# 7th HSSC MEETING

## Busan, Republic of Korea 9-13 November 2015

## Report of the S-100wg to HSSC 7

## S-100 Working Group

| | |
|---|---|
| ***Submitted by:*** | Chair, S-100wg |
| ***Related Documents:*** | List of Actions HSSC7-03B<br>HSSC5-05.1D Regulatory process associated with the implementation of S-100 based products and services |
| ***Related Projects:*** | NA |

| | |
|---|---|
| ***Chair:*** | Julia Powell, NOAA |
| ***Vice Chair:*** | Yong BAEK, KHOA |
| ***Secretary:*** | Eivind Mong, Jeppesen |
| ***Member States:*** | Argentina, **Australia**, Belgium, **Brazil**, **Canada**, Ecuador, **Finland**, **France**, **Germany**, India, **Japan**, **Republic of Korea**, Netherlands, **Norway**, Poland, Portugal, Russian Federation, Singapore, South Africa, **Sweden**, **United Kingdom**, Ukraine, **United States of America**. |
| ***Expert Contributors:*** | **The International Centre for ENCs (IC-ENC)**, **PRIMAR Stavanger**, **Caris**, **ESRI (USA)**, **Furuno (Finland)**, **Furuno Electric**, GEOMOD (France), Hydundai e-Marine (ROK), **Jeppesen Marine**, **IIC Technologies (Canada)**, NAVTOR AS (Norway), **SevenCs (Germany)**, TKartor (Sweden), and **Transas (Russia)**, Frank Hippmann (Australia) |

DRAFT

## 1 Meetings Held During Reporting Period

a. TSMAD 29/S-100WG 0: 2 February – 6 February, 2015, Ottawa, Canada (in conjunction with DIPWG7)
b. S-100/S-101 Test Strategy Meeting 3: 22-24 September 2015, Jeju Island, ROK

## 2 Work Program

Progress continues on the work items assigned by HSSC as follows:

### 2.1 Maintain and Extend S-100 "IHO Universal Hydrographic Data Model" (A)

### 2.1.1 Develop S-100 Edition 2.0.0 (A.1)

S-100 Edition 2.0.0 was approved by the IHO member states in March 2015 (CL19/2015) and officially published in June 2015. This closes the existing work item and it is **recommended that the work item be modified to Maintain and Extend S-100** as there continues to be further clarifications, corrections and extensions to S-100 as new product specifications are under development.

Some of the items that are currently under consideration for S-100 are:

- Inclusion of HDF-5 as an encoding format (needed for S-102 and S-111)
- Profile of SVG elements for portrayal
- Clarification of dataset attributes
- Use of Alerts and Indications

In addition, to maintaining the word documents of S-100, considerable work has gone into harmonizing the Enterprise Architect UML Models. NOAA was able to fund a small contract with Jeppesen to review the UML models against the approved edition of S-100. The S-100 WG chair would also like to thank Canada for the initial baseline of the models that were used in the update. Once the models have been reviewed by the S-100 working group they will be finalized and published on the IHO website for use in development in S-100.

### 2.1.2 Investigate a suitable grid referencing system for S-100 (A.2)

This item has been dormant for the past five years and it is **recommended that the work item be removed**.

### 2.1.3 Develop a guide book for using S-100 product specifications (A.3) Develop an S-10X product specification for Auxiliary Information Layer Integration. (A.5)

Work is ongoing on the development of a "guidebook" on the use of S-100. The work is currently being focused on developing an S-100 interoperability specification for use in navigation systems. Initial scoping work was completed at the S-100 Test Strategy Meeting in Jeju Island, ROK. As part of a joint project agreement between NOAA and ROK a small amount of funding has been allocated to contract the initial drafting of the specification. It is recognized that the initial specification will be a "think piece" and will undergo further refinement as the S-100 test bed progress and other S-100 product specifications are developed. These two work items are extremely similar and it is **recommended that they be merged into a single work item call: Development of an S-100 Interoperability Specification for ECDIS.**

### 2.1.4 Develop and maintain S-100 Portrayal component (A.4)

As a result of the publication of S-100 edition 2.0.0 the portrayal catalogue mechanism has been included in S-100 it therefore **recommended that this work item be removed and folded into A.1**

NOTE: This work item just addressed the documentation component of S-100 Portrayal and not the Potrayal Catalogue Builder or the S-100 Portrayal Register. These will be discussed under workplan item C.

## 2.2 Maintain and Extend the S-99 "Operational Procedures for the Organization and Management of the S-100 GI Registry (B)

DRAFT

Work has not been started on implementing the following HSSC6 action:

**HSS6/16: S-100WG to implement the proposal of TSMAD related to the registration of Product Specifications and to draft the appropriate changes to the S-100 GI registry and S-99.**

This is due to other infrastructure problems that were discovered during the handover from the former chair of TSMAD to the S-100 WG chair. These issues will be discussed in a separate paper.

