Paper for Consideration by NIPWG

[Status of the development progress of the S-100 Simple Viewer]

Submitted by:	Republic of Korea (KHOA)
Executive Summary:	This paper reports the progress on the S-100 Simple viewer of KHOA research project.
Related Documents:	S-100, S-101, S-100 Test Framework
Related Projects:	IHO S-100/S-101 Test Bed Project

Introduction / Background

KHOA has been promoting a R&D project on S-100 simple viewer development to cope with S-100 as a hydrographic office and to support S-100/S-101 test bed of the IHO. The S-100 simple viewer of KHOA has been used to test S-100 product specifications such as S-101, S-111 and will be able to be used to verify S-10X PSs developed by NIPWG. It will be also used to test interoperability with other S-100 based products. This paper would introduce the progress of S-100 simple viewer development by KHOA.

Analysis/Discussion

S-100 Test Program

The goal of S-100 test program is to provide a set of complete and validated standards and specifications and associated documents to support the development of S-100 marine navigation systems which meet the user need.
TSMAD made the following functional flowchart which depicts the high level S-100 System Overview. Each box represents a component or a set of components that will be tested utilizing S-100 test framework.
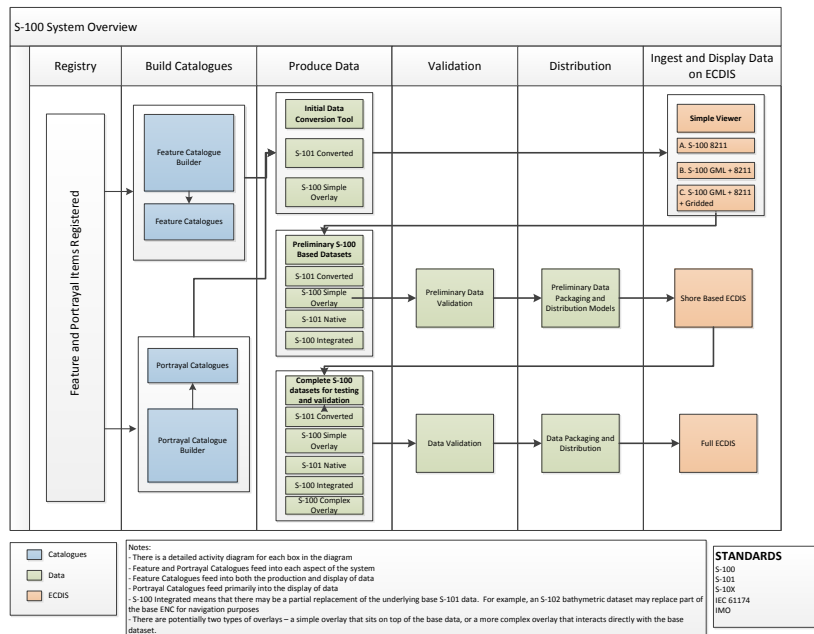

Fig. 1 S-100 High Level System Overview

The goal of the KHOA R&D project is a development of S-100 simple viewer which can be used in the S-100 Test Program. If the S-100 simple viewer corresponding Phase 3 is developed, it will be possible to verify the S-101 Feature/Portrayal Catalogue of Phase 1 and S-101 Converted ENCs of Phase 2.

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

SVG Symbol Reading and Drawing Module

The part 9 Portrayal was introduced in the S-100 Ver. 2.0, which includes portrayal topics that are required to develop S-10X PS. In particular, the Portrayal part defined SVG profiles as a symbol format. KHOA developed a module to load and draw SVG symbol data that is included in the S-10X PSs including S-101 ENC. The development result of SVG module which KHOA developed was presented and demonstrated in the 29th TSMAD meeting of this year.
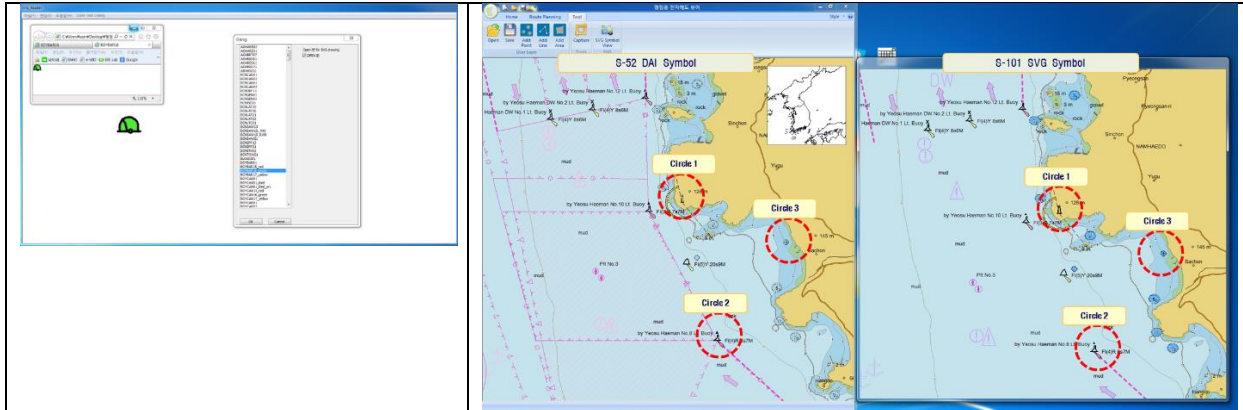

