



Hydrographic Services and Standards Committee

Report of the S-100 Working Group

HSSC8

November 2016

Principal activities and achievements

- ✦ Maintain and Extend S-100 (A.1)
 - Prepped Edition 3.0.0 for potential publication in 2017
 - Includes the results of 18 proposals that either clarified, corrected or extended S-100 including:
 - Added the HDF-5 encoding
 - SVG elements for portrayal
 - Portrayal Register model



Principal activities and achievements

✦ Maintain and Extend S-100 (A.1)

- March 2016 – Last set of proposals discussed by the WG and S-100 was finalized
- July 2016 – Edition 3.0.0 sent out for stakeholder review
 - 43 comments from 3 stakeholders
- September 2016 – resolution of comments



Principal activities and achievements

✦ Maintain and Extend S-100 (A.1)

- Impacts to S-100 based product Specifications, S-100 Register, FCB and PCB
 - S-100 is a framework standard that is intended to be extensible to meet the needs of the user community
 - S-102 is in the process of being updated to take advantage of items that will be in edition 2.0.0
 - All other S-100 based specifications that are under development need items that are contained in S-100 edition 3.0.0



Principal activities and achievements

✦ Maintain and Extend S-100 (A.1)

- Impacts to external applications:
 - S-100 GI Register (NOTE: The Portrayal Register Model has already been developed under contract from the IHB)
 - S-100 Feature Catalogue Builder (NOTE: KHOA has already started updating the FCB to concepts in 3.0.0)
 - S-100 Portrayal Catalogue Builder (NOTE: this still needs a general update to 2.0.0 and edition 3.0.0 does not have any changes that will affect the PCB)
- Updates to these items will not impact any existing Product Specifications



Principal activities and achievements

✦ Maintain and Extend S-100 (A.1)

- Action Required:

- HSSC approve S-100 edition 3.0.0 and forward to MS for approval

- Further recommendation:

- Update the workplan to reflect that edition 4.0.0 will be submitted in 2018 (includes new proposals from IALA and other items arising from the testbed) and HSSC investigate establishing a standards development and maintenance regime to normalize the updating process.



Principal activities and achievements

- ✦ Development of an S-100 Interoperability Specification(A.2)
 - Initial draft prepared under joint NOAA/KHOA funding
 - Reviewed at the S-100 Focus Group in August
 - Specification will be used as part of the S-100 test bed for further refinements
 - Anticipated finalization will be lined up to S-101



Principal activities and achievements

- ✦ Maintain and Extend the S-99 “Operational Procedures for the Organization and Management of the S-100 GI Registry” (B.1)
 - Action HSSC6/16 has not been completed due to other pressing S-100 registry infrastructure issues
 - 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.*



Principal activities and achievements

- ✦ Update the S-100 GI Register to edition 2.0.0 (3.0.0) and re-build the web interfaces (C.1)
- ✦ ROK rebuilt the web interfaces for the GI Registry to improve functionality.
 - Completed in Sept. 2016
 - Currently, NIPWG, S-101PT and WMO Weather are inputting new content from their product specification development



Principal activities and achievements

- ✦ C.1 continued
- ✦ According to S-99 a Domain Control Body and an Executive Control Body need to be established



Domain Control Body

- ✦ The Domain Control Body shall consist of a representative of each of the domains recognized in each Register type and members are responsible for:
 - acting as the spokesperson for their domain,
 - canvassing other members in their domain for an opinion on the acceptability of any new proposal. How this is organized is at the discretion of the Domain Owners, and
 - forwarding a decision to the Register Manager within 60 days.



Executive Control Body

- ✦ Representative from each of the Domains
- ✦ Monitor and advise the Register Manager
- ✦ Act as arbiters for any decisions or disputes in the process



Principal activities and achievements

- ✦ C.1 Continued
- ✦ **ACTION requested of HSSC: Establish a Domain Control Body and an Executive Control Body for the IHO Registry**
 - NOTE: Because S-99 was developed in a theoretical vacuum, the practical application of its principles may result in a new edition of S-99



Principal activities and achievements

- ✦ Connect the S-100 Feature Catalogue Builder to the S-100 GI Register (C.2)
- ✦ Work is still ongoing, it is expected to complete in early 2017



Principal activities and achievements

- ✦ Develop web-interfaces to propose new symbology to the S-100 Portrayal Register (C.3)
- ✦ Work is now underway by the ROK to develop the initial proposal interfaces for new symbology