**It is recommended that the following item be added to the S-100 workplan and the action be carried forward another year:**

*B.1 Update S-99 and the S-100 Registry pages for the registration of S-100 product specifications in accordance with HSSC6-05B rev1.*

## 2.3 Maintain and extend the S-100 GI Registry (C)

This work item is discussed in more detail in the accompanying S-100 Registry way forward paper. However, it is **recommended that the following sub work items be added to the S-100wg plan**:

*C.1 Update S-100 GI Register to edition 2.0.0 and re-build the web-interfaces*
*C.2 Connect the S-100 Feature Catalogue Builder to the S-100 GI Register*
*C.3 Develop web-interfaces to propose new symbology to the S-100 Portrayal Register*

## 2.4 [Supervise/Advise] and support the development and maintenance of S-100 based product specifications.

### 2.4.1 Review the S-100 Master Plan Annually (D.1)

After HSS6 the review of the S-100 Master Plan has been included into the S-100 wg plan. The IHB provided in input paper to TSMAD29 regarding input from Member States and IHO Stakeholders into the master plan. As a result the following changes are recommended:

| Section Number | Changes |
|---|---|
| 3 | Added language that there is currently no metadata register and no plans to establish one at this time |
| 3 | Added a listing of existing register domains |
| 3 | Removed duplicate information that is already contained in S-99 regarding the management of the registry |
| 5 | Updated the S-101 Section including the general timeline |
| 6 | Amended Section 6 to discuss the S-100 Test Bed |
| 7 | General edits to section 7 to account for the need of an S-100 Interoperability Specification |
| All | Other minor changes |

Annex B contains Member State comments from CL 8/2014 to the S-100 Master Plan and the chairs comments.

DRAFT

One of the items that's included in the S-100 master plan is to liaise with the IMO in regards to the regulatory process associated with the implementation of S-100 based products and services. At HSSC5 the IHB submitted a paper (HSSC5-05.1D) that outlines the specific IMO publications that may have to be changed as a result of S-100 and S-100 based product specification. In this document one of the key recommendations was the following:

*Therefore, it is recommended to advise IMO to consider the revision of the relevant Performance Standards and other instruments, if required, as a component of the draft e-navigation implementation plan to be finalized in 2014 for consideration by NCSR 1.*

Furthermore, the IHB reported out at HSSC6 (HSSC6-07.1A) the need for a change in the ECDIS performance standards was not reflected in the E-Navigation Information Paper that was submitted to NCSR1/INF.6 and the issue should be revisited under tasks T14 and T16 of the E-Navigation Strategic Implementation Plan.

The key issue is to determine when to begin the IMO process to propose changes to the IMO PS to enable the use of S-101. On one hand we do not want to be premature and not have any data available, but on the other hand the process should not wait until S-101 is finalized by the IHO as then it will still be several years until the IMO PS is updated and SOLAS ships will still be required to use S-57 data.

One option would be to focus on T16 of the e-Navigation SIP and propose a new item of work that will create a plan as to when the IMO performance standard for ECDIS should be updated and what updates would need to occur under the S-100 framework of products. In looking at the existing IMO PS, it might just need some minor revisions for S-101 as the rest of the S-100 products may be covered under the following language:

> *7 DISPLAY OF OTHER NAVIGATIONAL INFORMATION*
> *7.1 Radar information and/or AIS information may be transferred from systems compliant with the relevant standards of the Organization. Other navigational information may be added to the ECDIS display. However, it should not degrade the displayed SENC information and it should be clearly distinguishable from the SENC information.*
> *7.2 It should be possible to remove the radar information, AIS information and other navigational information by single operator action.*
> *7.3 ECDIS and added navigational information should use a common reference system. If this is not the case, an indication should be provided.*

**Therefore it is recommended that HSSC via the IHB and other MS should propose a new work item to execute T16 of the IMO's e-Navigation SIP in order to begin the process of creating a plan to update the relevant IMO standards for the use of S-100.**

### 2.4.2 Review the S-101 Value Added Roadmap annually (D.2)

The last major review of the S-101 Value Added Roadmap occurred in 2014 and has been published on the IHO website: http://www.iho.int/mtg_docs/com_wg/HSSC/HSSC_Misc/S-100_Master_Plan.htm

At this time, there are no major changes to the S-101 Roadmap.

### 2.4.3 Develop a template Product Specification for Maine Information Overlays (MIO) (D.2bis)

DRAFT

This item has been completed with the publication of S-100 edition 2.0.0 and the inclusion of an S-100 product specification template for use by other product specification developers. It is r**ecommended this item be removed from the workplan.**

