

## Paper for Consideration by TSM5

## KHOA S-100 Test datasets and Test Bed Plan

<b>Submitted by:</b>	Republic of Korea (KHOA)
<b>Executive Summary:</b>	This paper outlines the plan of KHOA S-100 Test datasets and Test bed plan
<b>Related Documents:</b>	S-100, S-101, S-102, S-104, S-111, S-112, S-124, S-412
<b>Related Projects:</b>	KHOA S-100/S-10X Testbed project

**Introduction / Background**

KHOA has promoted a research project to cope with S-100 as national hydrographic office and support the S-100 test bed project of IHO. The project started from 2016, which included the creation of S-100 test datasets, development of S-100 test system and sea trial test. The research project has been conducting again in this year to improve the creation of test dataset and set test based on the proposed scenario. This paper describes status and major plan of the project including the creation of S-100 test dataset and scenario for sea test.

**Analysis/Discussion**Creation of S-100 test datasets

The research team has been creating the S-100 test datasets for the purpose of testing in the S-100 test system. Since the test area will be the Port Busan, the test datasets will be created considering the test area and proper compilation scale. The tools and procedures of creating S-100 test dataset were summarized like Table 1.

Table 1. The method and process of creating S-100 test dataset

Num.	Product Specification	Tools and Procedures
1	S-101 Electronic Navigational Chart (ENC)	- Tools: NOAA/ESRI S-101 Converter (Version 0.8.19), CARIS S-57 Composer, KHOA S-101 editor. - Procedures: S-57 ENC data(ER) → CARIS S-57 Composer
2	S-102 Bathymetric Surface	- Tools: KHOA S-102 Editor (developed using open source application from the Open Navigation Surface Working Group). - Procedures: Survey data → Upload to DEM Database → Convert and edit using the S-102 editor (BAG).
3	S-104 Water Level Information for Surface Navigation	- Tools: KHOA S-104 Editor - Procedures: Water level in grid (sourced by KHOA Tidal system) → created by S-104 Editor
4	S-111 Surface Currents	- Tools: KHOA S-111 Editor. - Procedures: Speed and direction of surface current data (sourced by KHOA current system) → Created by KHOA S-111 Editor
5	S-112 Dynamic Water Level Data Transfer	- Tools: KHOA ASM Message 8 Encoder, water level service system connecting with AtoN AIS. - Procedures: Tidal station → Access and transfer the water level to QC system → Transfer the QC processed values to the water level service system → Encode the water level value to the ASM Message 8 → Send the Message 8 via AtoN AIS → Receive the ASM Message → Display the real time water level value in the sea trial system
6	S-124 Navigational warnings	- Tools: S-124 GML converter from NW DB - Procedures: KHOA NW DB → convert to S-124 NW GML data
7	S-412 Weather Overlay	- Tools: S-412 converter for Korean weather data - Procedures: KML (digital format for weather chart) → convert KML to S-412 GML data

The research team experienced the creation of S-100 test dataset in 2016. Based on the lesson learnt in last year, the team planned how to create the datasets like Table 2.

Table 2. Creation of S-100 test datasets

Num.	Product Specification	2016	2017
1	S-101 Electronic Navigational Chart (ENC)	Convert data using S-101 converter, add some attribute values.	Use a multiple tools like CARIS composer and converter with the DCEG of 2017. Add feature type required for sea trial
2	S-102 Bathymetric Surface	Gap between Bathy Grid, Step of sounding value between survey area Lack of Uncertainty values	Solve the problem of gap and step, consider uncertainty values
3	S-104 Water Level Information for Surface Navigation	Creation as HDF-5 format without meeting the product specification	Creation the test dataset according to the S-104 data model
4	S-111 Surface Currents	Creation of surface current with the value of numerical tidal prediction	Creation of surface current with the value of surface current prediction model
5	S-112 Dynamic Water Level Data Transfer	Transfer quality controlled water level value by ASM from the shore side	Transfer real time water level by ASM from tidal observation station
6	S-124 Navigational warnings	Creation NWS for specific points	Creation NWS based on the test scenario
7	S-412 Weather Overlay		New item

#### Development of S-100 test system

The research team will develop the S-100 test system again based on the lessons learn in 2016. The major characteristics of the system is like the followings;

- To follow the S-100 portrayal process based on Style sheet for all S-100 test datasets
- To connect the AIS receiver and receive the S-112 real time water level
- To display Go area and NoGo area using the S-102 bathy grid, S-104 tidal height, S-112 real time water level and vessel draft
- To improve the pick report function for querying the attribute values of S-100 test datasets
- To apply the S-100 interoperability catalogue
- To design the user interface of S-100 test dataset based on two monitors

#### Procedures of testing S-100 datasets

##### 1. Overview

- Sea test using the survey vessel of KHOA
- Install the S-100 test system in the bridge
- Three test subjects participate (Marine background)
- Prepare a questionnaire asking the opinion of test subjects after the experiment

##### 2. Test Scenarios

###### 2.1 Orientation for participants

- Introduction of S-100 test dataset and test system
- Purpose of S-100 sea test

###### 2.2 Before departure

- Scenario 1: Route planning with S-100 test datasets (Weather, Surface current, Tidal height)

###### 2.2 During ship operating

- Scenario 2: Display Go Area/NoGo Area using the S-102 bathy grid, S-104 tidal height and S-112 real time water level, compare between existing ECDIS(Safety contour) and S-100 test system
- Scenario 3: Reduce the area that can be operated adjusting the vessel draft values, Observe the behaviour of participants
- Scenario 4: Apply the S-100 interoperability catalogue and see the portrayal results, observe if the symbol is displayed properly and there is symbol clutter.

###### 2.3 After entry

- Survey the opinion of participants using the questionnaire prepared
- The main point of the questionnaire is (1) S-100 test data is useful for safe navigation, (2) The function of S-100 test system is effective, (3) There is any problems in displaying additional products on ENC.

#### Plan of S-100 sea test

KHOA is planning the sea trial of S-100 test datasets at the end of October 2017.

#### **Discussion/Conclusion**

KHOA has promoted the research project to support the IHO S-100/S-10X testbed. The project includes the creation of S-100 test dataset, development of test system and sea trial. TSM participants are invited to provide recommendation and consideration for the research project of KHOA.

#### **Recommendations**

KHOA thinks that the S-100/S-101 development schedule should be pursued according to the proposed plan in order to improve national hydrographic service and cope with the IMO e-Navigation. KHOA will continue the S-100/S-10X test bed research including S-100 test dataset and set test and report the research results to S-100WG and TSM.

#### **Action Required of TSM5**

The TSM5 is invited to:

- a. Note the progress reported in this paper.
- b. Provide recommendation and consideration for the research project of KHOA