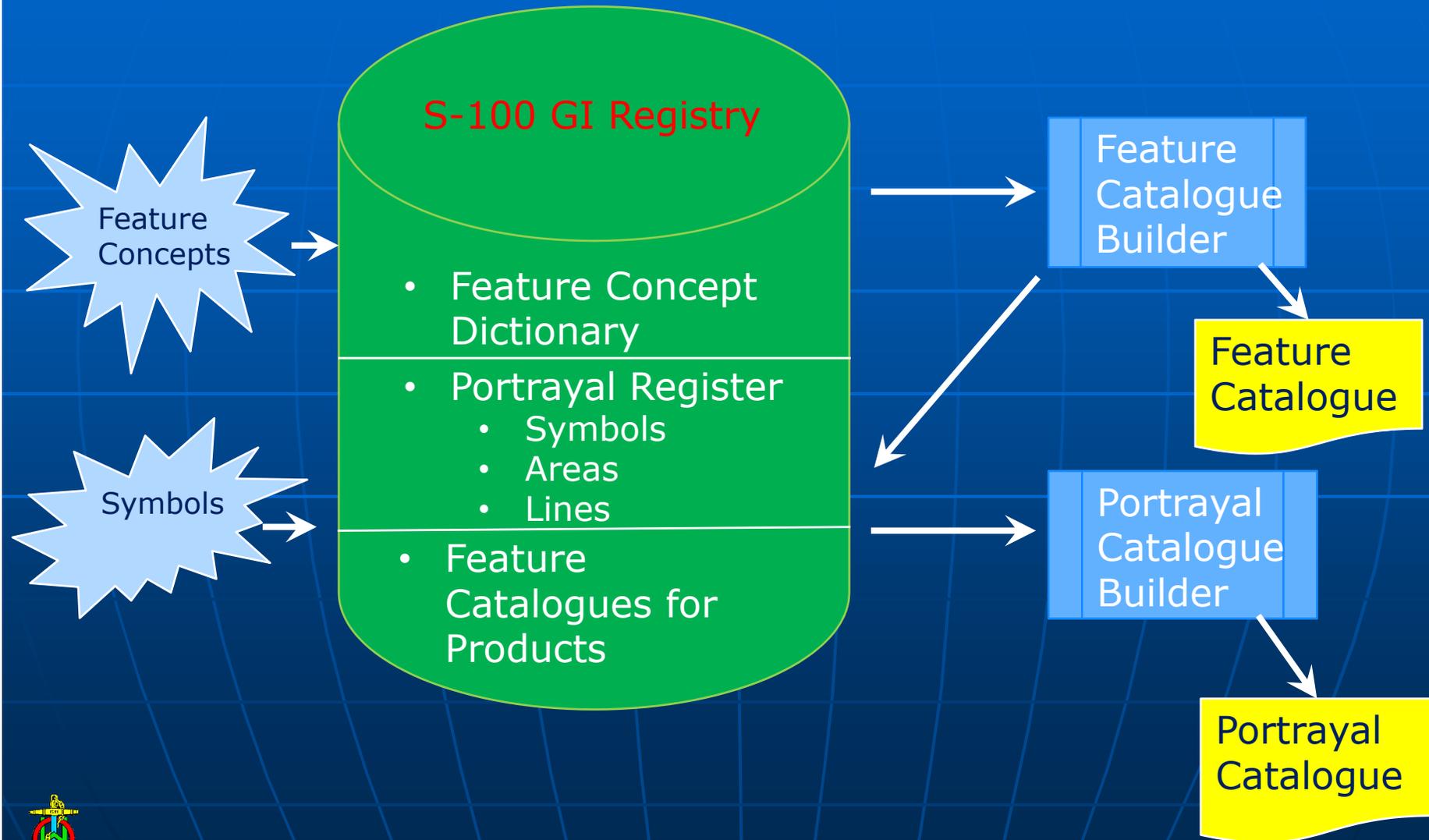


Principal activities and achievements

- ✦ Develop web-interfaces to propose new symbology to the S-100 Portrayal Register (C.3)
- ✦ **ACTION REQUIRED:** Add to the S100WG workplan to finalize the connection of the Portrayal Catalogue Builder to the GI Register.
- ✦ **ACTION REQUIRED:** Explore the use of IHB special project funds to resolve any issues that may be discovered with the Portrayal Catalogue Builder once the other infrastructure issues (GI Registry, FCB) have been resolved.



