IHO Standardization of Nautical Publications Working Group (SNPWG)

Research on MPA Dataset needed for Development of S-100 enabled ECDIS

to 17th SNPWG Meeting

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Proposal by KRISO(Korea Research Institute of Ships & Ocean Engineering), Jeppesen

Introduction

- The ROK government has been promoting S-100 enabled ECDIS as a R&D project that integrates maritime and ocean engineering fields with ICT (Information & Communication Technology).
- Hyun-dai e-Marine co.(ECDIS OEM), KRISO(Korea Research Institute of Ships & Ocean Engineering), and ETRI(Electronics and Telecommunications Research Institute) engage in this project.

Introduction

- KRISO is in charge of establishment of the S-10X test data set needed in S-100 enabled ECDIS development in the project, and has been conducting the research on establishment of MPA at present.
- This paper reports the contents of research which KRISO is working on, and recommends the establishment of NPUB S-10X Test bed related to R&D project of ROK.

Overview of Korean R&D Project

- This R&D project is on S-100 enabled ECDIS development needed in the marine industry in connection with IHO S-100/S-10X standards development, and has been conducted since June, 2012 with the 4 years plan.
  - The managing company of this project, Hyun-dai e-Marine, has been working on development of S-100 enabled ECDIS production,
  - KRISO is in charge of S-10X data set and standard required in S-100 enabled ECDIS, and
  - ETRI has developed Onshore based S-10X service technologies.

Overview of Korean R&D Project

- The overview of this R&D project has ever been introduced in IHO Stakeholders Forum which was held in related to HSSC4 in Taunton, UK in September, 2012 as the agenda for “Future S-100 based applications and value-added services”.

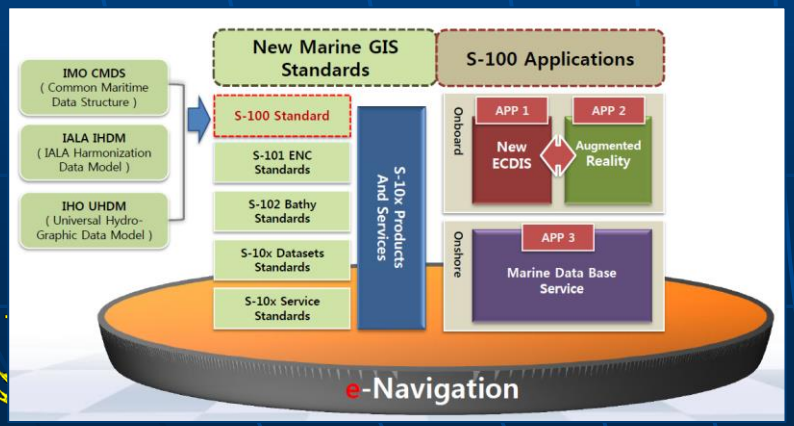
❖ Duration : 2012.6.1 ~ 2016.5.31 (4 years)