### 2.4.4 S-101 ENC Product Specification (D.3 and D.6)

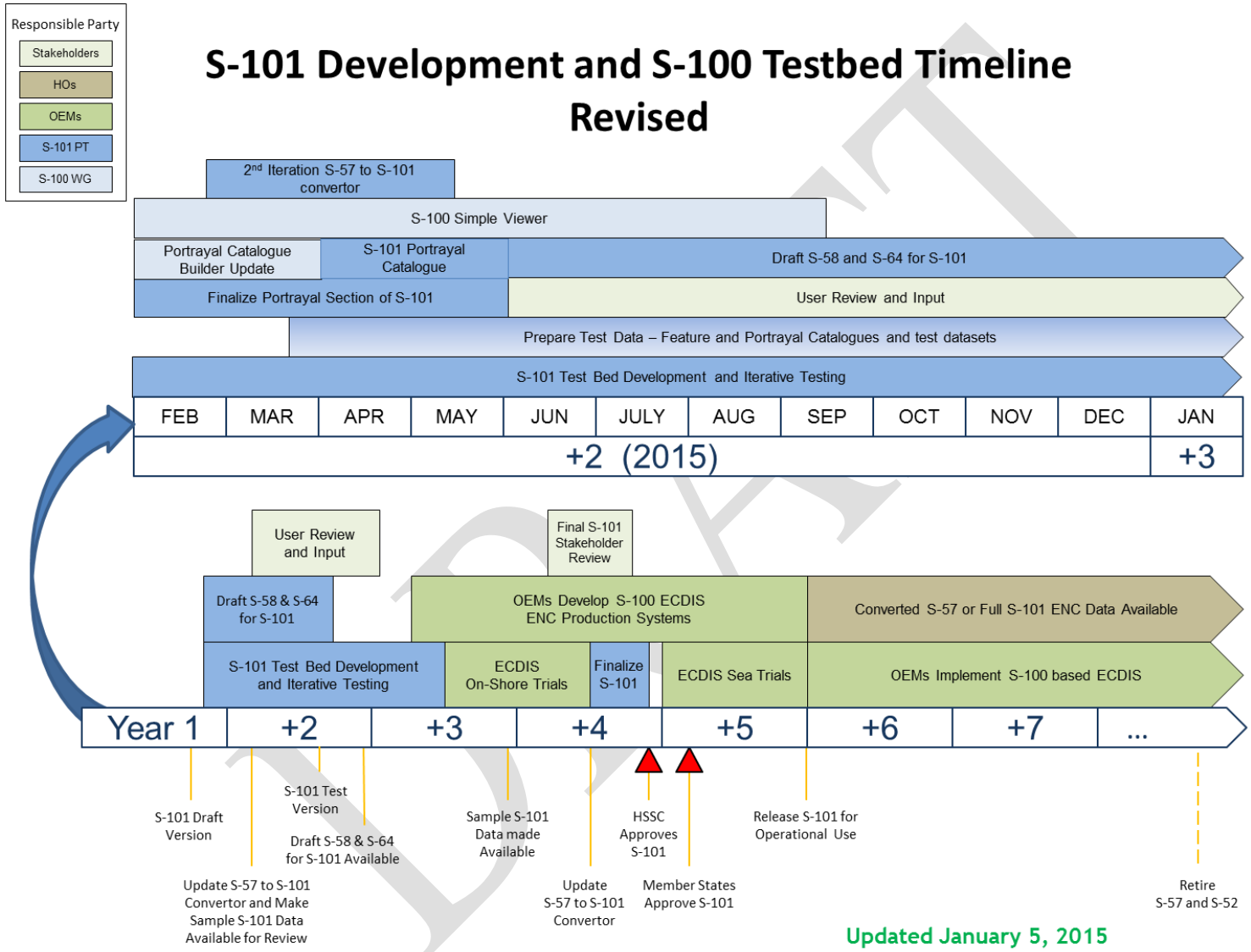
S-101 is the new Electronic Navigational Chart product specification that is based on S-100. The intent of S-101 is to utilize the flexibility of S-100 to allow the IHO and Member States to respond to the changing needs of the mariner. S-101 will include machine readable feature catalogues and portrayal catalogues that will facilitate updating of changes to shipboard systems.

#### 2.4.4.1 S-101 Progress

S-101 is a multi-part product specification when put together will form the basis for the creation and display of Electronic Navigational Charts. The major components of S-101 and their current status are as follows

| S-101 Component | Current Status | Comment |
|---|---|---|
| Main Document | Testing Baseline – June 2015 | Sent out for stakeholder review in September 2014 and final comments incorporated into the Testing Baseline.<br><br>Changes to the DCEG will undergo a controlled proposal process in order to manage change effectively. |
| **Data Classification and Encoding Guide** | Baselined – April 2014 | |
| **8211 Annex** | Testing Baseline – June 2015 | |
| **Feature Catalogue** | Testing Baseline – June 2015 | Created using the Feature Catalogue builder that has been developed by KHOA |
| **Portrayal Catalogue** | Partial Baseline – July 2015 | Caris has created a partial portrayal catalogue using the elements from S-52 in the S-100 format. There is still more work to be done once the S-100 Register is operational. |
| **Implementation Guidance** | In Progress | Will continue to be refined during the S-101 test bed process |
| **Validation Checks** | In Progress | |

As noted above, most of the main components have reached a baseline status – meaning that they are stable enough to be used for testing.