A brief overview of the S-100 Infrastructure



Principal activities and achievements

- ✦ Review the S-100 Master Plan Annually (D.1)
 - At this time there are no recommended changes



Principle activities and achievements

- ✦ Review the S-101 Value Added Roadmap (D.2)
- ✦ Minor edits were made to update to the latest timeline



Principal activities and achievements

✦ S-101 ENC Product Specification (D.3)

S-101 Component	Current Status	Comment
Main Document	Testing Baseline – June 2015	<ul style="list-style-type: none"> • Sent out for stakeholder review in September 2014 and final comments incorporated into the testing baseline • New Items have been registered in the GI Registry. • Changes to the DCEG will undergo a controlled proposal process in order to manage change effectively.
Data Classification and Encoding Guide	Baselined – June 2016	
8211 Annex	Testing Baseline – June 2015	
Feature Catalogue	Testing Baseline – June 2015	<ul style="list-style-type: none"> • Awaiting the FCB connection to the GI Registry to create a new version that contains the new DCEG items.
Portrayal Catalogue	Partial Baseline – July 2015	<ul style="list-style-type: none"> • 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. • NOAA has funded work on baselining the S-52 CSPs into XSLT 1.0 that will be part of the Portrayal Catalogue
Implementation Guidance	In Progress	Will continue to be refined during the S-101 test bed process
Validation Checks	In Progress	

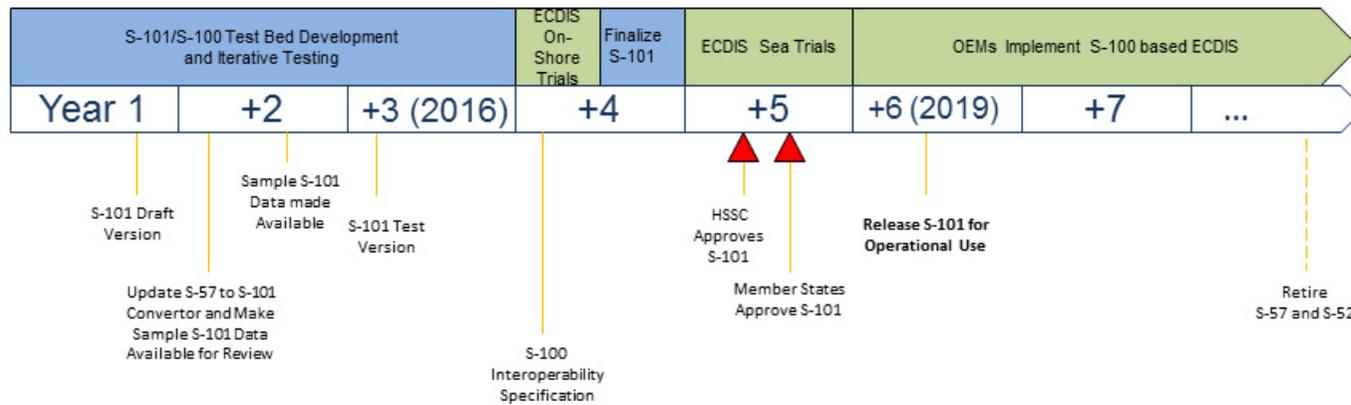


Principal activities and achievements

- ✦ Progress has been slowed
 - Lack of resources
 - Waiting for the S-100 Infrastructure to be updated for use.
 - 2017 milestones
 - New Feature Catalogue
 - Portrayal Catalogue
 - Determination on how complex portrayal will be handled by S-101/S-100



S-101/S-100 Test Bed Timeline



22.07.2016



Issues slow to progress

- ✦ Data Validation Checks behind schedule
 - Resources
- ✦ S-100 Infrastructure Updates
 - Larger scope of effort than expected
- ✦ S-101 Portrayal Catalogue and Conditional symbology
 - Infrastructure and needed to resource the rule creation

