide on new viewing groups. HB noted that we should not use the term CSP – in S-100 they are "portrayal rules"

Jurgen noted that the WMO – ICE have defined their symbols in SVG and they have developed their own colour tokens and queried how they would be integrated into the catalogue. DG – S-100 - colours are tokens that defined as cie values.

What about colours in different products. Certain colours (such as magenta or orange) may be reserved for specific purposes. There may be different colour schemes for front / back of bridge use. These issues will have to be considered by the interoperability group.

4.2B   Reference: S-100 Part 2b Portrayal Register Model

4.3B   Lua as an potential alternative to XSLT for CSPs   [Grant]

DG reported SPAWAR had done significant work on portrayal, but had reached the limit with what they are able to do with the current portrayal specification. This had prompted to look for an alternative option. The considered the following scripting languages – xslt, Javascript, Python and Lua. After testing it was concluded that Lua was a good option. SPAWAR have implemented it their test-bed software and have produced a simple viewer which is available on the basecamp website. He noted that there is no need for XSLT schemas as the Lua processor replaces the xslt processor. Lua is open source interpreter. The work carried out on the xslt schemas was used to produce the Lua scripts. It was noted that some customization would be required to implement Lua in S-100 and the chapter 9 (portrayal) would have to be updated. Seven Cs and Furuno both indicated their support for the use of Lua, and noted that they were not in favour of adopting two solutions – it should be one or the other. There were some issues raised about security relating to how Lua code will access the ENC data. It was agreed that all catalogue files should only be distributed using an authentication scheme such as s-63.

Action: SPAWAR to further develop the Lua implementation examples and draft the necessary text for S-100 section 9 to make provision for Lua portrayal. This is for presentation and agreement at the next S-100WG meeting and if approved, for inclusion in S-100 Edition 4.0.0.

5.   S-100 Test Bed Updates

5.1   KHOA Test Bed   [Oh]

Sewong – outlined the joint NOAA / KHOA project to improve the S-101 viewer to handle additional capabilities and highlighted the exchange catalogue produced by IIC.

DB proposed that there needs to be corresponding ENC / S-102 test datasets in different parts of the world to be used for testing the viewer.

Action: Send out a request to MS to provide data in different parts of the world for testing the viewer (chair). Next step will be the inclusion of the interoperability catalogue.

5.2   SPAWAR Test Bed   [Grant]

David Grant reported that version 1.2 of the S-101 viewer available on the Basecamp site. This also includes a Lua implementation. They have started work on a shore based ECDIS – this is based on Konstantin's work. The viewer loads all of the test datasets and is now able to detect invalidated geometries.

5.3   Version Control of Catalogues

YB proposed that the registry needs a mechanism to keep track of the names and edition levels of feature and portrayal catalogue associated with S-10X product specification. These also need to be linked to the appropriate S-100 section. Metadata about these edition level associations need to be available for use by the Feature and portrayal catalogue builder versions through the builders. There will need to be further discussion on the best method to get exchange set catalogue / or interoperability catalogue.   The interoperability catalogue will need to reference multiple feature catalogues – i.e. information from the registry – in an xml format.

JP reminded the meeting that this was discussed at a previous meeting i.e. about whether to have multiple catalogues or accumulative catalogues. The only way to make this bullet proof is to make the catalogues available with the exchange set.   The following issues were considered:

1. connection to PSR – proposal agreed in principle.

2. create a draft FC using proposing features – agreed in principle.

Decision: it was agree that this is an issues that needs further work, and a proposal is to be provided at the next S-100WG meeting.

Action: Paper to be submitted to the S-100WG2 meeting on Feature / Portrayal catalogues and the packaging / distribution.

6.1   AttributeValueType Uppercase vs Lowercase

Industry members noted they don't mind which way to structure the camel case as long as a consistent rule is applied. TP reported that the camel case rules in the registry database infer a model - the S-57 model in this case. He was of the opinion that the registry structure is incorrect and cited the seamount modelling example, which had been reported to an earlier meeting.   He proposed that concepts submitted for inclusion in the registry should be stateless (i.e. there should be no reference to them being features, attributes or enumerated values. The status should also not be inferred in the camelcase name either. Items in the concept register should also not have any status. Any decision about how a community will implement a real world object should be based on their choice of items from the concept register. The concept register should not have any implied status (as is currently the case).

When building a feature catalogue, the process of assigning status to an item (concept) should be done in the Feature Catalogue Builder. Currently this is not possible as all items in the registry are assigns as either "Feature concepts" or "Attribute concepts." Noting that registered concepts should be unique, it is not possible to use a registered "feature concept" as an "attribute concept", without having to duplicate, and remodel the original concept. This invalidates the rational behind establishing and maintaining a registry for a GI community to use.