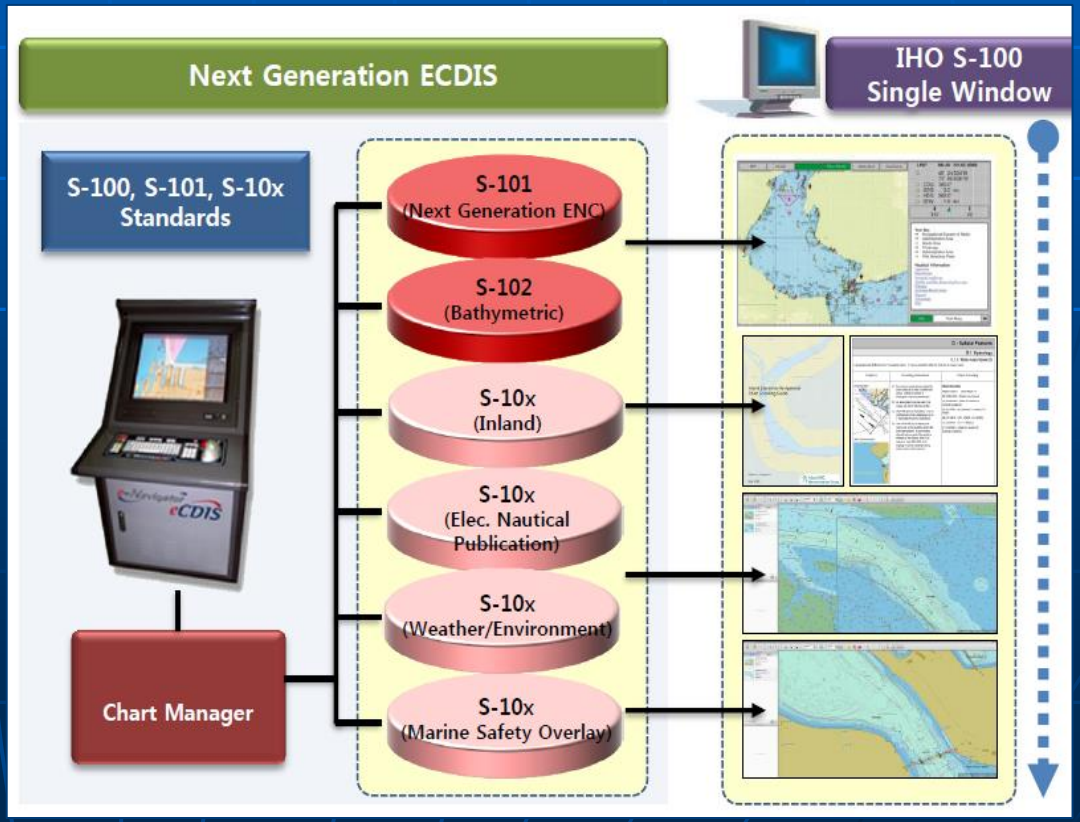
❖ Investment : US$ 9.7mn Equiv.