Responsible Party
Stakeholders
HOs
OEMs
S-101 PT
S-100 WG
S-101 Development and S-100 Testbed Timeline
Revised
2nd Iteration S-57 to S-101 convertor
S-100 Simple Viewer
Portrayal Catalogue Builder Update
S-101 Portrayal Catalogue
Draft S-58 and S-64 for S-101
Finalize Portrayal Section of S-101
User Review and Input
Prepare Test Data – Feature and Portrayal Catalogues and test datasets
S-101 Test Bed Development and Iterative Testing
FEB
MAR
APR
MAY
JUN
JULY
AUG
SEP
OCT
NOV
DEC
JAN
+2 (2015)
+3
User Review and Input
Final S-101 Stakeholder Review
Draft S-58 & S-64 for S-101
OEMs Develop S-100 ECDIS ENC Production Systems
Converted S-57 or Full S-101 ENC Data Available
S-101 Test Bed Development and Iterative Testing
ECDIS On-Shore Trials
Finalize S-101
ECDIS Sea Trials
OEMs Implement S-100 based ECDIS
Year 1
+2
+3
+4
+5
+6
+7
...
S-101 Draft Version
S-101 Test Version
Draft S-58 & S-64 for S-101 Available
Sample S-101 Data made Available
HSSC Approves S-101
Release S-101 for Operational Use
Update S-57 to S-101 Convertor and Make Sample S-101 Data Available for Review
Update S-57 to S-101 Convertor
Member States Approve S-101
Retire S-57 and S-52
Updated January 5, 2015

DRAFT

In addition, the S-100WG maintains an S-100/S-101 risk register highlights the areas where more work needs to be done and where progress is on track. Link to latest Risk Register

**It is recommended that items D.3 and D6 be merged into a single workplan item:**

*D.3 Finalization of S-101 ENC Product Specification*

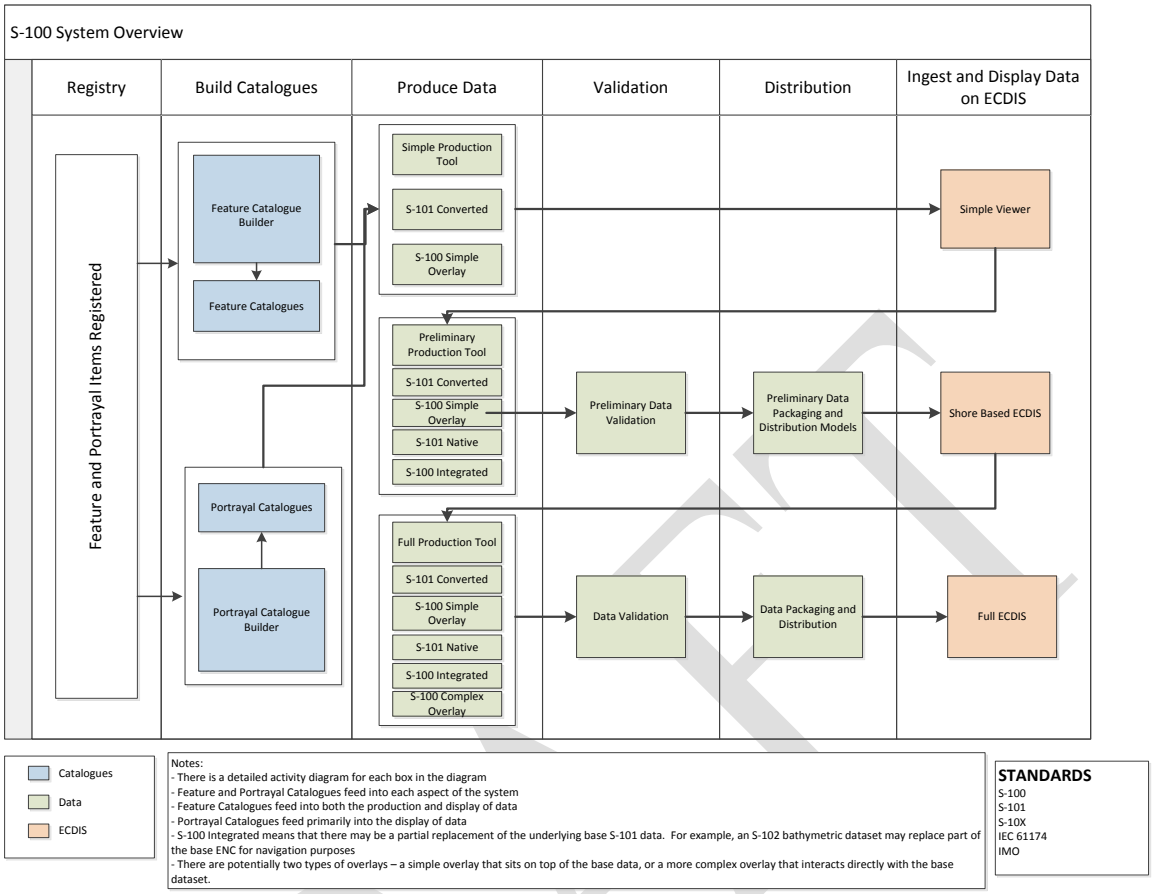
### 2.4.5 Monitor the implementation of the 1st draft of the S-101 Product Specification (D.4)

This is currently a planned activity. As the S-100 Test Bed matures, S-101 will be tested throughout each phase of the testbed.

