Paper for Consideration by TWLWG

Information paper for the S-112 Product Specification implementation plenary breakout session

Submitted by:	Su Marks / UKHO Hannu Peiponen / Furuno Finland Julia Powell / S-100 Working Group Chair
Executive Summary:	This paper outlines the S-112 Dynamic Water Level Data Transfer Product Specification AIS Application-Specific Message implementation plenary breakout session at TSMAD29/DIPWG7.
Related Documents:	TSMAD29/DIPWG7 06.4B Dynamic Water Level Data Transfer Product Specification - paper, TSMAD29/DIPWG7 06.4C Dynamic Water Level Data Transfer Product Specification (S-112) and TWLWG 4.2.1 Zone model for dynamic tide and water level for ECDIS - paper.
Related Projects:	HSSC6 decision to develop practical model to allow dynamic tide and water level adjustment for ECDIS. Development of S-100 and related product specifications.

Introduction / Background

Following on from the presentation of the Dynamic Water Level Data Product Specification by Su Marks, UKHO, to TSMAD29/DIPWG7, a breakout session was established to discuss the implementation of the AIS Application-Specific Message with the aim of producing some bullet points on the decisions made to take forward; Barrie Greenslade, UKHO - Chair and Su Marks - Secretary. Marc Journault, Fisheries and Oceans Canada, joined the breakout session via telecom.

Barrie Greenslade provided a brief overview to Marc Journault, relating the HSSC action on TWLWG with the subsequent action on TSMAD to provide S-100 expertise for the creation of a Dynamic Water Level Data Product Specification based on the AIS Application-Specific Message only. The draft version of the Product Specification is to be revised to include implementation of the AIS Application-Specific Message. The Chair S-100WG will present the Zone model paper along with this information paper from the TSMAD29/DIPWG7 discussions to the first TWCWG meeting in April 2015.

Analysis/Discussion

Not all of the data fields in the Meteorological and Hydrographic Data AIS ASM are required. The introduction to S-112 states:

> If only certain elements of the Meteorological and Hydrographic Data AIS Application-Specific Message are required such as Dynamic Water Level Data or Dynamic Water Level Data and Surface Current Data then it would be worth investigating whether a new message would reduce the number of slots used, in accordance with 4.2.2 Review of existing messages, IALA Guideline No. 1095.

The conclusion was therefore to:

- Create a new AIS Application-Specific Message containing only the relevant data fields. The input is to be resolved and agreed with TWCWG.

 It was agreed that the AIS Application-Specific Message should contain the following:

  o What the value is now

  o How to resolve the time lapse on measurements

  Comprising a shore based system - processing/broadcasting.

- Investigate how OEMs will use the AIS Application-Specific Message in ECDIS systems.

It is recognised that even with this very fast turnaround of water level data, the values are still predicted rather than truly dynamic, as they are not absolute.

Hannu Peiponen, Furuno Finland, stated that a practical example was required to create an information paper for TWCWG, stating that for real time dynamic tide not too much data was to be transferred to ship, so therefore the AIS Application-Specific Message worked.