Action: Write a paper on S-100 Producer Codes - for consideration by next S-100WG meeting (TP).

6.2   S100 Session Oriented Services – IALA

The chair noted that it is not clear how this would fit into the S-100 model and whether the proposed specification complies with the appropriate OGC / ISO standard. It appears that this is being driven by e-navigation and the meeting questioned whether any other options

had been considered for delivering content. She proposed that the IALA should be invited to make a presentation to the next S-100WG meeting to provide more information about the proposed extension, including the proposed changes to the S-100 standard.

Action: Invite IALA to present the proposal on Session Oriented Services to the next S-100WG meeting (chair)

6.4   Update on Feature Catalogue Builder

The meeting discussed the issue on super-type and subtype.   It was agreed that super-types should be allowed in the feature catalogue. HB note is not possible to have multiple inheritances, but chain inheritance is allowed.

7.1   S-100 Agency Code Register

TP provided background about the Producer Agency Codes published as the S-62 document. The database that was on the old registry application, has been moved to a new application and will eventually be moved too the new (KHOA) registry. The following issues were identified when developing the interim application;
-    the distinction between official and non-official is determined by which number space an agency code located (i.e. between 0 to 1599 – official or 1600 -> non official). This is not stated anywhere in S-57 or S-62 and must be inferred by OEMs. There need to be a distinctive field in the new registry for differentiating between official/non-official and this should be properly documented. The differentiation between official / non-official number space will have to be kept for backward compatibility, but the numberspace differentiation between IHO and non IHO should be removed – an extra database field can be used for this. He proposed that there is also need to investigate if the 32 bit integer data type provides sufficient scope for future requirements.
-    The only output from the S-62 database is (non-machine readable) pdf. All OEM members requested that a machine readable version should be available. They would also like to be able to check, (or be informed) when information is changed or new codes are added.
-    What to do about agency codes on the OEF (and other possible resources) that are not in the database. IHB to investigate.
-    Sub dividing agency codes into blocks of 10 numbers – for each country. Agreed that this was not a good mechanism and need to be changed for S-100.
-    Codes based on 2 letter country codes used in the ENC file naming convention. Agreed that this was not a good mechanism and needs to be changed for S-100.
YB – proposed an extended file naming convention that was not constrained by the 8.3 restriction and that included a reference to the product specification number. The meeting agreed that it was not a good idea to encode metadata in the filename and for S-100, this should be avoided. The metadata currently in the filename is in the main dataset metadata.

Action: IHB and KHOA to develop an enhanced producer code paper for next S-100WG meeting.

Presentation on the Registry (Mr Choi)
New registry online (http://www.registry.iho.int). Covered the FCD.

Noted that in the portrayal registry table, there is a pixmap field which is not described in the S-100 document i.e. its missing from the dictionary table in S-100 part 9. It was agreed that this needs to be included.

Action: Make provision for the inclusion of pixmap format in S-100 Ed 3.0.0. Part 9.

Catalogue Product Specification

The proposal to develop this PS it was approved at HSSC7 and assigned the number S-128. The catalogues could include paper products as well as digital (S-57) and S-100) based products. JP – questioned whether S-128 is aligned with what is being developed for S-63 service data, and proposed that the S-128 could be extended to include S-63 service elements. She questioned what community the specification was aimed at. HP – noted that the products.txt currently includes global ENC coverage.

Jurgen- proposed that it should be a specification of a database and web service that will allow data users to input product metadata which will allow users to get access to the data. HB note that the structure is a template for a catalogue – and proposed that there should be a common format / structure for product metadata. KI – supported that requirement to have a standard – and proposed that it needs to consider the e-navigation marine service portfolio (msp) requirements.

EK – in the web services community there is a catalogue serves specification specifically for catalogue services and recommended that the PT take into consideration.

JP – within S-101 there is already a catalogue specification which overlaps with S-128 and there is a need for some harmonization between the two.

HP – agreed with Jurgens comment about defining the structure of a catalogue database as a web service infrastructure.

YB expressed appreciation for the comments provided and noted that he will feed them back to the next NIPWG. JP requested TSM members to provide feedback to the PT working on S-128.

Meeting Closure

The chair thank all members for their contribution to the meeting and especially the BSH (Jens Schroeder-Fuerstenberg) for the excellent hosting facilities.