Fig.2 Development of the SVG reading and drawing module

Changes of ISO/IEC 8211 Encoding in S-100 Ver. 2.0

The ISO/IEC 8211 Encoding part of S-100 Ver. 2.0 was slightly changed than the S-100 Ver. 1.0. In particular, new codes fields were added in the Data Set General Information Record of ISO/IEC 8211 Encoding, which means that S-101 ENC has an individual code value management scheme. Newly added Fields are as follows:

- ATCS (Attribute Codes field)
- ITCS (Information Type Codes field)
- FTCS (Feature Type Codes field)
- IACS (Information Association Codes field)
- FACS (Feature Association Codes field)
- ARCS (Association Role Codes field)

Although each feature type has own code value in the existing ISO/IEC 8211 encoding, the code value will not be used in the new ISO/IEC 8211 encoding rule because the S-100 registry only allowed Camel case, not code value. Accordingly, as the S-101 ENC based the S-100 ver2.0 contains local index systems, the S-100 simple viewer was updated to consider the changes of 8211 encoding.

Review of S-101 Portrayal Catalogue

Since the TSM2, DIPWG provided KHOA with the draft version of S-101 Portrayal Catalogue, and then KHOA reviewed it and the part 9 of S-100 ver. 2.0 to develop portrayal parts in the S-101 simple viewer. S-101 portrayal catalogue consists of several folders with portrayal catalogue XML files in the root folder as below. More details on S-101 Portrayal Catalogue appear as the Part 9 of S-100 Ver. 2.0.

- AreaFills
- ColorProfiles
- Fonts
- LineStyles
- Pixmaps
- Rules
- Symbols

KHOA decided to adopt the Rules and Point typed symbols of S-101 Portrayal catalogue in current stage. 162 rules as XML format and 533 point typed symbols as SVG format were used to develop S-101 simple viewer of current stage.

<u>S-100 Portrayal Process</u>

As the portrayal process that can be applied to S-10X PSs was defined in the Part 9 Portrayal of S-100 Ver. 2.0., S-100 enabled S/Ws like S-101 simple viewer are required to make sure the portrayal process. The portrayal process means that all feature information of S-10X datasets is converted to a FeatureXML, and a DrawXML is developed by combining the FeatureXML and Rules (XSLT files) of Portrayal catalogue. The portrayal process is an outside proceduralization using portrayal rules of Portrayal Catalogue from the internal process of ECDIS system on S-52 PL look-up table. KHOA discussed this topic in the 29th TSMAD meeting and has been preparing to update S-100 simple viewer.
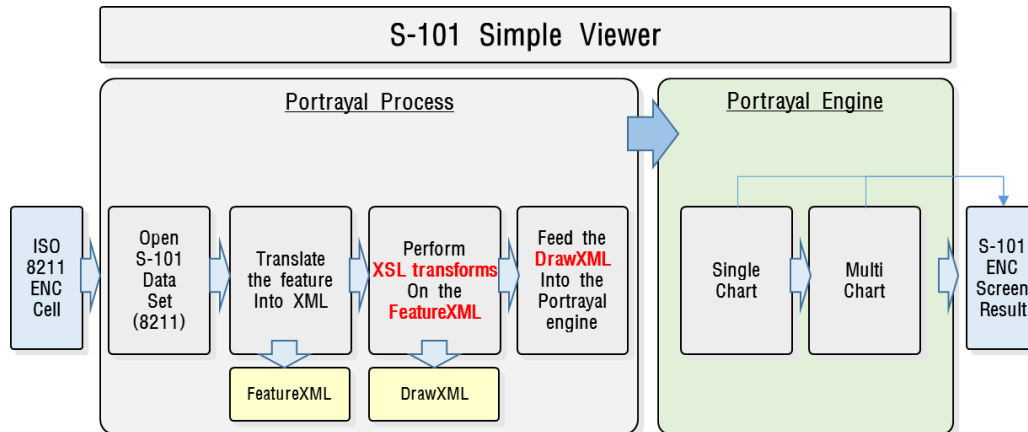

Fig. 3 Portrayal Process of S-101 Simple Viewer

<u>Draft version of S-100 Simple Viewer</u>

KHOA has developed a draft version of S-100 simple viewer using S-101 relevant information and data created till now which are shown as below:

- S-101 Converter 0.8.8
- S-101 Converted ENC data set (S-101 Feature Catalogue 0.8.8)
- S-101 Feature Catalogue 0.8.8
- S-101 Portrayal Catalogue (Rules, Point typed SVG Symbol)

