Paper for Consideration by SNPWG

[Progress of e-MIO project of EAHC]

Submitted by:	ROK(Republic of Korea)
Executive Summary:	Marine environment MIO Working Group under EAHC CHC (Charting and Hydrography Committee) was organized to establish regional marine environment MIO specifications and datasets. This paper informs on the progress of this project.
Related Documents:	IHO S-57, S-52, S-100, S-101, and S-99 standards
Related Projects:	EAHC Charting and Hydrography Committee, Marine Environment MIO WG Project

Introduction / Background

To contribute to the systematic research on various marine environmental matters and the effective response to maritime accidents such as oil spills, discussions took place on developing the marine environment MIO (Marine Information Overlay) which can be used together with the ENCs produced by HOs(hydrographic offices).
The development of marine environment MIO is not part of the usual work required for a hydrographic office. However, it was agreed that national hydrographic offices are the suitable organizations to perform the work so as there is a similarity between the ENCs and MIO information. Accordingly, the EAHC organized the e-MIO WG and agreed to conduct the e-MIO Test-bed Project. This agenda reports on the progress made in 2013 in the e-MIO Test-bed Project.

Analysis/Discussion

<u>e-MIO Implementation Procedures and Key Information</u>

At the 1st CHC meeting held in Bohol, the Philippines in 2013, the following procedures were proposed for the development of e-MIO database:

(1) Phase 1 Test-bed Stage: Draft e-MIO product specifications for oil spills response in the level of S-57 Model, Produce test dataset for the e-MIOs, Develop an e-MIO viewer, Prepare and present a report on the results of the e-MIO test-bed project
(2) Phase 2 Actual Business Stage: Review the results of the pilot production for the e-MIOs, Establish a detailed schedule of the actual business stage
(3)Phase 3 S-100 Standard Application Stage: Develop S-10X standards regarding the e-MIOs, Establish an e-MIO S-10X dataset on a trial basis.

The 1st CHC meeting considered areas for e-MIO demonstration and agreed to produce test datasets in the West Coast of Korea and Singapore Water.

<u>Development of e-MIO Test-Bed Model for EAHC</u>

To ensure successful implementation of the test-bed project and smooth transfer to S-10X dataset, the e-MIO WG developed the following e-MIO Test-Bed model. The detailed procedures are as follows:

(1) Identify e-MIO user needs
(2) Design the data model on the e-MIO data
(3) Register object/attribute of e-MIO in the Registry
(4) Create and set MIO production tool configuration files using the catalogue builder
(5) Produce e-MIO test dataset
(6) Verify the test dataset using e-MIO Viewer

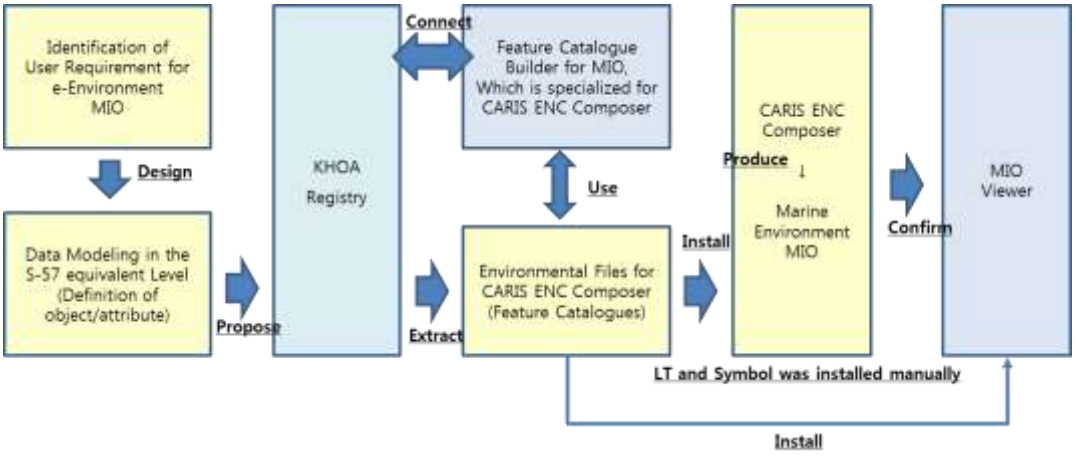

Fig. 1 Model of e-MIO Test-Bed

The above e-MIO Test-Bed model is linked with a specific MIO production tool (CARIS). If any EAHC MS uses a different production tool, this model cannot be applied. In such cases, e-MIO will need to be produced by setting the configuration file to the specific MIO production tool used by the EAHC MS and verified by the e-MIO Viewer.

Draft e-MIO Product Specification for EAHC

In developing the e-MIO product specifications, the e-MIO WG agreed to consider oil spills response and to use the relevant documents available at the IMO and NOAA as reference. The e-MIO WG reviewed the documents on oil spills response together with the HGMIO's General Content Specifications for MIO and IHO SNPWG's MPA specifications.

