Paper for Consideration by HSSC and S100 WG

Results of the Compatibility with ISO Activity

Submitted by:	Canadian Hydrographic Service
Executive Summary:	The Canadian Hydrographic Service, Kian Fadaie (Canadian HSSC representative) submitted a paper to the HSSC 7 meeting in November 2015 on "Ensuring Compatibility with ISO Standards". This paper was reviewed by HSSC and recommendations were accepted. As a result, the HSSC tasked Tony Pharaoh of the IHB and Douglas O'Brien (Canadian ISO representative) to raise the issue at the ISO TC211 plenary meeting in December 2015. ISO TC211 passed a resolution that allows for a solution of the problem.
Related Documents: **Related Projects:**	S-100, and all of the S-100 suite of standards, ISO TC211 suite of standards S-100, S-102, S-111, S-121, and any IHO standards that directly references an ISO standard.

Introduction / Background

The IHO standards need to be stable because they become the basis for regulations that affect safety. Navigational safety is too important to have the electronic navigational systems fail because of the continuous updating, "improvements" and bug fixing that goes on in the realm of many commercial software systems. The problem is that one cannot easily freeze a standard because technology is evolving at an ever increasing rate in the electronics, communications and computing world. If the IMO standardized equipment became an island separated from all other electronic systems then it would be a special case development and would become extremely expensive.

IHO developed the S-100 "Universal Hydrographic Model" standard based on the International Organization for Standardization (ISO) suite of standards, and then developed the eNavigation standard S-101 for an Electronic Nautical Chart (ENC) and other standards for marine data Product Specifications based on the S-100 standard. The intent was that this would allow the S-100 standard to evolve, in a carefully managed manner, while allowing product specifications to be stable for a significant period of time.

A critical element of this strategy is the stability of the ISO suite of standards. However, the ISO standards are continuously evolving. The current ISO policy is to revise standards every 5 years. Older versions of the ISO standards are withdrawn and are difficult to obtain.

IHO S-100 references many of the older withdrawn ISO standards and has had no plan for evolving toward the more recent versions. For example, the metadata used in S-100 derives from the ISO 19115:2003 Metadata standard. ISO published a revision of this standard ISO 19115-1:2014 Metadata – Fundamentals in 2014. The new standard includes many changes and moved some metadata classes to a separate standard ISO 19157:2013 Data Quality, The new data quality standard replaces previous data quality standards such as ISO 2013:2002 Quality principles, ISO 19114:2003 Quality evaluation procedures and ISO 19138:2006 Data Quality measures. Since the data classes often change names when they are moved or revised it is sometimes difficult to trace what has changed.

If IHO continues to reference the withdrawn versions of the ISO standards then it will not be able to make use of the newer capabilities such as the service standards needed for an Marine Spatial Data Infrastructure (MSDI) or make use of commercial GIS equipment and databases.

Alignment with ISO

The problem of alignment is one of versioning. ISO numbers and dates its standards and IHO references the ISO standards by published version. At the technical level this is not really what happens. The ISO standards are modelled using the Universal Modelling Language UML and each class is uniquely identified. These information classes do not disappear. When a standard is revised almost all of the old classes remain unchanged. Some new classes are added and new attributes are added, but only in a very few cases are the older classes ever changed and when they are changed they are replaced with a new structure. Alignment with ISO means keeping track of the references from the IHO S-100 classes to the ISO classes.

In the past it was difficult to do this tracing. However, because of the input from IHO to the ISO meeting, ISO agreed to add an annex to each revised standard tracing on a class by class basis to the older version of the standard. What this means is that IHO, or any other users, can always reference the latest version of an ISO standard, because that standard will maintain the relationship back to the original class. That is, **the references made to the ISO standards by external standards such as IHO S-100 will remain valid even if the ISO standards are revised.**

The text of the resolution passed in the ISO TC211 plenary 11 December 2015 is given below:

> **Resolution 744**   **Backward compatibilities in revised standards**
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> ISO/TC 211 strongly recommends that revisions of standards and technical specifications include an informative annex which describes how backward compatibility is addressed. This annex may include crosswalks, mappings or similar mechanisms, which evidence the degree of compatibility.
>
> *Unanimous*

Implementing this resolution will take some time, so it is not an instant solution; however, it means that IHO S-100 can reference the updated version of the ISO standards as they develop.

Recommendation

It is recommended that the S-100 WG develop a plan to make use of this new capability in ISO. Specifically S-100 should reference the ISO standards on a class by class basis to particular versions of classes. This is what already happens in the IHO UML model for S-100. This will need to be formally documented so the annexes that will be developed in ISO can be used. For example, ISO has moved (and renamed) the data quality classes from ISO 19115:2003 and 19138:2006 to the new ISO 19157:2013 standard. The actual classes have not changed. They have just moved and been extended.

Action Required of S-100

- IHO to maintain a reference table (or use the UML model) to reference specific ISO data classes.
- When new ISO standards are issued, IHO is to use the annex being developed by ISO to also map to the newer classes so that compatibility is maintained.