Model to arrange tide and water level adjustment both for Route planning and Real time navigation
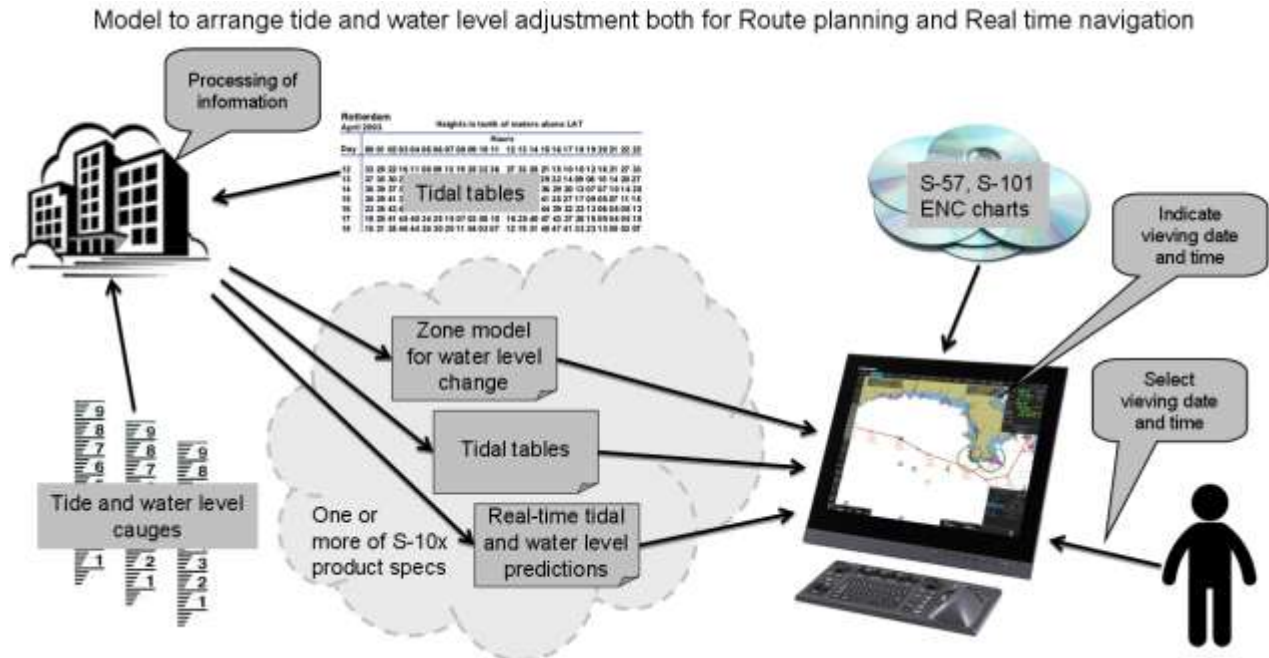
There is already a requirement for this service which can be implemented with both the S-57 ECDIS now and the S-100 ECDIS in the future.

The metadata will need to contain information such as applicable ENC chart, accuracy, timeout for too old real.-time update, etc.

The following question would be required on the ECDIS or other dynamic tide application:

Tide adjustment allowed: Yes/No

Tide adjustment could only be allowed when strict criteria was met, using qualifiers, etc.

An infrastructure is required, splitting an area into zones (polygons); each zone would have a unique identifier, A, B, C, etc. and could be any shape or size, dependent on how the water levels behave in a certain area. A simpler area would contain fewer polygons. A single value would be applied to each polygon. It is envisaged that the zones would require minimal updating, if any.
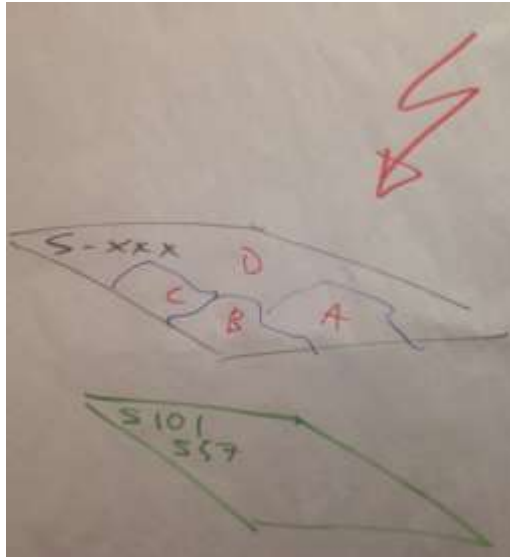
Example from Hannu Peiponen - TSMAD29/DIPWG7

AIS sends real time data every 1hr, 2hr, and so on.

- There may be a requirement for a separate S-100 based Product Specification for tidal prediction tables which could utilise the same polygons.

Portable pilot units (PPU) have already had dynamic water level adjustment functionality for limited areas. But these are ECS equipment, not ECDIS. Real ECDIS is still limited by the rule available in the IHO S-52 not to allow adjustment of the water level. However as we now know based on IHO HSSC6 decision the IHO is willing to release water level adjustment for the real ECDIS as soon as a safe method has been developed to perform this function.