### 2.4.6 Develop an S-100/S-101 Test Strategy and Test bed (D.5)

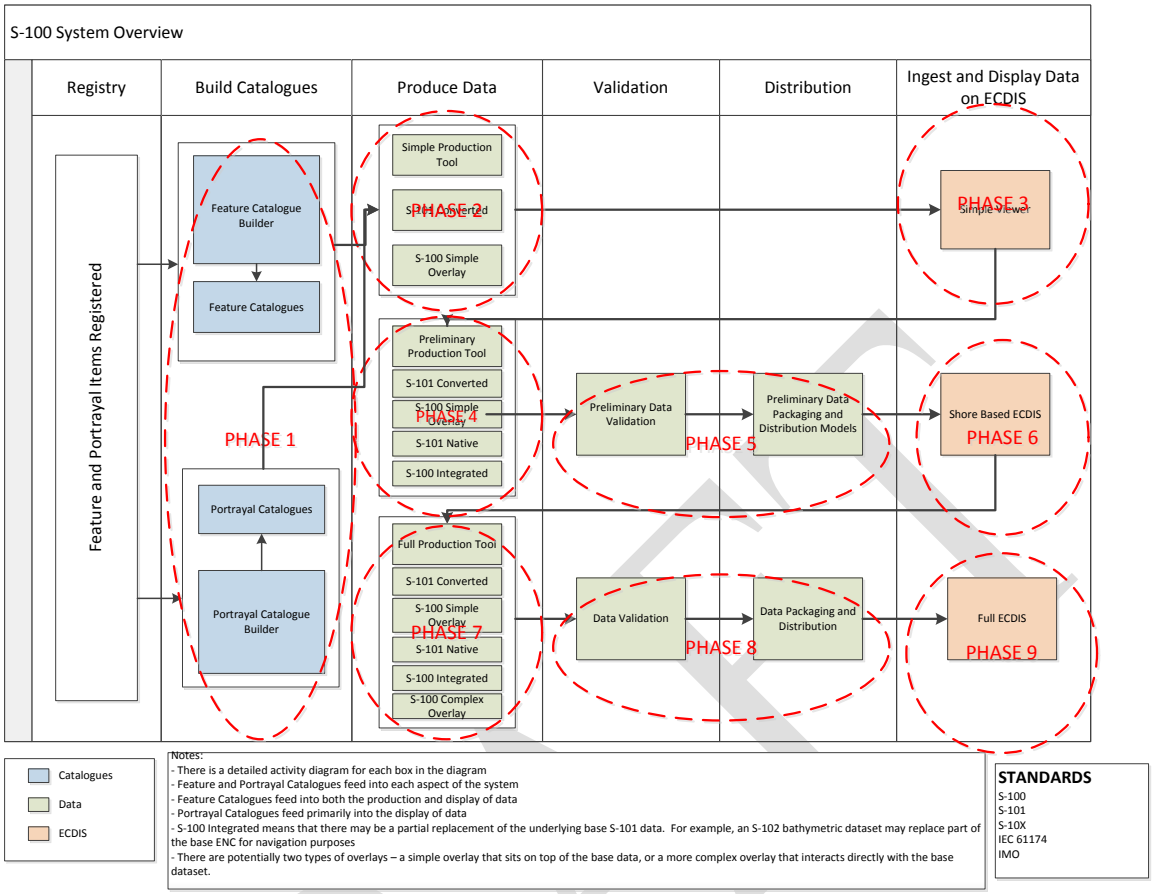
Before the IHO Member States can approve S-101 as a functional standard, it must undergo a rigorous testing process that will require the implementation of test bed projects. It is important to understand that these test beds will need to be S-100 based, capable of testing other product specifications which can be either supplementary to S-101 ENCs or non-related GIS applications. The overarching test bed strategy is depicted in the following figure which shows the logical progression from catalogue creation to use within an ECDIS.

DRAFT




However, in order to manage the complexity of the testing process it has been divided into nine phases that cover the entire end-to-end process as depicted in the following diagram.