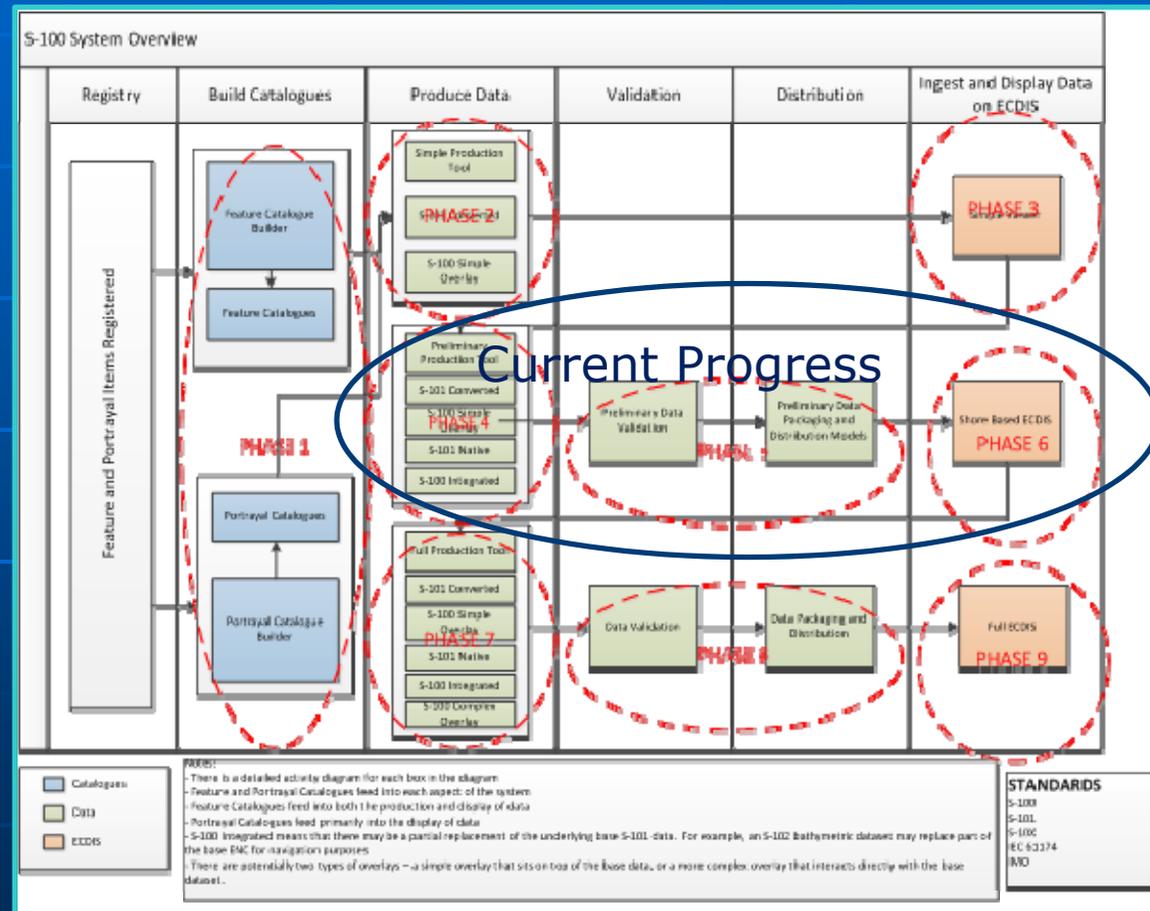


Principal activities and achievements

- ✦ Monitor the implementation of the 1st draft of the S-101 Specification (D.4)
 - Planned
- ✦ Develop an S-100/S-101 Test Strategy and Test Bed (D.5)
 - Much of this years effort was spent on the S-100 Interoperability specification



Principal activities and achievements



S-100/S-101 Test bed

S-100 Activities of KHOA

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	<ul style="list-style-type: none"> Development done by KHOA S-100 Test Cases Written
1B	Portrayal Catalogue Builder	Completed	<ul style="list-style-type: none"> Developed under IHB Contract S-100 Test Cases Written
2	Simple Production Tool	In Progress	<ul style="list-style-type: none"> S-57 to S-101 Convertor Joint NOAA/ESRI initiative
3	Simple Viewer	In Progress	<ul style="list-style-type: none"> S-100 Test Cases Written ROK Simple Viewer SPAWAR Simple Viewer
4	Preliminary Production Tool	In Progress	<ul style="list-style-type: none"> ROK has developed a tool to produce S-101 updates for testing
5	Preliminary Data Validation and Packaging	Not Started	<ul style="list-style-type: none"> Initial Scoping Required
6	Shore Based ECDIS	Not Started	<ul style="list-style-type: none"> Initial Scoping Completed
7	Full Production Tool	Not Started	<ul style="list-style-type: none"> Initial Scoping Required
8	Data Validation and Packaging	Not Started	<ul style="list-style-type: none"> Initial Scoping Required
9	Full ECDIS	Not Started	<ul style="list-style-type: none"> Initial Scoping Required



S-100/S-101 Test bed

S-100 Activities of KHOA

S-100 FCB (Feature Catalogue Builder)

The screenshot displays the S-100 FCB 2.0(beta) software interface. The main window is titled 'S-100 FCB 2.0(beta)' and contains several panes:

- Binding List - ComplexAttribute:** A tree view on the left showing various feature types like 'communicationInformation', 'currentVelocity', etc.
- Property - ComplexAttribute:** A pane below the binding list showing properties for the selected feature type, such as 'domain', 'name', 'definition', and 'code'.
- Feature List - FeatureType:** A table listing feature types. The selected entry is 'Air Temperature'.
- Information Types:** A pane showing the 'Air Temperature' feature type details, including its definition, code, and various bindings.
- Information:** A pane on the right showing the current local FCD DB information and the generated XML schema for the feature catalogue.