In particular, as rules and point SVG symbols were only available in the current version of S-101 portrayal catalogue, it was decided to adopt hybrid method using S-101 Portrayal catalogue and S-52 Presentation Library 4.0 as below:

- Rules / Look-up table: S-101 PC Rules
- Point Symbol: S-101 SVG Symbol
- Line Symbol: S-52 PL 4.0
- Pattern Symbol: S-52 PL 4.0
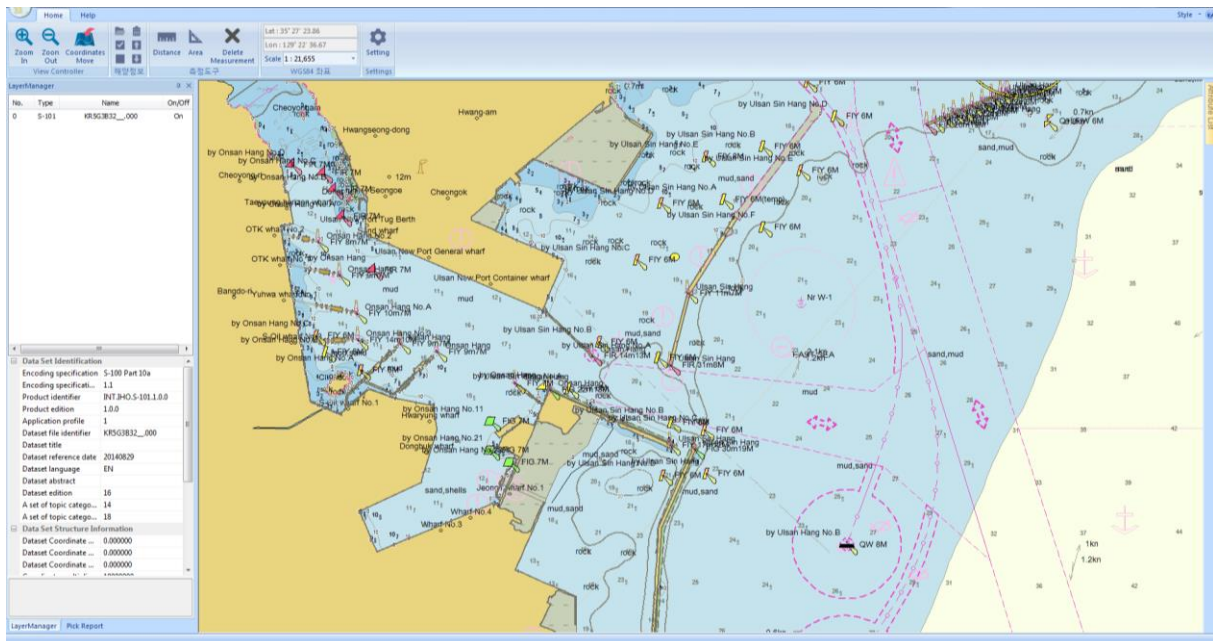- Conditional Symbol: S-52 PL 4.0

Fig. 4 Draft version of S-100 Simple Viewer

Encoding module development on GML and HDF-5 format

The 2nd TSM held in the US in 2014 reviewed the existing the S-100 test framework to identify any gaps. It was noted that phase 3 focused more on S-101 testing and needed to be expanded to encompass S-100 in general. The group agreed to split phase 3 into three parts to concentrate on the following aspects of S-100.

- Phase 3A – Testing of S-100 product specifications that utilize the S-100 8211 encoding format
- Phase 3B – Expand the simple viewer to account for the new S-100 GML encoding
- Phase 3 – Further expand the simple viewer to account for gridded encoding such as HDF5.

According to the agreements on phase 3 of S-100 test framework, KHOA has been developing to cover not only 8211 format but also GML and HDF-5. The development result can be used to verify ongoing PSs such as S-122 MPA, S-124 MSI, S-102 bathy surface, S-111 Surface Current.

Application of S-100 simple viewer to PSs developed by NIPWG

KHOA is developing the S-100 simple viewer considering GML format as well as 8211 format. Meanwhile, the NIPWG has a progress to develop S-10X PSs on nautical publications as below:

- S-122 Marine Protected Areas
- S-123 Radio Services
- S-125 Navigational Services
- S-126 Physical Environment
- S-127 Traffic Management
- S-128 Marine Services
- S-xxx Digital Mariners' Routeing Guide
- S-xxx Harbour Infrastructure

As it is expected that product specifications under NIPWG will use the GML encoding of S-100 Ver. 2.0, S-100 simple viewer of KHOA can be used to test the NIPWG's PSs soon. KHOA will support NIPWG consistently in the test work of S-10X development using S-100 simple viewer.

Action Required of NIPWG
The NIPWG1 is invited to:
   a.   note the progress reported in this paper.
   b.   provide recommendations that may be helpful to develop the S-101 Simple Viewer.

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