TSMAD20/DIPWG2-18A

Requirements for the Integration of S-100 compliant Auxiliary Navigational Information with S-101 ENC data

As prepared by

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1.0 Introduction

Action 4.1.1 TSMAD 19

Action: Develop a paper outlining how multiple Layers of S-100 compliant Auxiliary Navigational Information can be integrated with S-101 ENC data. The paper is for circulation to TSMAD members and OEM's for report back by the next TSMAD (2010 - Rostock) meeting. (Canada)

As actioned by TSMAD during the meeting in the Fall of 2009 in Australia, CHS with assistance from CARIS, UKHO, Jeppesen and Canadian Ice Services began work on the task for the development of a paper outlining how multiple layers of S-100 compliant auxiliary navigational information could be integrated with S-101 ENC data.

Through several teleconferences and a joint meeting held in Miami with members of the Harmonization Group on Marine information Overlays (HGMIO) a scope was developed, preliminary meta data requirements drafted as well as a list of considerations that must be analysed by any group who wishing to develop an S-100 product specification that must/can be reviewd in conjunction with an S-101 ENC data set or other S-100 product specification.

This paper will detail the work completed by this group.

2.0 Definition of S-10X

S-10x Auxiliary Navigational Information is a vector product produced on the authority of a government authorized Hydrographic Office. Its primary function is for use **with** an official Electonic Navigational Chart (ENC) and within an Electronic Chart Display and Information Systems (ECDIS) to meet International Maritime Organisation (IMO) and Safety Of Life At Sea (SOLAS) chart carriage requirements.

3.0 Scope

The scope of this initial draft was to identify a draft list of meta data requirements that will facilitate the integration of S-101 and other S-100 level product specification, as well as identify a detailed list of considerations that users need to take into consideration when developing S-100 product specifications that are designed to work with S-101 ENC datasets.

4.0 Deliverables

4.1 Meta data

The following is a high level template for common meta data to allow ECDIS' to recognize and accept S-100 Product Specifications that have been built in accordance with the guidelines outlined in the S-10X draft specification, and that are to be displayed with S-101 ENC datasets

- It must carry sufficient detail to ensure interoperability between products and contain constraints for data models (gridded) and formats to ensure integration

- Identification of how to make the data work together, as an overlay, interleaved within existing features, or as extensions of existing datasets (additional objects or attribution)

4.1.1 Meta Data required attributes

- **Abstract** – to provide a general definition and description of the auxiliary layer.

- **Intended Use** of the data – to identify the purpose for which the data was intended.
    - Route planning
    - Route verification
    - Safety
    - Navigation
    - Security
    - …

- **Intended usage Start date** - to identify valid starting time frame for when the data is valid (e.g. Ice data is produced weekly).

- **Intended usage End date** – to identify the date when the data is no longer valid.

- **Minimum Scale** – to identify the minimum scale for which the data is valid, if the mariner zooms beyond the min/max scale range then the layer should be removed from the display.

- **Maximum Scale** – to identify the maximum scale for which the data is valid, if the mariner zooms beyond the min/max scale range the layer should be removed from the display.

- **Information Type**
    - Overlay – The data is a simple overlay with no solid fills. (e.g. Ice)
    - Extension – The data is an extension to the S-101 product specification, with the identification of additional attribution and potential additional object definitions. (e.g. AML extensions)
    - New product Spec – features in this Product specification are completely different features and may modify or replace features in the S-101 ENC data. (e.g. Tidal fluxuations)

- **Linkage** – to identify how this layer is to be linked to S-101 ENC data. (e.g. In the case of AML data one must be certain that the extensions are added to the right object and this must be done by FOID.)
    - By Foid
    - by spatial location

- **Intended interaction level** - to identify how this layer interacts with the base S-101 data.
    - interleved with existing data,
    - superseeds existing data,
    - Overlayed additions (No solid fills or obtrusive symbols)

- **Dependencies** on other products. The identification of other S-100 product specifications that this layer depends upon in order to be of use to the mariner.
    - What is this product dependant on?
    - Implications of updates on dependant products