Centimetre accuracy could be achieved

- Opportunity to tailor for different/specific purposes.

- Each HO should have the expertise in their area to calculate and produce the coverage of polygons for their waters.

Doug O'Brien, IDON, mentioned that Canada were proposing dataset coverage of water level data, however an information paper had not been submitted to TSMAD29/DIPWG7. He suggested that this could be complimentary with the point set methodology proposal from UK; he also suggested collaborating with UK on this further. Doug O'Brien envisaged a base dataset and a set of corrections, using both a broad channel structure and narrow channel structure, which is not consistent with the intention for this Product Specification, to utilise the AIS Application-Specific Message with Hannu's zone infrastructure model.

Konstantin Ivanov, Transas, clarified that the ENC is not to be used for the base dataset as there is insufficient rich bathymetry available.

Barrie Greenslade identified the following action required for the Product Specification:

- Add more on the implementation side.

- Hannu to provide Su Marks with diagram/text for inclusion in the Product Specification.

AIS uses an open protocol and is not intended for secure communication; there is no intention for IALA to encrypt the AIS service.

- DPSWG to investigate AIS Application-Specific Message encryption.

- Hannu suggested using a digital signature, using a private/public key.

Action from Barrie Greenslade:

- Su Marks to create an information paper on the TSMAD29/DIPWG7 plenary breakout session for the TWCWG meeting in April 2015.

Barrie Greenslade stated that IMO approved the addition of supplementary layers; emphasising that there was no intention to change the ENC data.

- A paper for HSSC7 is required clarifying the use of supplementary layers for dynamic water level data.

Wade Ladner, NAVO, suggested the following approach for the wider implementation of tidal data:

- Product Specification for Dynamic Water Level Data using zones (S-112)

- Product Specification for predicted tides with time interval

- Product Specification for observed tides

Konstantin Ivanov suggested the use of the maritime cloud for AIS.

Hannu Peiponen stated that the mathematical methods need to be correct.

- Each zone would contain a single value for a given moment in time.

Hannu Peiponen stated that the zone coverage would be preferred by HOs.

Konstantin Ivanov queried the sounding datum.

Zones within the model, should be features with geometric primitive polygon.

S-100 may also need to be extended for AIS Application-Specific Messages.

CHS uses gridded data for St Lawrence River.

There is a need to create a project team, with Holger/Hannu/Eivind, etc.

Conclusions

- Create a new AIS Application-Specific Message containing only the relevant data fields. The input is to be resolved and agreed with TWCWG.

- Investigate how OEMs will use the AIS Application-Specific Message in ECDIS systems.

- There may be a requirement for a separate S-100 based Product Specification for tidal prediction tables which could utilise the same polygons.

- Opportunity to tailor for different/specific purposes.

- Each HO should have the expertise in their area to calculate and produce the coverage of polygons for their waters.

- Add more on the implementation side for inclusion in the S-112 Product Specification. Su Marks to create an information paper on the TSMAD29/DIPWG7 plenary breakout session for the TWCWG meeting in April 2015.

- A paper for HSSC7 is required clarifying the use of supplementary layers for dynamic water level data.

- Potentially three Product Specifications are required:

    o Dynamic Water Level Data using zones (S-112),

    o Product Specification for predicted tides with time interval,

    o Product Specification for observed tides.

- Each zone would contain a single value for a given moment in time.

Recommendation

Chair S-100WG asked for a list of interested parties:

- The following will make up a small correspondence project team to move S-112 forward:

Australia - Jeff Wootton
Brazil - Cesar Reinert
Canada - Lynn Patterson
France - Geoffroy Scrive
UK - Su Marks
US - Julia Powell
Caris - Hugh Astle
Esri - Tom De Puyt
Furuno - Hannu Peiponen
Jeppesen - Eivind Mong
SevenCs - Holger Bothien
Transas - Konstantin Ivanov

Action Required of TWLWG (TWCWG)

The TWLWG (TWCWG) is invited to:

a.   note this information paper.
b.   further develop S-112 Product Specification.