

**1st IHO-HSSC Meeting
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Paper for Consideration by HSSC

**PROGRESS REPORT ON THE DEVELOPMENT OF S-100
AND ITS INTRODUCTION AS AN IHO STANDARD**

Submitted by:	TSMAD
Executive Summary:	This paper provides a report on the final review of S-100 and invites the HSSC to recommend that the IHO adopt S-100 as an active standard.
Related Documents:	<ul style="list-style-type: none"> a. HSSC1-06.1A – <i>Report of TSMAD</i> b. CL69/2006 dated 10 October 2006 – <i>Progress report on the development of S-100 and S-101.</i> c. CONF.EX4/INFODOC.1 – <i>Status report on S-100 – IHO Geospatial Standard for Marine Data and Information</i> d. www.ohi.net/mtg_docs/com_wg/TSMAD/TSMAD_Misc/S-100_InfoPaper_Mar09.pdf - <i>S-100 Information Paper (March 2009)</i> e. Resolution A1.21 – Principles and Procedures for Making Changes to IHO Technical Standards and Specifications

Introduction / Background

1. The development of S-100 was introduced into the IHO Work Programme in 2001 at the recommendation of the Committee on Hydrographic Requirements for Information Systems (CHRIS). TSMAD has reported progress annually to CHRIS and now HSSC (see related document a.). Member States have been informed of the progress of S-100 and its potential impact through a number of Circular Letters (see related document b.) and most recently through a briefing by the Chairman of the HSSC at the 4th Extraordinary Hydrographic Conference in June 2009 (see related document c.). An extensive overview paper is available on the IHO website (see related document d.).

Analysis/Discussion

2. The draft edition of S-100 was circulated for formal stakeholder feedback in May 2009, in accordance with the process described in Resolution A1.21 – *Principles and Procedures for Making Changes to IHO Technical Standards and Specifications* (see related document d.). All Member States, NGO's and organizations registered on the list of IHO Stakeholders maintained by the IHB were invited to provide comments. The closing date for comments was 31 August 2009.

3. Five Member States and three industry stakeholders provided constructive comments and suggestions. No adverse comments were received. The relatively low number of respondents is probably due to the wide range of stakeholders that have already been involved throughout the S-100 development process. The feedback results were considered by an editing team at a TSMAD S-100 sub-working group in early September 2009 and minor amendments to the draft text incorporated subsequently. The final version of S-100 would be posted on the IHO website not later than 25 September 2009.

4. Almost all the comments received were editorial in nature resulting from the late amalgamation of the 13 separate parts of S-100 into a single document. The remaining comments were either proposed adjustments from stakeholders already using the draft version of S-100 to develop product specifications, which in future, would be dealt with as routine corrections to S-100; or fundamental questions about certain technical content.

5. Three significant comments, received from industry stakeholders were rejected by the editing team. A summary of the reasons for rejection are contained in Annex A.

6. The draft version of S-100 is already being used by various groups to develop product specifications and test-bed applications, including S-101 – *next generation ENC Product Specification* by TSMAD, *Law of the Sea Feature Code Dictionary* by UN DOALOS, and nautical information products by SNPWG. These developments have been reported separately in the relevant WG reports.

Conclusions and Impact

7. S-100 is now ready for release as an active standard. It has been developed with continuous input from a range of industry stakeholders and expert contributors. It has undergone two review processes by various stakeholder and peer groups.

8. The adoption of S-100 as an active IHO standard will allow a full maintenance and management infrastructure to be adopted. Developers will be able to use the new standard with confidence for new applications that cannot otherwise be supported by S-57. This, in turn, will provide focussed active feedback and proposals for extension and development of the standard. It will be counter-productive for the standard to continue to remain in draft or development form.

9. The release of S-100 as an active IHO standard will not affect any stakeholders who rely on S-57. S-100 is intended primarily to support next-generation requirements for the use of hydrographic data. ENC data conforming to S-57 Edition 3.1 will continue to be a requirement for type approved, IMO-compliant ECDIS for the foreseeable future - even after S-100 and any subordinate ECDIS-related product specifications, such as S-101, have come into force. As a consequence, the adoption of S-100 as an IHO standard will have no direct impact on hydrographic offices and the production of ENC data for many years to come but will give the opportunity to ENC producers and system developers to evaluate the need, the capacities and the impact of this new generation of standards.

Recommendations

10. TSMAD recommends that S-100 be adopted by the IHO as an active standard effective from 1 January 2010.

Action Required of HSSC

11. The HSSC is invited to:

- a. **Recommend to Member States** that S-100 be adopted by the IHO as an active standard effective from 1 January 2010.

S-100 Editing Group – Rejection of Feedback Proposals

Adopt GML encoding rather than ISO/IEC 8211

The use of this encoding format was questioned and a change to GML was proposed.

Reasons for rejection:

- The encoding schema based on ISO/IEC 8211 has been chosen to retain compatibility with ENCs, especially for use with the new S-101 ENC product specification.
- Early indications are that this is the preferred choice of ECDIS manufacturers.
- ISO/IEC 8211 is a mature standard, whereas GML has been through at least three iterations in the last five years.
- GML does not include an update mechanism; S-101 ENC updates would consequently only be issued as new editions.
- S-100 extensibility and the concept of separating the content model from the encoding format, enables other encoding to be developed for other products in the future. For example, data used in web feature services.

Spatial Positional Quality Attribution

The comment referenced a diagram of the General Feature Model and mistakenly identified a spatial attribute as a spatial “quality” attribute, but the general tone of the comment criticised the methodology used for the latter. The S-100 spatial quality attribution methodology was considered by the submitting organization to be against mainstream ISO/GIS policy and created potential interoperability issues, that might not be recognized by generic data converters. A feature-based solution was suggested.

Reasons for rejection:

- S-100 uses similar constructs to S-57 for providing positional quality attribution.
- Changing to a feature based solution would be a retrograde step, particularly as this would require splitting features, such as depth areas. The IHO solution is considered to be more elegant. ISOTC11 was asked to incorporate such functionality, but without success, probably because of the dominance of topographic data users for whom positional information is generally well defined.
- Web based use of the data will be a compromise anyway. Most generic data transfer is based on GML using a Simple Feature standard which does not include all of the constructs which may be required; for example, Arcs, 2.5 Dimension geometry.

Complex Attributes

Although S-100 offers a solution to some issues existing in S-57, the lack of a machine readable schema would limit if not eliminate the ability to take advantage of a complex attribute. This was accompanied by the following two specific questions:

- Q. What problems does using a complex attribute solve?
- Complex data types which are encoded as a single formatted text string.
 - Enable the encoding of complex meta data as demonstrated by test beds being developed by the SNPWG.
 - Rationalising the encoding of complex structures such as lights and their light sectors.
- Q. What consideration has there been for the use of validation within the application schema?

Answer 1. The relevant section of S-100 does not state that there will not be a machine readable schema. As with any XML schema, it is only possible to verify the data structure against a schema, not the full product specification.

Answer 2. Essentially complex attributes are a specialization of the ISO 19109 General Feature Model class – attribute of attribute, which would have posed similar issues if included in S-100.