Fig. 2 Relevant documents for e-MIO Product Specification

As the HGMIO provides template documents for the production of MIO Product Specifications, these template documents can be used as a reference in developing the e-MIO Product Specifications. The table of contents of the MIO specifications consists of the following:

- Contents (Introduction, General information, Objects and attributes, Cartographic framework, Provision of data, Application profiles)
- Object / Attribute Catalogue, Symbol and Look-up Table

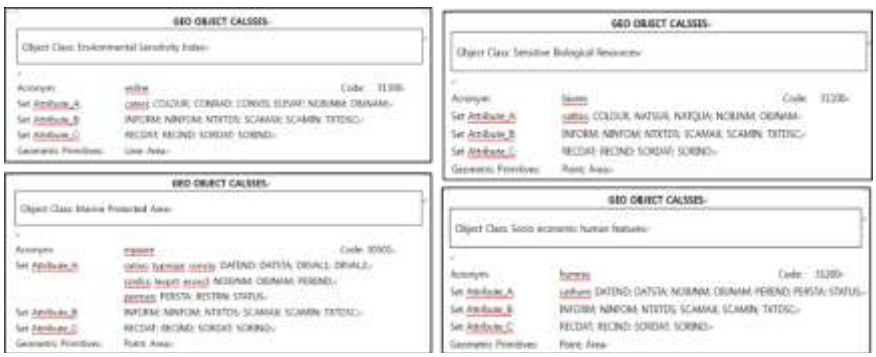

Fig. 3 Object / Attribute Catalogue

Note: FOR REASONS OF ECONOMY, DELEGATES ARE KINDLY REQUESTED TO BRING THEIR OWN COPIES OF THE DOCUMENTS TO THE MEETING

A draft version of e-MIO Product Specification has been developed using the MIO template documents based on the case of ICE Product Specification. The objects and attribute catalogues are as shown in Fig. 3.
Also, the e-MIO WG reviewed the symbols and look-up table in accordance with S-52 PL 3.4 in order to display e-MIO dataset on ENC as follows:

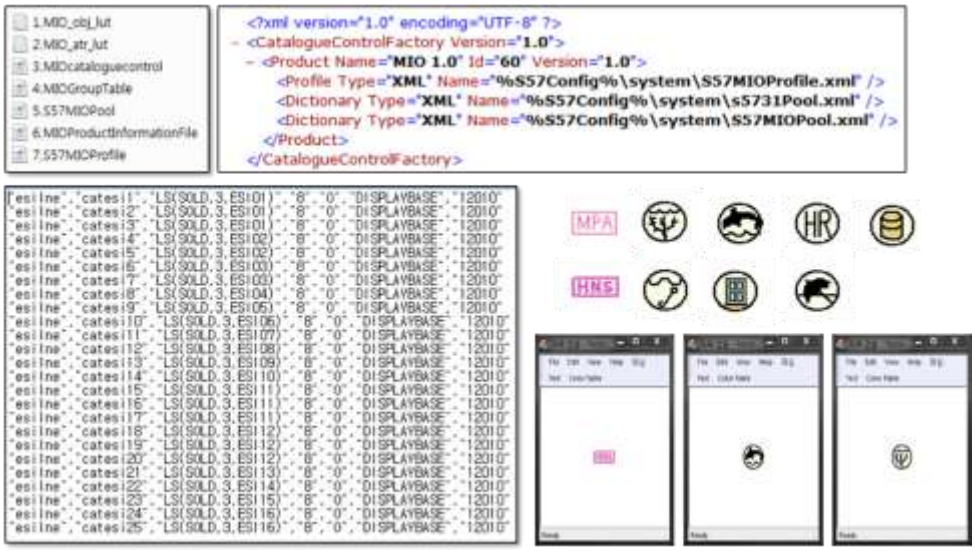

Fig. 4 Symbol and Look-up table of e-MIO

Production of e-MIO test dataset and Viewer

Source data like Fig. 5 has been collected to establish e-MIO test data for Tae-an region located in the west coast, ROK. The coastline classification data from hyper spectral image data taken by KHOA airborne LIDAR Survey Project in 2012, marine environment and oil spill response from Korea Coast Guard have been collected and used.

