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Development of the S-100 based Ice Information Product

Submitted by:	BSH (German Ice Service)
Executive Summary:	This paper contains information about current status and future plans of development of S-100 based ice information products.
Related Documents:	S-411 Ice Information Product Specification
Related Projects:	ICEMAR
Organizations:	BSH, ETSI, IICWG

1   Introduction / Background

The Project ICEMAR is developing a solution to deliver sea ice information products onboard ships. One of the working points in the project ICEMAR is development of ice information product, which could be used within ECDIS. There is already a product specification for ice information based on S-57: "Marine Information Overlays – Ice Coverage", Edition 1.0, November 2008 but no production and display software available. Because of these difficulties and for the development of a sustainable ice information product it was decided to develop a product based on IHO S-100 framework.

2.   Analysis / Discussion

S-100 Ice Information Product – Overview

The main goal of S-100 based ice information product is to provide ice information for using it in ECDIS. The specification provides information for data providers and ECDIS manufacturers about how to use ice information for navigational purposes.

S-100 Ice Product Specification – Progress

Overview 100%	Specification Scopes 100%	Dataset Identification 100%	Data Content und Structure 100%
Coordinate Reference Systems (CRS) 100%	Data Quality 70%	Data Capture and Classification 60%	Data Maintenance 80%
Portrayal 90%	Data Product Format (encoding) 100%	Data Product Delivery 70%	Metadata 80%

It is planned to finish all components until April 2014.

S-100 Ice Product Specification – Related Resources

Additionally to Product Specification following resources will be delivered for further use:

Feature Catalogue

Feature catalogue is already in IHO registry (FCD Register "ICE"). The catalogue can be exported from registry as xml catalogue for further use (e.g. for software developers). The catalogue contains 28 features (3 area, 8 line, and 17 point).

XML Schemas

Within the product specification also an xml schema pack will be delivered. The pack contains the following:

- XML Schema for ice data set structure
- XML Schema for meta data required by ice product
- S-100 GML Profile Schema
- S100 Portrayal Schemas
- ISO 19139 Schemas

The schemas can be used for validation of products, generation of programming code or UML diagrams. Current schema pack (development snapshot) is available under:
https://sites.google.com/site/iceecdis/iho-s-10x-ice-product.

Portrayal

After the presentation of "S-100 Part 9 Portrayal" at TSMAD 26, the machine readable will be developed for S-100 Ice Information Product. Although the proposed portrayal builder is not there yet, it is possible to develop S-100 portrayal manually within provided xml schemas for it. The portrayal library content for ice product:

- XSLT files (rules for automatic generation of display instructions from data set)
- SVG Files (predefined symbology as vector graphics for using in the charts)

```xml
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg
   xmlns:dc="http://purl.org/dc/elements/1.1/"
   xmlns:cc="http://creativecommons.org/ns#"
   xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
   xmlns:svg="http://www.w3.org/2000/svg"
   xmlns="http://www.w3.org/2000/svg"
   version="1.1"
   width="10"
   height="10"
   id="svg3807">
  <defs id="defs3809" />
  <metadata id="metadata3812">
    <rdf:RDF>
      <cc:Work rdf:about="">
        <dc:format>image/svg+xml</dc:format>
        <dc:type rdf:resource="http://purl.org/dc/dcmitype/StillImage" />
        <dc:title></dc:title>
      </cc:Work>
    </rdf:RDF>
  </metadata>
  <g
     transform="translate(0,-1042.3622)"
     id="layer1">
    <path
       d="M 5,1 1,9 9,9 z"
       transform="translate(0,1042.3622)"
       id="path3821"
       style="fill:none;stroke:#000000;stroke-width:1px;stroke-linecap:butt;stroke-linejoin:miter;stroke-opacity:1" />
    <path
       d="M 5,4 3,8 7,8 z"
       transform="translate(0,1042.3622)"
       id="path3823"
       style="fill:none;stroke:#000000;stroke-width:0.5;stroke-linecap:butt;stroke-linejoin:miter;stroke-miterlimit:4;stroke-opacity:1;stroke-dasharray:none" />
  </g>
</svg>
```
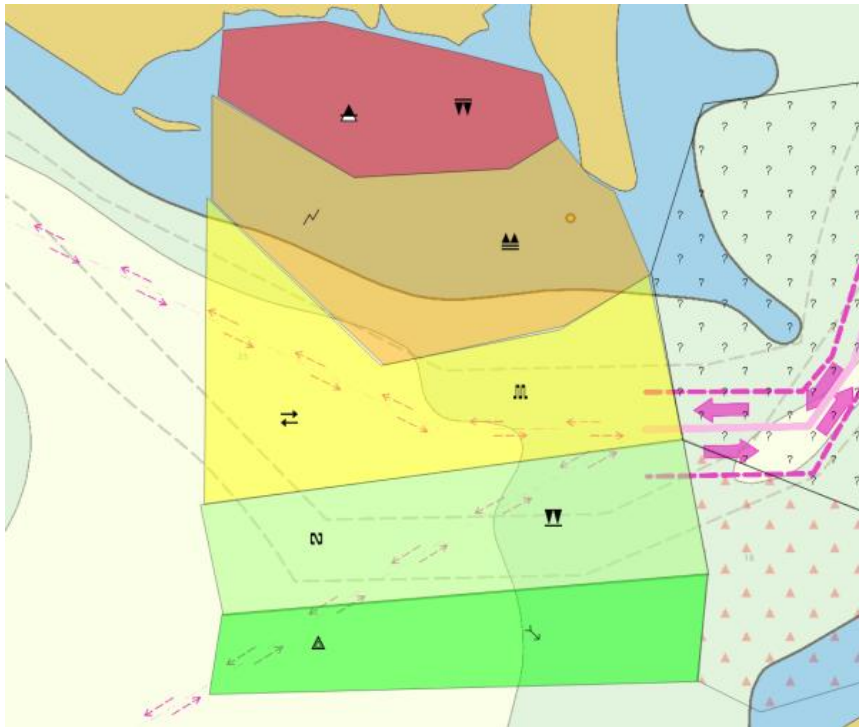
- Portrayal Catalogue XML file (structured machine readable catalogue of portrayal items)
- User Context XML File (file with parameters used for display of ice information, e.g. ice class of the vessel)

Test Data Set

Test data set contains all ice features presented in the feature catalogue.

Example Data Sets

The S-100 based ice information product will be available for free. Because of this it is possible to use at least the older data sets for testing purposes. The test data sets from last winter are available under: https://sites.google.com/site/iceecdis/iho-s-10x-ice-product.

S-100 Ice Information Product – Other planned activities

For avoiding difficulties like lack of producing and display software and lack of data producing following activities have been started:

- Development of tools for producing, converting and sharing of ice products for ice agencies:
  - Stand-alone application (open source)
  - ESRI ArcGIS Toolbox (most of ice agencies are using ArcGIS)
  - FME workflow
  - Web Application (Show Case)
- Establishing of an automatic data delivery from other ice agencies, e.g. via FTP Server

3.   Conclusions

The development of S-100 based Ice Information Product is almost finished. At HSSC5 meeting the product specification got the official IHO number S-411. It was discussed at the meeting of the International Ice Charting Working Group (IICWG) and will be discussed at the next meeting of the Expert Team on Sea Ice (ETSI) for approval within the joint commission of oceanography and marine meteorology (JCOMM). The operational use of the product in ECDIS is not possible yet, but the product can be already used for other applications. The S-100 GML encoding (XML based) of ice data allows using of the data also in other systems, even for web applications. It is obviously succeeded to join the mainstream of GIS world. The product meets ISO, IHO S-100 and OGC standards.

4.   Action required of CSPCWG10

The CSPCWG10 is invited to take note of the product for other activities

5.   Contact

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