❖ Matching Funds : 75% from Ministry of Knowledge Economy

25% from Hyundai + Hanjin

❖ Team : HYUNDAI e-MARINE, CyberLogitec, ETRI, KIOST, DSU, INHA UNIVERSITY



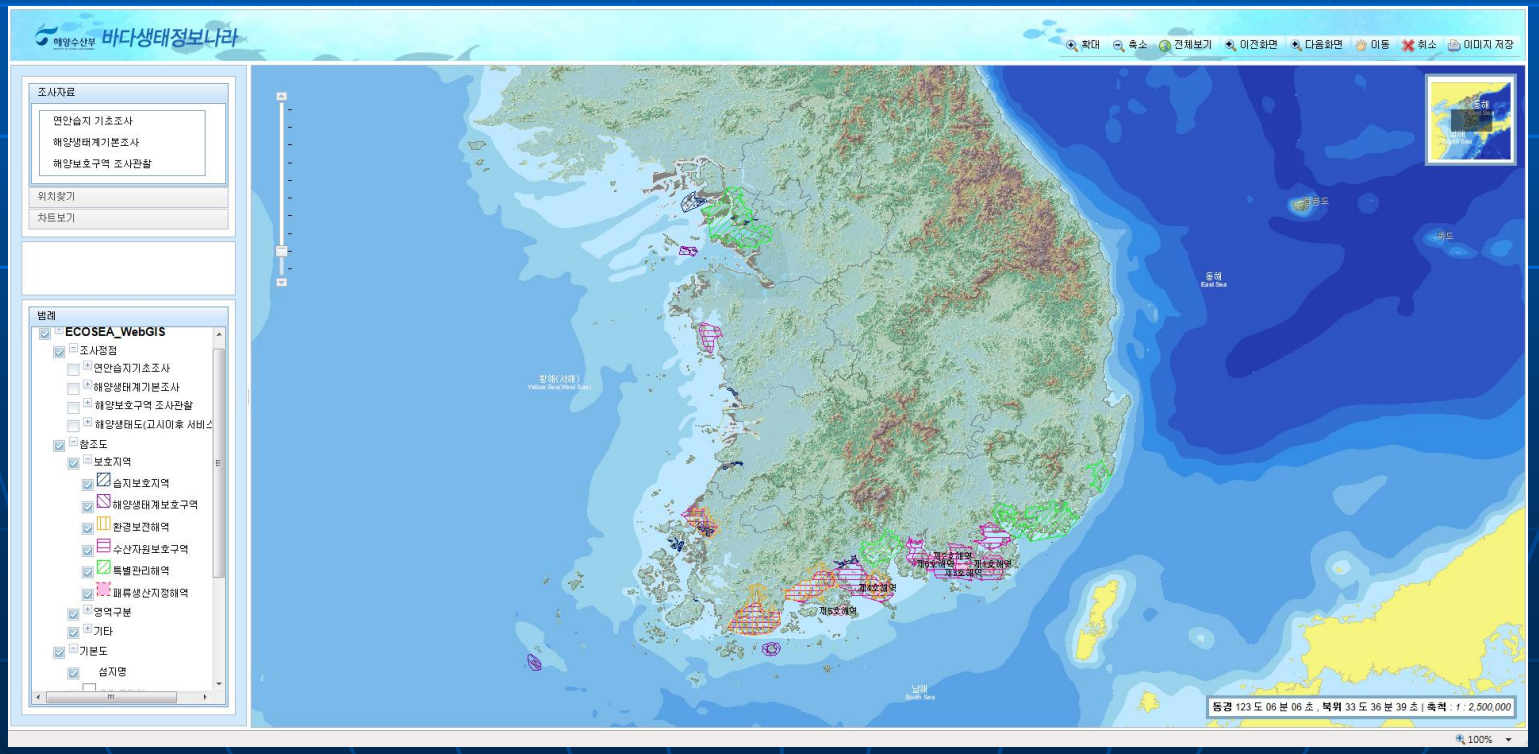


Status of MPA data in ROK

- KRISO has the plan to establish MPA test data based on MPA product specification developed by SNPWG as the use case of S-10X.
- Sailing Direction which is published by ROK Hydrographic office does not include the information of MPA.
- MPA Centre of KOEM (Korea Marine Environment Management Corporation) under the Ministry of Maritime Affairs and Fisheries manages MPA and serves it in the form of Web GIS.

Status of MPA data in ROK

- MPA Information
  - Wet land, Ecological Reserve, ESSA (Environmentally Sensitive Sea Area), Fish Sanctuary, PSSA (Particularly Sensitive Sea Area), Shellfish Farm Area, Mud Flat



Progress on MPA research by KRISO

- KRISO has investigated and analysed the contents of MPA Product Specification, Sample Dataset, Feature Catalogues developed by SNPWG, and considered establishment for MPA test dataset.
- In addition, as a result of MPA dataset research, KRISO established test dataset, and developed MPA Viewer to test this MPA dataset.

Progress on MPA research by KRISO

- Category of Restricted Area

Category of Restricted Area	Code No.
Nature Reserve	4
Bird Sanctuary	5
Game Reserve	6
Seal Sanctuary	7
Historic Wreck Area	10
Research Area	20
Fish Sanctuary	22
Ecological Reserve	23
ESSA (Environmentally Sensitive Sea Area)	24 (New)
PSSA (Particularly Sensitive Sea Area	25 (New)
Coral Sanctuary	26 (New)

