Paper for Consideration by TSMAD27

Test Bed Projects in Support of S-101 Development and Implementation

Submitted by:	Korea Hydrographic and Oceanographic Administration (KHOA)
Executive Summary:	In support of the timely development and implementation of S-101, KHOA is conducting three test bed projects.
Related Documents:	IHO S-100, S-101, S-64, and S-101 Value-added Roadmap
Related Projects:	TSMAD Work Plan

Introduction

1. In 2010, the IHO adopted S-100 as the over-arching standard for the production and exchange of hydrographic-related data. Using S-100 as the base, TSMAD is developing several standards for hydrographic information products including S-101 which will become the standard for the 'next generation' ENC to be used with ECDIS. In order to progress the timely development and implementation of S-101, the IHO needs active participation from member states. In particular, support is required from member states in carrying out test bed projects to further the development process.

Background

2. Beginning in 2008, the Korea Hydrographic and Oceanographic Administration (KHOA) started conducting S-100 related projects in order to evaluate the impact of the S-100 standard on the production of nautical chart-related products and services. In particular, KHOA has been closely monitoring the development of the S-101 standard by TSMAD. KHOA has also been actively engaged in developing a standardized management system for producing customized S-57 ENCs and environmental information overlays in the East Asia region. In addition, the Republic of Korea (ROK) Ministry of Trade, Industry and Energy, conducted a research and development project on the development of next generation ship navigation system based on S-100. Included in this project was the development of augmented reality system in a transparent panel form, closed-circuit TV (CCTV), and an ECDIS capable of using S-10X information. Recently, KHOA recognized the need to conduct S-101 test bed projects as well.

Planned Testing Process for S-101 Development

3. In May 2013, a "Project Concept Map for S-101 Test Bed" was initially proposed during TSMAD 24/ DIPWG 4 (Figure 1). More recently, an overarching test strategy for both S-100 and S-101 was agreed during a two-day S-100 Test Strategy Meeting held on 9-10 September 2013 at the UKHO. One of the key outcomes was a revised phased-approach to S-101 Test Bed development that follows a more iterative development process (Figure 2). This test strategy diagram will be used to further develop a testing framework document, and help determine the various types of test scenarios and datasets that will be needed throughout the S-100 /S-101 Test Bed Process.

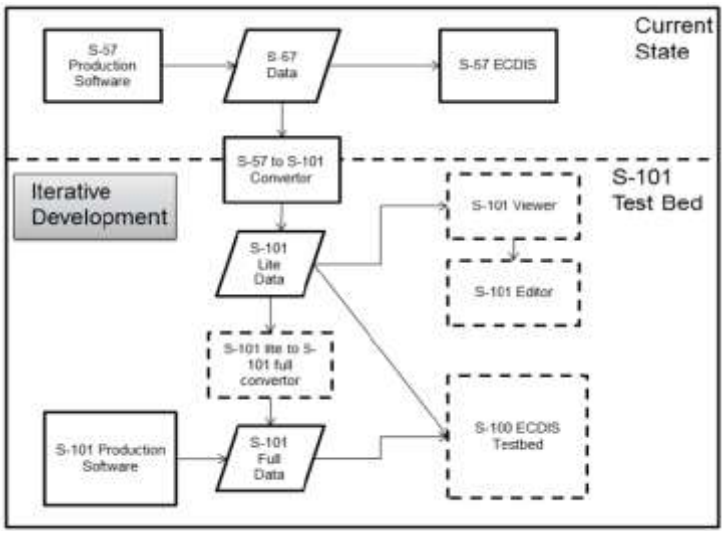


Figure 1 – The initial Project Concept Map of S-101 Test Bed
[Source : TSMAD24-DIPWG4_S-101 Information Paper]