DRAFT




Breaking out the testing through phases allows for the iterative development of future ECDIS as a system by gradually expanding requirements and the different types of test scenarios that are needed to validate S-101 as a functional standard.

| # | Phase Name | Status | Comment |
|---|---|---|---|
| 1A | Feature Catalogue Builder | Completed | • Development done by KHOA<br>• S-100 Test Cases Written |
| 1B | Portrayal Catalogue Builder | Completed | • Developed under IHB Contract<br>• S-100 Test Cases Written |
| 2 | Simple Production Tool | In Progress | • S-57 to S-101 Convertor<br>• Joint NOAA/ESRI initiative |
| 3 | Simple Viewer | In Progress | • S-100 Test Cases Written<br>• ROK Simple Viewer<br>• SPAWAR Simple Viewer |
| 4 | Preliminary Production Tool | Not Started | • Initial Scoping Required |
| 5 | Preliminary Data Validation and Packaging | Not Started | • Initial Scoping Required |
| 6 | Shore Based ECDIS | Not Started | • Initial Scoping Required |
| 7 | Full Production Tool | Not Started | • Initial Scoping Required |
| 8 | Data Validation and | Not Started | • Initial Scoping Required |

| | | | |
|---|---|---|---|
| | Packaging | | |
| 9 | Full ECDIS | Not Started | • Initial Scoping Required |

The outcome of testing will also enable a more detailed impact study, as prescribed by IHO Resolution 2/2007 on principles and procedures for making changes to IHO technical standards and specifications, and will provide a clear picture of the effects on the various stakeholders involved in the eventual introduction of S-101.

Work is still ongoing regarding the S-100 Test bed. At this time there are several S-100 simple viewers under development, such as those by ROK and SPAWAR. The latest edition of the S-57 to S-101 convertor has been released and there are several initiatives to develop additional S-101 test datasets to support functional testing.

### 2.4.7 Investigate enhancing the appearance of traditional paper chart symbols used in ECDIS by modifying their size, shape and colour. (D.7)

As S-101 is tested, enhancements to symbology will be made to reflect more of a paper chart look. Current plans are to colour fill the existing paper chart symbols for S-101. As this item is for tuned to enhancing S-52 it is **recommended that this item be removed from the workplan**.

### 2.4.8 S-102 (D.8)

At TSMAD27 it was noted that S-102 needed to be updated to implement changes in the Open Navigational Surface Working Group's Bathymetric Attributed Grid (BAG) Specification which forms the basis of S-102. In addition, at TSMAD28 a paper was submitted highlighting the need to improve S-102 metadata. As a result the following HSSC action was assigned:

**HSSC6/13: In accordance with Resolution 2/2007 as amended, TSMAD to provide relevant documentation on the impact assessment for HOs and Industry of the future edition of S-102.**

In response to this action, a short questionnaire was published as an internet survey and sent to Member States and TSMAD participants. The outcome of the survey was that a majority of the respondents wanted an update to S-102 to address the existing shortcomings in S-102. Link to S-102 Survey Results

Following the survey outcome an S-102 Project Team has been established to prepare an update to S-102. It is expected that the draft of S-102 will be presented at the next S-100 Working Group meeting in March 2016 with an aim to present the final draft at HSSC8,

## 2.5 Monitor the development of other related international standards (E.1)

Various members of the S-100 working group also participate in the development of other related international standards and regularly report back on relevant developments.

## 2.6 Liaise with IHO subsidiary bodies and subordinate organs (F.1)

S-100WG continues to coordinate with other IHO working groups on building S-100 compliant product specifications and submits activity reports to various IHO working groups. As part of this liaison activity the

DRAFT

IHB has set up a project management site called Basecamp. This allows for the creation of specific tasks and a repository for working documents that are too large to exchange via email.

## 2.7 Liaise with non-IHO constituents (F.2)

### 2.7.1 IALA

S-100 members continue to coordinate with IALA. Two representatives from the IALA E-NAV working group attended the S-100 Test Strategy Meeting.

### 2.7.2 ISO

The IHB continues to send a representative to ISO meetings. The IHB then informs the S-100 working group of changes to ISO standards that may impact S-100.

.

### 2.7.3 JCOMM

JCOMM continues to make progress on developing S-411 (Ice Information) and S-412 (Weather Information).

## 3 Progress on HSSC Action Items

| Agenda Item | Subject | Action No | Actions | |
|---|---|---|---|---|
| 4.2 | Implementation of transition arrangements | HSSC6/05 | **Chairs of S-100WG, DPSWG, HDWG** to investigate the interactions between their activities and report at HSSC-7. | **In Progress** |
| 4.2 | Implementation of transition arrangements | HSSC6/06 | S-100WG to consider the need for creating an S-101 Project Team (with contribution of ENCWG if deemed necessary). | **Completed. S-101 Project Team has been established.** |
| 4.2 | S-100WG TOR | HSSC6/10 | **S-100WG** to consider whether additional business rules should be imposed (via draft amendments to S-100 Part 12). | **Completed (no additional rules are needed at this time)** |
| 5.1 | S-102 | HSSC6/13 | In accordance with Resolution 2/2007 as amended, **TSMAD** to provide relevant documentation on the impact assessment for HOs and Industry of the future edition of S-102. | **Completed** |
| 5.1 | S-99 | HSSC6/16 | S-100WG to implement the proposal of TSMAD related to the registration of Product Specifications and to draft the appropriate changes to the S-100 GI Registry and S-99. | **In Progress** |
| 5.1 & 4.3 | S-100 Registry | HSSC6/20 | **S-100 WG** to investigate possible options for providing some | **In Progress. Established a clone** |