    - How do you carry forward updates to avoid losing linkages
    - clip display of interdependant product layers to common data coverage. (*** Need Picture ****) ← *this may be more for the ECDIS manufactures*

- **Identification of feature catalogue** required to be used to read and interrpret this product information properly.
    - Name of Catalog
    - Version of Catalog required,
    - Method for obtaining feature catalogue (URI, packed with exchange set, Download) ie http://iho.com/register/iceCatalog.xml

- **Identification of portrayal catalogue** required to be used to display this product information properly.
    - Name of Catalogue
    - Version of Catalog required
    - Method for obtaining portrayal catalogue (URI, packed with exchange set, Download) e.g. http://iho.com/register/iceCatalog.xml

- **Product category** - What type of information is contained in this layer?
    - High Density Bathymetry (e.g. Gridded data)
    - Tides and Waterlevel
    - Hazards
    - Aids to Navigation
    - Security
    - Ice coverage
    - Meteorlogical
    - Oceanographic
    - Archaeological
    - Geophysical data (seismic, gravity, magnetic,..)
    - Benthic/Marine Habitats
    - Environmental Protection
    - Port Operations
    - Law of the Sea Limits
    - Pipelines/Cables
    - …

- **Product Query precedence –** to identify what is returned by pik reports if the mariner queries the data, the S-101 ENC data, or the S-10X layer
    - Default must match Display priorities
    - Query by layer,
    - Modifiable by Mariner,

- **C-Square location identification** – to provide a general location for the auxiliary layer of information

4.2 Considerations

Things that need to be investigated while developing a product specification

4.2.1 Links between data across products, Geo-Referencing

- Foids

- Approximate location and a feature class and potentially attribute (spatial query)
- Geographically related

4.2.2 Updating Scenarios and Implications

- How to update the layer and any implications that may have to be considered when the base ENC has been updated. (e.g. Full replacement, remove from system if expired)
- Implications on base product if the layer has been updated

4.2.3 Query Precedence logic for pick report

- What layer is returned from a pick report first? What layer takes precedence over the others for common product types (e.g. DEPARE, and gridded Bathymetry)
    - If displayed should be first in Pick rep
    - If not turned on, do not report on the layer

4.2.4 Display Priority

- What needs to always be seen (e.g. Aids)
    - #1 in priority when turned on,
- Define a set of display priorities and identify what features reside where, with Land always on the bottom and Aids on the top, but with sufficient space in between to allow for other layers to be interleved.

4.2.5 Presentation

- Portrayal catalogues must be designed to not clash with dependant product types and must take into considerations things such as Day, Dusk and Night colour schemes.
    - A group that can determine if proposed symbology/portrayal is valid, and does not clash with exisiting features portrayal is required.

4.2.6 Compatible Reference Models

- Common reference models (spatial, temporal, units) are mandatory between dependant products and layers, or a transform must accompany subsidary datasets. Otherwise datasets cannot be used together. (e.g. The WGS84 or a transforamtion to WGS84

5.0 Next Steps

5.1 Development of use cases

- Simple overlay of point line and areas
- Extension to exising product specification, Points Lines and Areas with Additional Attribution
- Points Lines and Areas with Integrated vertical data columns

5.2 IMO submission

Submit a proposal to the IMO to address the issue of not being allowed to integrate auxiliary information that modifies the water column within the ECDIS. Currently data such as tides must be displayed in a side display. This data should be allowed to adjust the water column for mariner automatically.

5.3 TBD by TSMAD

6.0 Recommendations

This S-10X specification is better suited to an annex to the S-100 specification as it is something that users take into consideration when they are building S-100 product specifications

TSMAD has determined that one person/group would be in charge of new submissions to existing product specifications or new specifications in order to ferret out submissions that look similar to existing definitions and to point users towards exisitng definitions. It is recommended that someone/group be appointed to determine if there are any display issues with product specifications that are deemed dependant on an other, or are meant to be used in conjunction with each other.