The 'Information' pane displays the following XML schema:

```
<?xml version="1.0" encoding="utf-8" ?>
<S100FC:S100_FC_FeatureCatalogue
  xmlns:S100FC="http://www.iho.int/S100FC"
  xmlns:S100Base="http://www.iho.int/S100Base"
  xmlns:S100CI="http://www.iho.int/S100CI"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:S100FD="http://www.iho.int/S100FD"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.iho.int/S100FC
  S100FC.xsd" />
```



S-100/S-101 Test bed

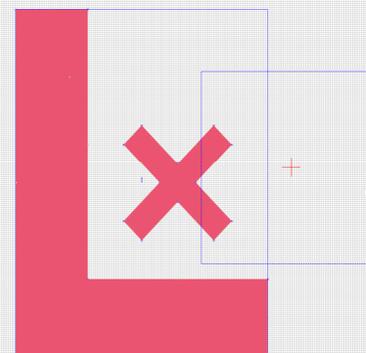
S-100 Activities of KHOA

S-100 Editor(Preliminary production tool) / SVG Editor

The screenshot displays the S-100 Editor software interface. The main window shows a map of South Korea with several radar transponder beacons overlaid as yellow circles. The interface includes a LayerManager on the left, an Attribute List on the right, and a Feature Information List at the bottom. The LayerManager shows two layers: S-101 KR1P0000 and S-101 KR1G0000. The Attribute List shows various properties for a Radar Transponder Beacon, including category, feature name, fixed date range, periodic date range, radar wave length, sector limit, signal group, signal sequence, status, value of maximum range, and scale minimum. The Feature Information List shows details for a radar transponder beacon, including signal sequence, signal status, signal duration, and value of maximum range.

No.	Type	Name	On/OFF
0	S-101	KR1P0000_...	On
1	S-101	KR1G0000_...	On

Category of radar transponder beacon	Value
Category of radar transponder beacon	racon, radar transponder f
Signal sequence	
Signal status	illy/sound
Signal duration	20
Signal sequence	
Signal status	eclipsed/silent
Signal duration	40
Value of maximum range	10



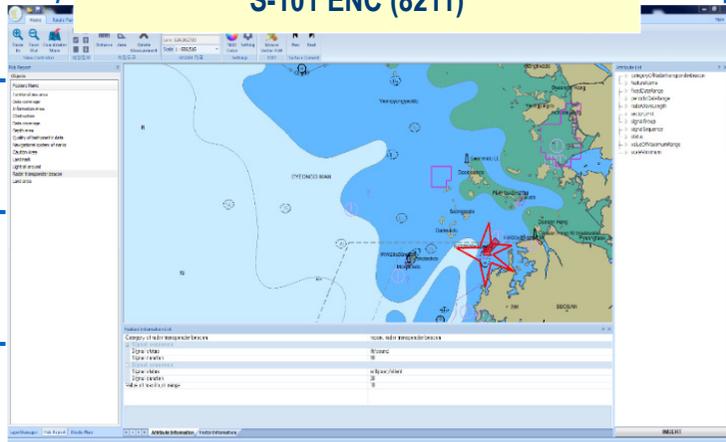
SVG Editor

S-100/S-101 Test bed

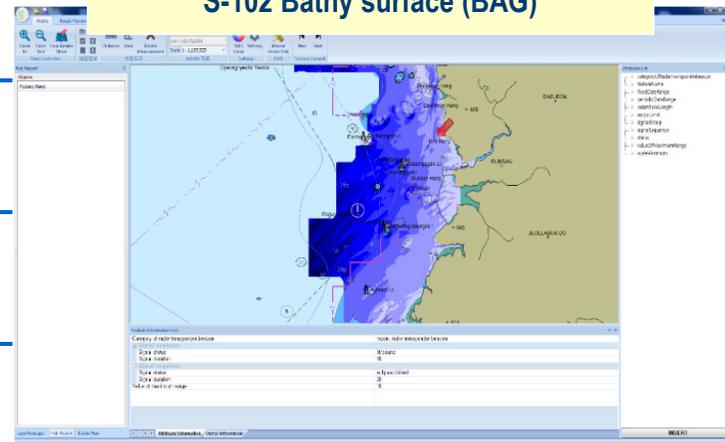
S-100 Activities of KHOA

KHOA S-100 Test bed (S-100 Viewer)

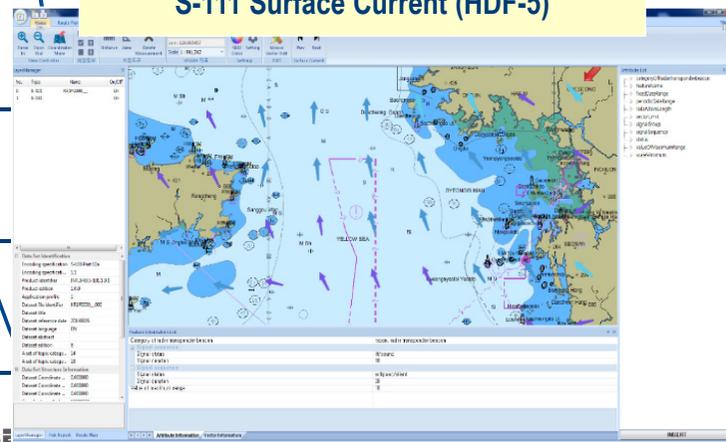
S-101 ENC (8211)