Progress on MPA research by KRISO

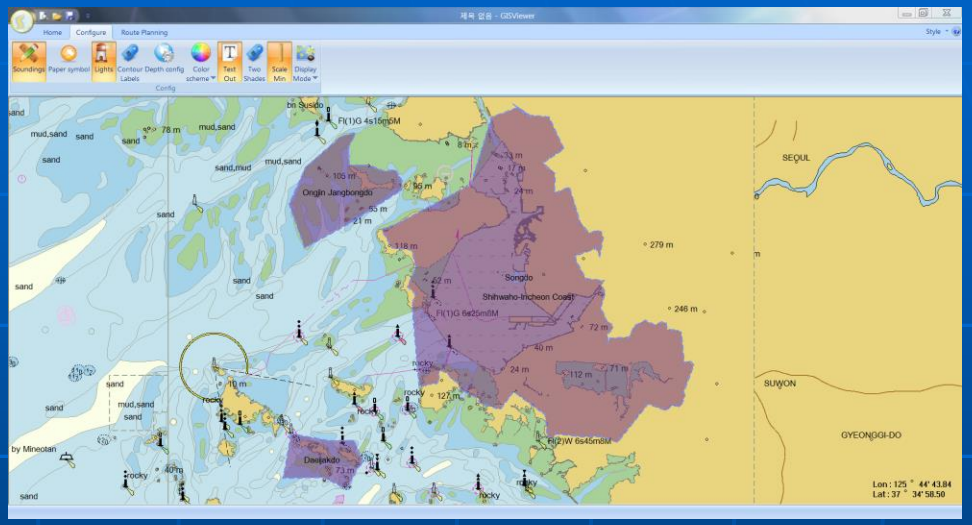
MPA Sample Dataset (GML)

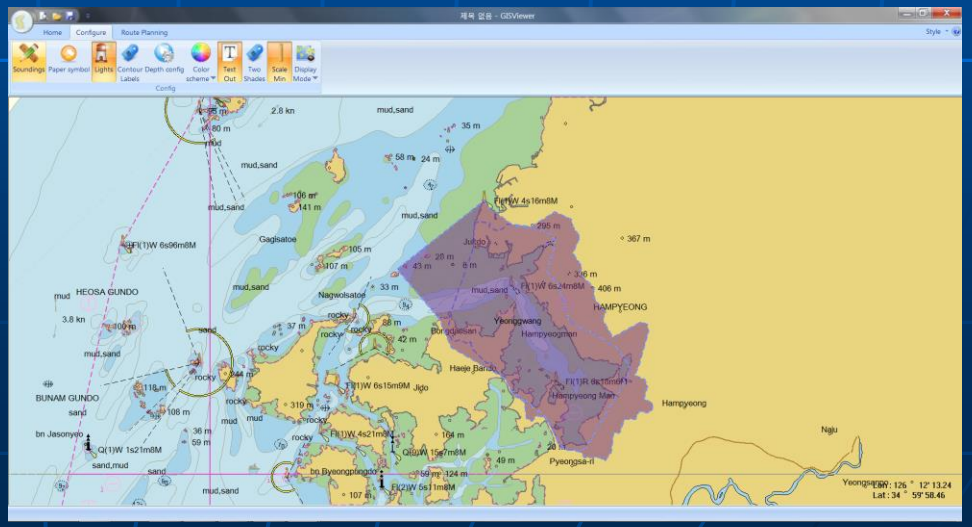
```
<?altova_sps ..W..WschemasW0.2WMPAdataentry.sps?>
<MPA:DataSet xmlns:MPA="http://www.iho.int/s100_mpa/0.3" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xmlns:s100="http://www.iho.int/s100gml" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:S100="http://www.iho.int/MPA/S100/0.2"
 xmlns:xlink="http://www.w3.org/1999/xlink" xsi:schemaLocation="http://www.iho.int/s100_mpa/0.3 ../../schemas/0.3/mpaDS.xsd"
 gml:id="EC001">
  <gml:boundedBy>
    <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4326">
      <gml:lowerCorner>37.0000 126.0000</gml:lowerCorner>
      <gml:upperCorner>38.0000 127.0000</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>
  <member>
    <MPA:MarineProtectedArea gml:id="EC001">
      <name>
        <text>Daeijakdo</text>
        <language>eng</language>
        <categoryOfName>Ecological Reserve</categoryOfName>
      </name>
      <sourceIndication>http://webgis.ecosea.go.kr/</sourceIndication>
      <categoryOfRestrictedArea>23</categoryOfRestrictedArea>
      <jurisdiction>national</jurisdiction>
      <s100:surfaceProperty>
        <!--

          S-100 currently restricts surfaces to one exterior polygon but this will be rediscussed with TSMAD; we have to use mul
        -->
        <s100:surface gml:id="WA11301_SURF001" srsName="http://www.opengis.net/def/crs/EPSG/0/4326">
          <gml:patches>
            <gml:PolygonPatch>
              <gml:exterior>
                <gml:Ring>
                  <gml:curveMember>
                    <gml:Curve gml:id="Curve001">
                      <gml:segments>
                        <gml:LineStringSegment>
                          <gml:posList>
                            37.195833 126.209722 37.136111 126.196667 37.136944 126.265833 37.121111 126.304444 37.150833
                            126.324444 37.157222 126.333333 37.186667 126.317222 37.186389 126.273889 37.195833 126.209722
                            <!--   converting R-108A to decimal lat/lon   -->
                          </gml:posList>
                        </gml:LineStringSegment>
                      </gml:segments>
                    </gml:Curve>
                  </gml:curveMember>
                </gml:Ring>
              </gml:exterior>
            </gml:PolygonPatch>
            <!--

              an alternative and temporary solution to defining one Notice for each area is to define a PolygonPatch for each ar
            -->
          </gml:patches>
        </s100:surface>
      </s100:surfaceProperty>
    </MPA:MarineProtectedArea>
  </member>
  <!--  Data quality feature placeholder  -->
</MPA:DataSet>
```

