

6<sup>TH</sup> MEETING OF THE HYDROGRAPHIC SERVICES AND STANDARDS COMMITTEE  
Viña del Mar, Chile, 11-14 November 2014

Paper for Consideration by HSSC

**Development of the S-100 based Ice Information Product S-411**

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

**1 Introduction / Background**

Within the framework of the WMO-IOC JCOMM Expert Team on Sea Ice the German ice service at the BSH developed an ice information product specification within the IHO S-100 standard. Since April 2014 this is an official specification, named S-411 within the IHO publications. The main purpose of S-411 is to deliver ice information onto the bridge of ships, but the data can also be portrayed using some standard GIS applications. The product follows ISO, IHO S-100 and OGC standards.

**2. Analysis / Discussion**

**S-411 Ice Information Product – Overview**

The main goal of this 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 – Related Resources**

Additionally to the product specification following resources are available:

**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**

An xml schema pack is delivered within the product specification. The pack contains the following:

- XML Schema for ice dataset structure
- XML Schema for metadata required by ice product
- GML Profile Schema
- Portrayal Schemas
- ISO 19139 Schemas

The schemas can be used for validation of products, generation of programming code or UML diagrams

## **Portrayal**

The S-411 portrayal was developed manually within the provided xml schemas. The portrayal library content for ice product is:

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

A test data set is available which contains all ice features presented in the feature catalogue.

## **Example and Operational Data Sets**

An example data set is available with the specification. Actually the only operationally available data set are the Baltic ice chart from the BSH, but work is in progress to add more products, most of them will probably be operationally available shortly after the International Ice Charting Working Group (IICWG) meeting in October 2014 and made available at the websites of the respective ice services and at the JCOMM Ice logistics portal.

Although S-411 products can be displayed using some GIS programs (e.G. QGIS) there is still no ECDIS available that can display S-411. The BSH ice service, also representing JCOMM ETSI, is therefore in contact with ECDIS producers to foster the inclusion of the S-411 standard in electronic display systems onboard ships.

As for the production of S-411 based products a version 0.x software package is already available, which is capable to transform the most common formats used within the ice charting services of the world into S-411. Work is in progress to refine and more thoroughly test this software, a version 1.x hopefully being available end of 2014.

The ongoing work updating the specification due to changes in the underlying S-100 standard, ice objects catalog, etc., is done mainly at the BSH in close cooperation with the IICWG and ETSI.

### **3. Conclusions**

The development of S-100 based Ice Information Product S-411 is finished and was approved by the Expert Team on Sea Ice (ETSI) within the joint commission of oceanography and marine meteorology (JCOMM) in 2014. The use of, already operationally available products in ECDIS is not possible yet, but due to the XML based GML encoding the product can be already used by other programs and even for web applications.