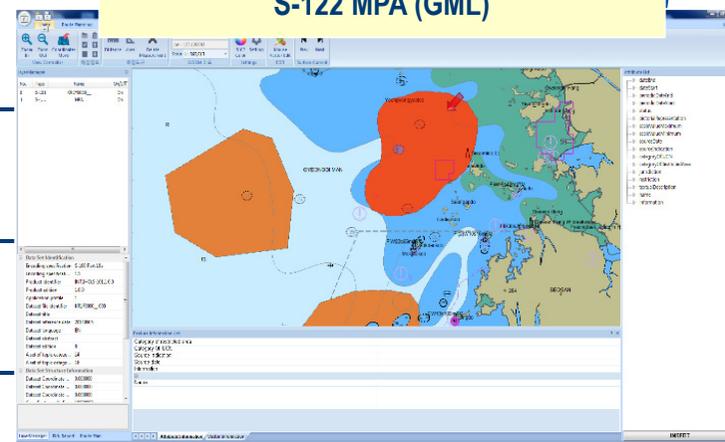
S-102 Bathy surface (BAG)



S-111 Surface Current (HDF-5)



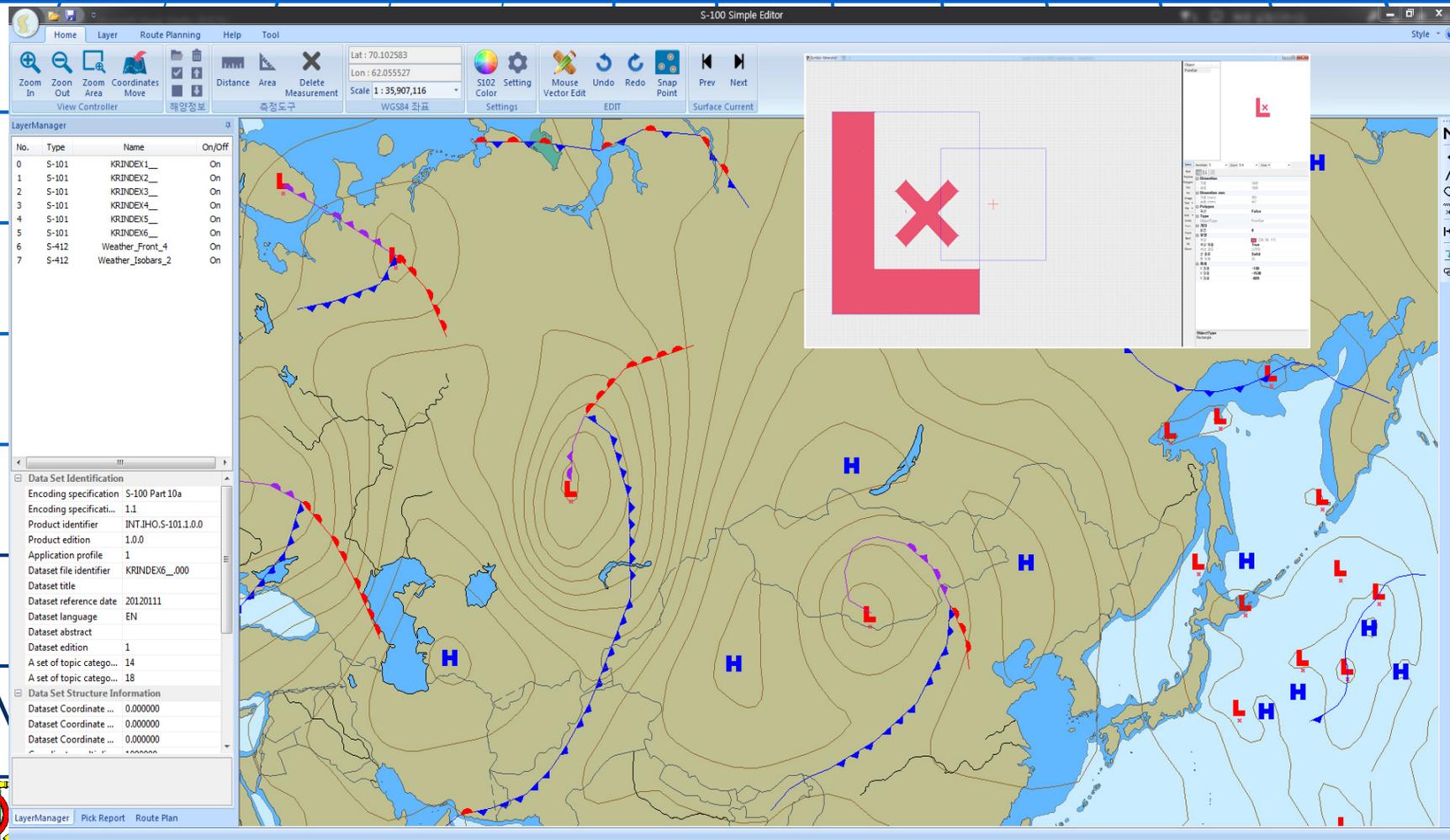
S-122 MPA (GML)