MPA Viewer





Progress on MPA research by KRISO

- Main features of MPA Viewer
  - Loading S-57 ENC dataset and rendering S-57 ENC according to S-52 PL3.4
  - Loading MPA GML dataset and Overlay on ENCs
  - Rendering MPA GML dataset according to S-52 PL3.4.
- KRISO plans to produce data set on the MPA information throughout the country according to S-122 MPA PS in cooperation with KOEM which retains ROK MPA information, and update MPA Viewer after completion of S-101 Converter, S-101 Feature/Portrayal Catalogue, and SVG Symbol by TSMAD.

Conclusions

- KRISO has been working on not only S-10X research of S-100 enabled ECDIS project but also S-100 related technical projects funded by KHOA(Korea Hydrographic and Oceanographic Administration).
- Jeppesen has a high professionalism in S-10X data modelling and Use Case research, and KHOA (Korea hydrographic office) engages in S-100/S-101 Test Plan of IHO.
- KRISO/JEPPSEN/KHOA suggests following contents in accordance with SNPWG works that are close to completing S-122 MPA, and its plan for various NPUB S-10X as well as current S-123 Radio Services.

Conclusions

- Proposals
  - To support Compilation of Feature Catalogue required in NPUB S-10X Product Specification
  - To support Compilation of Portrayal Catalogue required in NPUB S-10X Product Specification
  - To develop NPUB S-10X Test-bed (Loading and rendering S-101 ENC as the base layer)
  - To test NPUB S-10X dataset (Auxiliary NPUB Layer, Standalone NPUB Layer)

Conclusions

- Role allocation
  - KRISO: Development of NPUB S-10X Test-bed and Test of NPUB datasets
  - Jeppesen: NPUB S-10X Data Model, GML Schema, Sample Dataset, Technical Management
  - KHOA: Compilation of NPUB S-10X feature catalogue and cooperation with TSMAD for portrayal catalogue production.

Action Required of SNPWG

- The SNPWG is invited to:
  - Note the need for conducting NPUB S-10X test bed projects as a crucial step in the development and implementation of NPUB S-10X standards.
  - Include the proposals of this paper in the SNPWG work program.