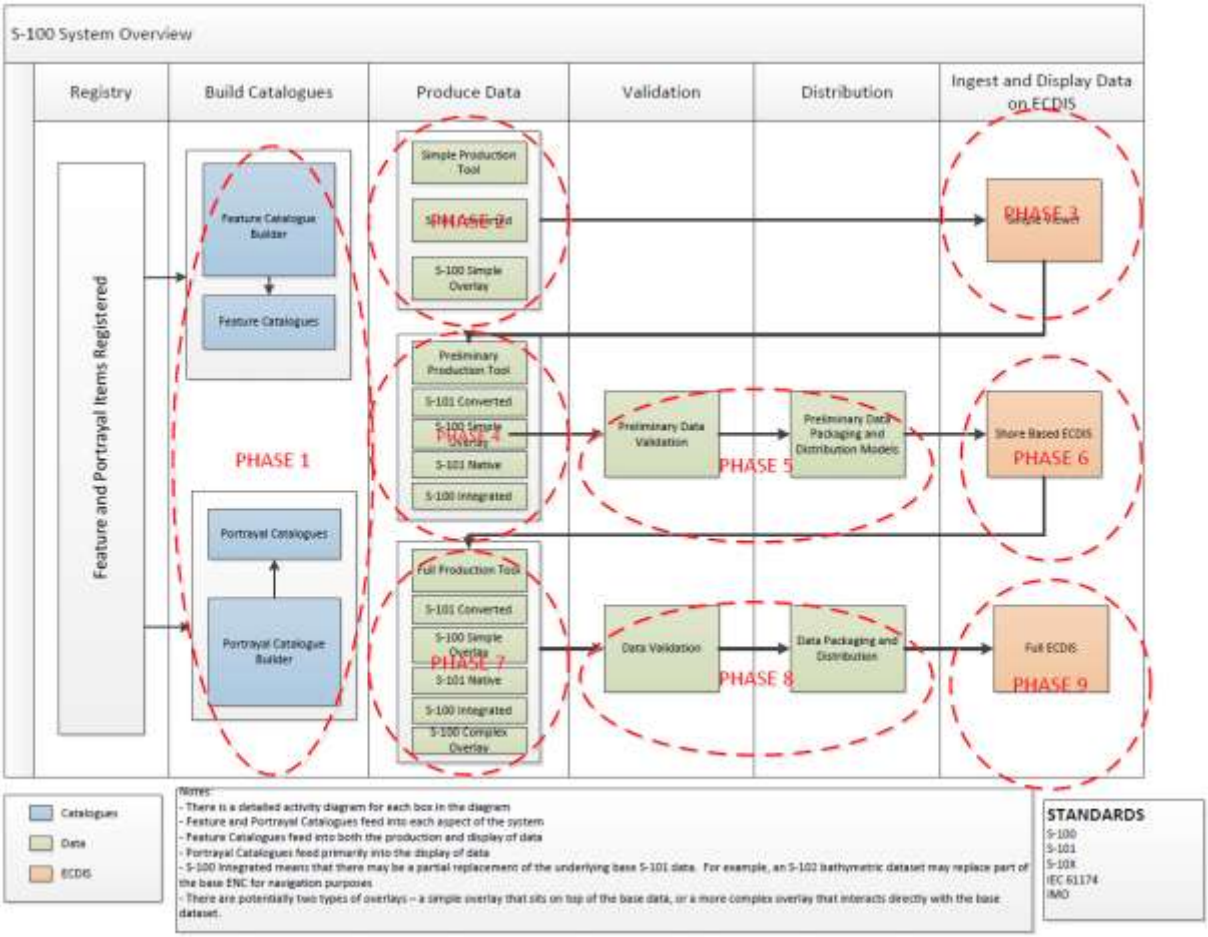
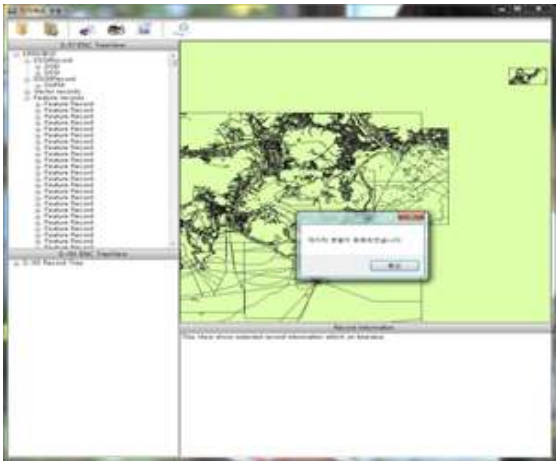
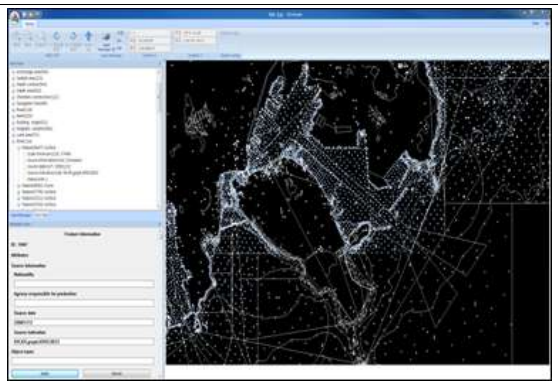
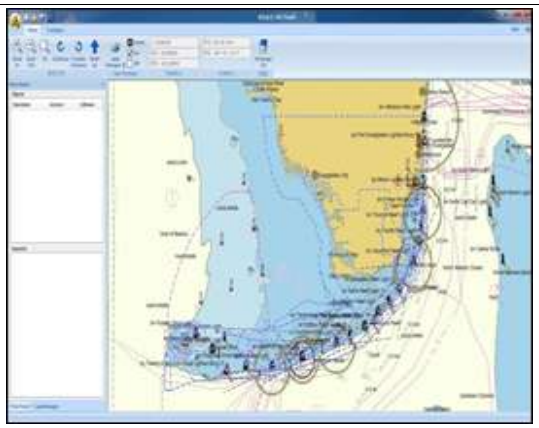