S-100/S-101 Test bed

S-100 Activities of KHOA

KHOA S-100 Viewer (Test bed) – S-412 Weather Overlay



Principal activities and achievements

✦ S-102 (D.8)

- Work continues to progress slowly

- New Target

- HSSC9

S-102 Section	Section Name	Due Date	Status	Comments
12.0	Metadata	12/30/16	Ongoing	<ul style="list-style-type: none">• Clean up section 12.0 to ensure compliance with S-100 version 3.0.0.
9.0	Portrayal	3/30/17	Ongoing	<ul style="list-style-type: none">• (12/30/16) Develop draft portrayal options for submission to the S-102 project team.• (2/28/17) Hold telecom to discuss draft portrayal.• (3/2017) Hold breakout session to finalize portrayal at S-100WG2 (Genoa, Italy).
4.3	S-102 Feature Catalogue	3/30/17	Ongoing	<ul style="list-style-type: none">• S-102 features to be registered during portrayal phase.• Features to finalized after S-100WG2 meeting.
Annex B	HDF	12/30/16	Ongoing	<ul style="list-style-type: none">• Clean up HDF5 section.



Principal activities and achievements

- ✦ Develop a Product Specification for Under Keel Clearance Management Information (D.7)
 - 1st Meeting – September 2016
 - Singapore
 - 16 participants



Principal activities and achievements

- ✦ Develop a Product Specification for Under Keel Clearance Management Information (D.7)
 - Product Specification focus areas:
 - Primary outputs produced by shore based UKCM service providers
 - A time based layer indicating calculated go/no-go areas
 - Critical UKCM waypoints and their associated tidal windows
 - Coordinate with other PS developers to include “discovery” information about UKCM services



Principal activities and achievements

- ✦ Develop a Product Specification for Under Keel Clearance Management Information (D.7)

ACTION REQUIRED: The UKC PT requests that HSSC assign the UKC an official S-100 product specification number.



Principal activities and achievements

- ✦ Develop S-121 Product Specification for Maritime Limits and Boundaries
 - 1st Meeting Scheduled for December 2016
 - Understand Member State specific implementation requirements
 - Frame the content of the standard ???
 - Concern about Scope Creep and extending beyond the initial terms of reference.
- ✦ **ACTION REQUIRED: Add Develop S-121 Product Specification for Maritime Limits and Boundaries to the S-100 Work Plan (new D.8)**



Principal activities and achievements

- ✦ Monitor the Development of international standards
 - OGC has established a Marine Domain Working Group
- ✦ Continue to liaise with other IHO bodies and provide assistance to developing S-100 product specifications



Principal activities and achievements

✦ Progress on HSSC Action Items

AGENDA ITEM	SUBJECT	ACTION No.	ACTIONS (in bold, action by)	TARGET DATE/EVENT	STATUS (at 15 Dec 2015)
5.1	IMO Performance Standards	HSSC7/06	S-100WG to investigate and identify any amendments to existing IMO Performance Standards that may be required to use S-100 based products including S-101 ENCs.	HSSC-8	Completed – See Input Paper
5.1, 5.5	S-100 Domains	HSSC7/07	NIPWG to submit to the S-100WG a proposal relating to harmonization requirements within the different domains of the Feature Concept Dictionaries.	February 2016	Completed See S100WG01-10.6A
NOTE: S100WG has asked NIPWG to defer to at least 18 months until we can properly use the registry. However, it was agreed by both NIPWG and the S100WG to merge the two domains into a single IHO Hydro Domain to make management easier.					
5.1	Registry Manager	HSSC7/08	HSSC Members to ensure that their country support the IHO budget for 2016 proposing to staff the S-100 Registry Manager position through a permanent IHB staff member (IHO CL 74/2015 refers).	30 November 2015	Completed - Jeff Wootton reported on October 3.
5.1	Under Keel Clearance Management Information	HSSC7/09	S-100WG to set up a project team for developing a product specification for under keel clearance management information	HSSC-8	Completed
5.3 ENC Standards Maintenance (ENCWG)					
5.1, 5.3	Portrayal of Lengths of Sector Lights	HSSC7/15	S-101 Project Team to consider the proposal submitted by the Norwegian Coastal Administration on the portrayal of lengths of sector lights (Doc. HSSC7-05.1C).	HSSC-8	Completed See S101PT01-3.4
5.6 Nautical Cartography (NCWG)					
5.1, 5.6	AIO	HSSC7/24	S-101 PT to address the need for improved functionality regarding T&P updates in future ENC/ECDIS.	HSSC-8	Completed
Note: The DCEG provides some guidance for utilizing the Update Information feature for this purpose.					