Date and Venue of next meeting

The next meeting is scheduled to take place in Sept – North America – t.b.d

AGENDA

Document Number Prefix*	Agenda Item	Agenda Item / Document Title
1. Opening and Administrative Arrangements		[Powell]
TSM4	01A	List of Documents
TSM4	01B	List of Participants
2. Approval of Agenda		[Powell]
TSM4	02A	Agenda
3. S-100 Interoperability Specification Review		[Powell]
TSM4	3.1	Update on S-412 Weather Specification [Philips]
TSM4	3.2	Update on NIPWG Specifications [Schroder-Furstenburg]
TSM4	3.3	Update on S-411 Sea Ice [???]
TSM4	3.4	S-100 Product Interoperability Analysis [Kuwalek]
TSM4	3.5	S-100 and the IMO Performance Standard [Powell]
TSM4	3.6	Update on S-104 Water Level Information for Surface Navigation Product Specification [Powell]
TSM4	3.7	S-100 Draft Interoperability Catalogue (.zip) [Powell]
4. S-100 Portrayal Issues		[Powell]
TSM4	4.1A	S-101 CSP to XSLT Review [Powell/Kuwalek/Astle]
TSM4	4.1B	S-101 CSP to XSLT Draft
TSM4	4.2A	Portrayal Register Interfaces [Powell]
TSM4	4.2B	Reference: S-100 Part 2b Portrayal Register Model
TSM4	4.3B	Lua as an potential alternative to XSLT for CSPs [Grant]
TSM4	4.3C	
5. S-100 Test Bed Updates		
TSM4	5.1	KHOA Test Bed [Oh]
TSM4	5.2	SPAWAR Test Bed [Grant]
TSM4	5.3	Version Control of Catalogues [Baek]
TSM4		
6. S-100 Edition 3.0.0 Review and other S-100 Issues		
TSM4	6.1	S-100 Schemas/FC/Register uppercase v. lower case [Powell]
TSM4	6.2	IALA Proposal on Session Oriented Services [Powell]
TSM4	6.3	S-100 Edition 3.0.0 Comments [Powell]
TSM4	6.4	Update on the Feature Catalogue Builder [Oh]
TSM4	6.5	Update on the S-100 Registry [Choi]
7. Any Other Business		
TSM4	7.1	IHO Producer Agency Codes Register [Pharoah]
8. Review of Meeting Actions		[Powell]
9. Close of Meeting		[Powell]

Annex B

Participants

Name	Affiliation	Email
Julia Powell [JP] (Chair)	United States (NOAA)	Julia.Powell@noaa.gov
Lt. Joseph Phillips [JPh] (S-412)	United States (NOAA)	Joseph.T.Phillips@noaa.gov
Dave Brazier [DB] (S-102PT)	United States (NAVO)	David.Brazier@navy.mil
Jens Schroeder-Fuerstenberg [JSF](NIPWG)	Germany	Jens.Schroeder-Fuerstenberg@bsh.de
Jonathan Pritchard [JPr] (DPSWG)	United Kingdom	Jonathan.Pritchard@ukho.gov.uk
Ed Kuwalek [EK]	IICT	Edward.Kuwalek@iictechnolgies.com
Hannu Peiponen [HP]	Furuno	Hannu.Peiponen@furuno.fi
Tom DePuyt [TdP]	ESRI	tdepuyt@esri.com
Holger Bothien [HB]	SevenCs	Holger.Bothien@sevencs.com
Sewong OH [SO]	KRISO	osw@kriso.re.kr
Hyunsoo CHOI [HC]	KRISO	troychoi@kriso.re.kr
David Grant [DG]	US SPAWAR	David.Grant1@navy.mil
Hugh Astle [HA]	Caris	Hugh.Astle@caris.com
Konstantin Ivanov [KI]	Transas	Konstantin.Ivanov@transas.com
Tony Pharaoh [TP]	IHB	addt@iho.int
Yong Baek [YB]	IHB	ybaek@korea.kr

Actions

TSM4 / 1	Produce a simplified version of the design document which only includes level 1 and 2 for discussion at the next S-100 meeting.	EK
TSM4 / 2	EK to provide new interoperability options to Chair. Chair to distribute to WG members with comment sheet soliciting comments – for further discussion at the next S-100WG meeting.	EK / Chair
TSM4 / 3	Propose to hold a Stakeholders event at the HSSC9 meeting.	Chair
TSM4 / 4	SPAWAR to further develop the Lua implementation examples and draft the necessary text for S-100 section 9 to make provision for Lua portrayal. This is for presentation and agreement at the next S-100WG meeting and if approved, for inclusion in S-100 Edition 4.0.0.	SPAWAR
TSM4 / 5	Send out a request to MS to provide data in different parts of the world for testing the viewer. Next step will be the inclusion of the interoperability catalogue.	Chair
TSM4 / 6	Write an explanatory paper on concepts and their inclusion in the Registry - for the next S-100WG meeting.	TP
TSM4 / 7	Write a paper on S-100 Producer Codes - for consideration by next S-100WG meeting.	TP / YB
TSM4 / 8	Invite IALA to present the proposal on Session Oriented Services to the next S-100WG meeting.	Chair
TSM4 / 9	Make provision for the inclusion of pixmap format in S-100 Ed 3.0.0. Part 9.	Chair