Figure 2 – S-100 System Overview Test Flow Diagram
[Source : Minutes of the S-100 Test Strategy Meeting, UKHO, 9-10 September 2013]

S-101 Test Bed Projects by KHOA

4. In support of the development and implementation of S-101, three test bed projects are being planned and will be conducted by KHOA.

S-57 to S-101 Converter: During an initial research project carried out in 2012, KHOA developed a converter based on the S-101 Feature Catalogue 0.5 version. This version was first created by TSMAD when the S-101 standard was initially being developed. The converter was then used to convert a KHOA S-57 ENC into the so-called "Lite" S-101 ENC. Similar to the S-57 to S-101 converter being developed by ESRI for USA NOAA, the KHOA S-57 to S-101 converter will be open-source and free for any party to use. There is benefit of having at least two converters. Ideally, both will achieve the same results. If not, then this would indicate that the S-101 standard may need further refinement.	 S-57 to S-101 Converter
S-101 Attribute Editor: In conjunction with 'next generation' ECDIS development, KHOA is developing an S-101 attribute editor in order to fill in the gaps of the so-called "Lite S-101 ENC". This is a necessary step in order to construct a so-called 'Full S-101 test dataset' for use in developing and testing the 'next generation' ECDIS. Ideally, the results of this project can be used to produce a future edition of IHO S-64 (Ed. 3.0) that contains S-101 related data sets required for ECDIS type-approval testing.	 S-101 Attribute Editor
S-101 Viewer: This viewer is software that can display S-101 ENCs by utilizing the internal data structure SENC and Portrayal Engine, and applying the Feature Catalogue and Portrayal Catalogue. S-101 ENC loading and SENCs were designed using the S-101 Editor. Once S-101 Portrayal Catalogue is complete, the development of S-101 Viewer can be finalized. This KHOA project will contribute to an "Action Item" from the recent S-100 Test Strategy Meeting that there should be more than one simple viewer, and that there should be at least three ECDIS manufacturers involved in producing a shore-based and 'full ECDIS." In this regard, KHOA plans to work with Hyundai e-Marine.	 S-57/S-52 ENC Viewer including a S-101 ENC Loading Module

Analysis/Discussion

5. In response to a request made during the 2012 S-100 Stakeholder Meeting, TSMAD prepared a Master Plan for the development and implementation of S-100. In addition, an S-101 "Roadmap was also prepared that lists various phases and dates related to the S-101 ENC development and implementation process:

- S-101 First Draft (October 2013)
- Initial Test Bed (2013 - 2015)
- S-58 and S-64 (2014)
- OEM Review (2014 - 2015)
- OEM Implementation (2015 - 2017)
- ECDIS On Shore Trials (2015 - 2016)
- S-101 Final Draft (2016)
- ECDIS Sea Trials (2017)
- S-101 To be Released for Full Implementation (2018)

The three KHOA S-101 test bed projects are intended to contribute to accomplishing these overall objectives and timelines. In addition to the 'Initial Test Beds' during 2013 - 2015, KHOA will conduct other types of test bed projects that may be necessary to meet the planned S-101 'Full Implementation' scheduled for 2018.

Justification and Impacts

6. The KHOA S-101 test bed projects are being conducted to assist TSMAD in the development and implementation of the S-101 ENC standard.

Action Required of TSMAD:

7. The TSMAD is invited to:
   a. **Recognize** the need for conducting test bed projects as a crucial step in the development and implementation of S-100 and S-101 standards.
   b. **Note** the benefit of KHOA conducting test beds in support of the development of S-101.
   c. **Include** the KHOA S-101 test bed program as part of the TSMAD S-100 Test Plan Strategy.

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