DRAFT

| | | | | |
|---|---|---|---|---|
| | | | redundancy/robustness in the administration of the Registry and Registers managed by the IHO in the long term. | **server and rebuilding the interfaces** |
| 7.7 | Harmonization in standards development | HSSC6/37 | **S-100WG** to monitor and coordinate interactions with OGC and IOGP, to ensure proper harmonization in the development of standards (such as IOGP SSDM SeabedML) and facilitate the multi-use of survey data and report to HSSC. | **Ongoing** |

## 4 Problems Encountered

The major issue that was encountered is the stability of the S-100 Registry and interfaces to propose new features and attributes. The initial registry and interfaces were developed as a prototype and it was discovered that certain key mechanisms were broken. The associated paper S-100 Registry Way forward explains these issues in more detail.

## 5 Recommendations

HSSC is invited to

- Continue to address the need to update the relevant IMO performance standards to accommodate S-100
- Approve the continued activity of the S-100WG work plan.
- Approve the proposed changes to the S-100 master plan.

## 6 Justification and Impacts

Not applicable.

## 7 Action Required of HSSC

The HSSC is invited to

- note this report and approve the continuance of the Work Plan.
- Continue to address the need to update the relevant IMO performance standards to accommodate S-100
- Approve the proposed changes to the S-100 master plan.

DRAFT

## Proposed S-100 Working Group Proposed 2016-2017 Workplan

### Tasks

| | |
|---|---|
| A | Maintain and extend S-100 "IHO Universal Hydrographic Data Model" (IHO Task 2.2.2.2) |
| B | Maintain and extend S-99 "Operational Procedures for the Organization and Management of the S-100 Geospatial Information Registry" (IHO Task 2.2.2.9) |
| C | Maintain and extend the S-100 GI Registry (IHO Task 2.2.4) |
| D | [Supervise/Advise] and support the development and maintenance of S-100-based product specifications |
| E | Monitor the development of other related international standards |
| F | Provide outreach and technical assistance regarding the implementation of S-100 (IHO Task 2.2.5) |
| G | Maintain the S-100 section of the IHO website (IHO Task 2.2.2) |
| H | Conduct the 2015 and 2016 meetings of the S-100WG and its sub-group(s) and project team(s) (IHO Task 2.2.1) |

### Work Items

| Work item | Title | Priority H-high M-medium L-low | Next milestone | Start Date | End Date | Status P-planned O-ongoing C-completed S-Superseded | Contact Person(s) | Related Pubs / Standard | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| A.1 | Maintain and Extend S-100 | H | HSSC 8 | 2010 | Permanent | O | Julia Powell (NOAA) | | |
| A.2 | Development of an S-100 Interoperability Specification | H | HSSC 8 & 9 | 2015 | 2017 | O | Julia Powell (NOAA) | | |

DRAFT

| Work item | Title | Priority H-high M-medium L-low | Next milestone | Start Date | End Date | Status P-planned O-ongoing C-completed S-Superseded | Contact Person(s) | Related Pubs / Standard | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| B.1 | Update S-99 and the S-100 Registry pages for the registration of S-100 product specifications in accordance with HSSC6-05B rev1 | M | HSSC 8 | 2015 | 2016 | P | Julia Powell (NOAA) | | |
| C.1 | Update S-100 GI Register to edition 2.0.0 and re-build the web-interfaces | H | HSSC 8 | 2015 | 2016 | O | Yong Baek (KHOA) | | |
| C.2 | Connect the S-100 Feature Catalogue Builder to the S-100 GI Register | H | HSSC 8 | 2015 | 2016 | O | Yong Baek (KHOA) | | |
| C.3 | Develop web-interfaces to propose new symbology to the S-100 Portrayal Register | H | HSSC 8 | 2015 | 2016 | O | Julia Powell (NOAA) | | |
| D.1 | Review the S-100 Master Plan annually | M | HSSC-7 & 8 | 2014 | Permanent | O | Julia Powell (NOAA) | S-100 | Include monitoring the need to revise existing S-100-based PS (e.g. S-102) and or to develop new S-100-based PS. |
| D.2 | Review the S-101 Value Added Roadmap annually | H | HSSC-7 & 8 | 2013 | Permanent | O | Julia Powell (NOAA) | S-101 | |
| D.3 | Finalization of S-101 ENC Product Specification | H | | 2015 | 2018 | O | Julia Powell (NOAA) | | |
| D.4 | Monitor the implementation of the 1st draft of S-101 ENC product specification | H | | 2015 | | P | | | |
| D.5 | Develop an S-100/S-101 Test Strategy and Test Bed | H | | 2013 | 2018 | | Julia Powell (NOAA) | | |