AGENDA ITEM	SUBJECT	ACTION No.	ACTIONS (in bold, action by)	TARGET DATE/EVENT	STATUS (at 15 Dec 2015)
5.9 Hydrographic Dictionary (HDWG)					
5.1, 5.9	Future of S-32	HSSC7/28	S-100WG to provide the HDWG with its generic technical specifications / requirements in terms of definitions, register(s) and procedures.	May 2016	Complete
Note: Closed via email exchange with the chair of HDWG. It was decided that where it was relevant that the FCD would use the S-32 definitions, but would not replace S-32. The Registry Manager will have to harmonize the definitions between the two items.					
7.1 IRCC (incl. MSDIWG)					
5.1, 7.1	S-102	HSSC7/33	Chair of S-102 PT to consider the issues of interoperability with SDI standards (such as INSPIRE elevation data specification, etc.).	HSSC-8	Complete
NOTE: Inspire references the following in their documentation: For the latter, (bathymetry) a file according to the BAG standard format of the International Hydrographic Organisation may be used optionally as an external file to provide the values. It should be noted that the BAG format is standard that is maintained by the Open Navigation Surface Working Group. The IHO standard, S-102, makes use of the BAG format but reserves the right to be more restrictive due to the final product (SoN).					
7.2 IMO					
5.1, 5.5, 7.2	Harmonized display of navigation information	HSSC7/36	S-100WG to prepare, in liaison with NIPWG, the IHB and the HSSC Chair, a submission on the contribution of the S-100 framework to the harmonized display of navigation information and the impact on existing performance standards for consideration by NCSR 2 (deadline: 25 Dec 2015).	18 Dec. 2015	Completed
5.1, 5.3, 7.2	E-navigation implementation	HSSC7/37	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 related standards respectively.	HSSC-8	On-Going
5.1, 5.5, 7.2	Unique Identifiers	HSSC7/41	NIPWG and S-100WG to consider referring the issue of Unique Identifiers to the IMO-IHO Harmonization Group on Data Modelling and report to HSSC-8 (see Action HSSC7/42).	HSSC-8	Complete – S-100 has the capability for Unique Identifiers will utilize the IALA MRN concept
7.6 IALA					
5.1, 7.6	Unique Identifiers	HSSC7/42	IALA to submit its requirements on Maritime Resource Name scheme to the S-100WG (see Action HSSC7/41).	Prior to S-100WG-1	On-Going
7.13 DGIWG – NATO GMWG					
5.1, 7.13	AMLs	HSSC7/45	S-100 Registry Manager to process the request for the establishment of a domain for Additional Military Layers (AML) in accordance with S-99.	S-100WG-1	Completed



Problems or outstanding issues

- ✦ Delay in the S-100 Registry
 - Complex task
 - Limits progress for the development of other S-100 based product specifications
- ✦ Portrayal Catalogue Builder
 - Little to no testing for two years
 - Some additional functionality may need to be added



Action requested of HSSC

- ✦ The HSSC is invited to
 - note this report and approve the continuance of the Work Plan.
- ✦ Approve the actions requested with in this report



Actions Requested of HSSC

- ✦ **ACTION REQUIRED:** HSSC8 approve S-100 Edition 3.0.0 and forward to Member States for approval.
- ✦ **RECOMMENDATION:** that the workplan reflect that edition 4.0.0 will be submitted to HSSC in 2018 and that HSSC investigate establishing a standards development and maintenance regime to normalize the process
- ✦ **RECOMMENDATION:** 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.*
- ✦ **ACTION REQUIRED:** Establish a Domain Control Body and an Executive Control Body for the IHO Registry.



Actions Requested of HSSC

- ✦ **ACTION REQUIRED:** Add to the S100WG workplan to finalize the connection of the Portrayal Catalogue Builder to the GI Register.
- ✦ **ACTION REQUIRED:** Explore the use of IHB special project funds to resolve any issues that may be discovered with the Portrayal Catalogue Builder once the other infrastructure issues (GI Registry, FCB) have been resolved.
- ✦ **ACTION REQUIRED:** The UKC PT requests that HSSC assign the UKC an official S-100 product specification number.
- ✦ **ACTION REQUIRED:** Add Develop S-121 Product Specification for Maritime Limits and Boundaries to the S-100 Work Plan (new D.8)