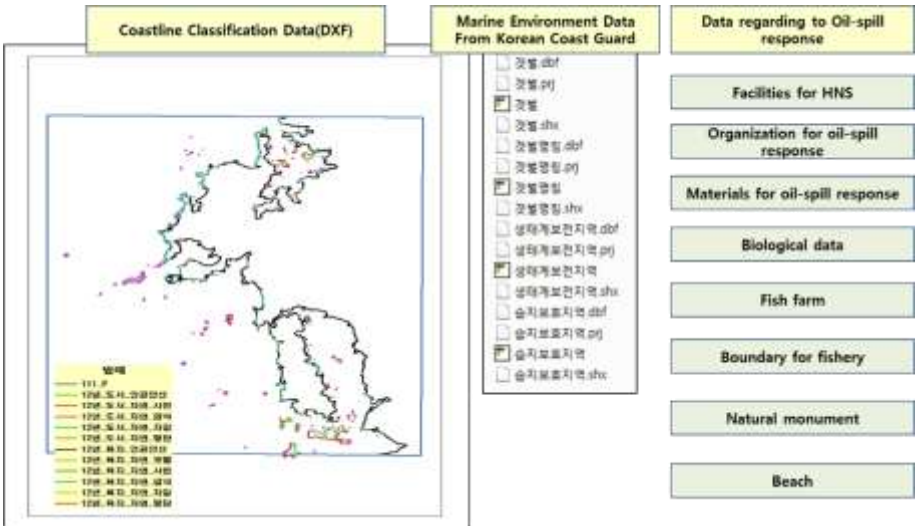

Fig. 5 Source data for e-MIO of ROK West Coast

ROK has established e-MIO test dataset which can be overlapped with ENC (Usage Band 4) for Tae-an region located in the west coast.
The e-MIO Viewer has functions such as loading and displaying of Shape and ENC file, GIS basic function, Layer On/Off, changing of layer display order, and pick report as a viewer not only for ENC but e-MIO data set. In addition, it is available to add a new object or look-up table to each catalogue. In order to test the e-MIO Viewer, MPA and Coral Reef data in the U.S. state of Florida provided by HGMIO website, and MIO data in Singapore have been used.
ROK tested the e-MIO test dataset with Tae-an MIO data established in this Test-Bed and two ROK ENC cells. Details will be given through a demonstration at the meeting.

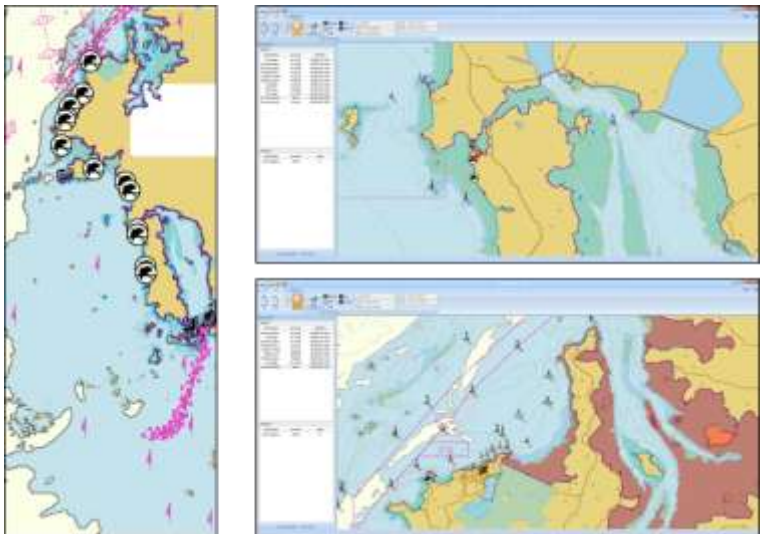

Fig. 6 Test of e-MIO in the e-MIO Viewer

Conclusions

In this e-MIO Test-Bed, ROK established e-MIO Test-Bed model required for e-MIO database in East Asia region and production environment for e-MIO data set, developed specifications, and produced and tested the e-MIO dataset. However, there was not enough discussion through e-MIO WG due to tight test bed timeline and there are some shortcomings such as limited area for test data. Therefore, the following suggestions was being asked for CHC2 regarding establishment of e-MIO database.

- To review the research results of e-MIO Test-Bed project.
- To task e-MIO WG review the Product Specification and gather the opinions
- To produce the additional test data through cooperation with EAHC MS.
- To discuss the plan for production of e-MIO database in East Asia region through e-MIO WG
- To report the plan at the next CHC meeting.
- To report the research result of e-MIO test bed project to the next SNPWG meeting.

Recommendations

When the e-MIO project of EAHC was introduced at the TSMAD Meeting, SNPWG chair recommend that the e-MIO data model have to be aligned with the MPA model of SNPWG. But, as the schedule of test bed project was too short, the MPA model was not considered sufficiently in the development of e-MIO product specification. Therefore ROK will try to redesign the e-MIO Model considering the MPA Model of SNPWG and seek to find a method to change from S-57 model to S-10X model in the future.

Action Required of SNPWG

The SNPWG is invited to:

a. Take note of this initiative.

b. Provide recommendations that may be helpful in developing S-10X standard for marine environmental protection in the future