DRAFT

| Work item | Title | Priority H-high M-medium L-low | Next milestone | Start Date | End Date | Status P-planned O-ongoing C-completed S-Superseded | Contact Person(s) | Related Pubs / Standard | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| D.6 | Develop Edition 2.0.0 of S-102 Bathymetric Content Specification. | H | HSSC 8 | 2014 | 2017 | P | Wade Ladner (NAVO) | | |
| E.1 | Monitor the development of other related international standards | M | | | | P | | | |
| F.1 | Liaise with IHO subsidiary bodies and subordinate organs, e.g. WWNWS-SC, NIPWG, ENCWG, etc. | | | | | | | | Establish joint project teams as required |
| F.2 | Liaise with non-IHO constituents, e.g. IALA E-nav Committee, IEHC, JCOMM Expert Teams, DGIWG, ISO, marine navigation and GIS industry, etc. | H | | 2004 | Permanent | O | Julia Powell (NOAA) | | |
| G.1 | Maintain the S-100 section of the IHO website | H | | 2003 | Permanent | O | Tony Pharoah (IHB) | | |

DRAFT

## Annex A

**Comments from IHO Member States on the draft S-100 Master Plan**
**(Responses to IHO CL 8/2014 dated 20 January)**

S-100 WG chairs comments in red.

**Canada**
Canada accepts the Master Plan and has no further comment, as Canada provided its input when the plan was being developed.

CHAIR comment: Noted

**Chile**
With regard to the draft Master Plan for the development and implementation of S-100, we consider a very useful document that helps to understand where we are going in this matter. A couple of minor comments are offered with the intention to avoid later misunderstandings:

a) Point 2 Principles of S-100, page 4, says: All proposed changes shall be technically and commercially assessed before approval.
Comment: Who is responsible for conducting this assessment, the organization proposing a change or the IHO and which body of the IHO? We are particularly concern on the commercial component.
CHAIR Comment: Propose to remove the statement as S-100 is already governed by IHO Resolution 2/2007 which includes a testing component. Since S-100 provides the framework to develop S-100 based product specifications it cannot be tested in the traditional sense. Instead, it forms the basis for the S-100 test bed which will be used by S-100 based product specifications to test against.

b) Point 3 Tools and Maintenance of S-100 GI Registry, page 6, 3rd line says: Any recognized organization can propose a new domain.
Comment: We would recommend being more specific as "any recognized organization" seems to be too wide.
CHAIR comment: This language is in line with S-99 and after discussion with the IHB the view is any organization (including IGO and NGIO) can submit a proposal. The proposal including the references of the proposing organization is reviewed by the Executive Control Body and then decided upon the HSSC on a case by case basis.

**Finland**
Due to limited human resources we have not been able to study in depth the *S-100 Master Plan* and thus have no comments to it.
CHAIR Comment: Noted

**France**
France suggests that the IHO e-navigation strategy should be described in a master plan totally separate from the S-100 master plan. The IHO could develop better its contribution to the IMO programme in such a high level strategic document, thus displaying its determination to develop, implement and maintain the standards within its purview which are useful to e-navigation
1/ IHO e-navigation Master Plan
This document would refer to the IMO e-navigation strategy implementation plan by establishing a connection between the requirements of the maritime service portfolios and related IHO products and services, whether existing or future.
It would be supported by the new IHO governance associated with the restructuring of HSSC working groups.
In addition to IHO Resolution No 2/2007 and in accordance with the IMO methodological approach, this document would describe the different steps in a decision-making process including: the study of users' requirements, the economic analysis and the engineering

design of different solutions, the analysis of any possible deviations between the solutions and the requirements, the implementation plan of the agreed solutions and feedback management.
It would propose implementation milestones set in accordance with the planned IMO e-navigation schedule and provide appropriate regulation mechanisms.

CHAIR Comment: Would concur as S-100 is a component to e-navigation but this would be a separate work item that should be proposed to HSSC.

2/ S-100 Master Plan
The structure of this document should be reconsidered in line with a global roadmap which would set the implementation priorities of the different IHO products and services, in accordance with the interests of Member States and the level of their contribution.
It could also become a reference documents for the designers of new products and services. It would explain to IHO stakeholders what is expected and required to implement a new product or service based on the S-100 standard through describing the process which transforms requirements into standard specifications.
Through examples and typical cases related to domains of use, it could clarify the management of registers and point out the prerequisites.
Finally, considering that the current S-101 roadmap should refer to it, this document should not repeat elements which are already included in the S-101 roadmap.

CHAIR Comment: Notes the comments made by France and has removed the Registry management section from the master plan as it is already documented in S-99. The chair has also reviewed the S-101 Value Added Roadmap and notes that occasionally some duplication will be required especially in relation to the S-100 test bed and how the S-101 product specification will be tested.

**United Kingdom**
Through our participation in TSMAD, DPSWG and DIPWG we have been actively involved in the drafting of the S-100 Master Plan. We therefore have no further comment at this stage but look forward to reviewing contributions from other MS.

CHAIR Comment: Noted

**United States**
The S-100 master plan seems to be more of an information paper. Are we trying to develop a “Strategic Plan” for S-100? There is a timeline in the plan, but it seems there is a need for clear goals, objectives and the actionable strategies associated with it.

CHAIR Comment: Noted.

DRAFT