Joint TSMAD18 & DIPWG1 MEETING

4th to 8th May 2009 (Ottawa, Canada)

Tidal Data and S-57 Tide Aware ENCs

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Executive Summary:	This discussion paper has been submitted in response to CHRIS 20 action item 20/6 which requires; *"**TSMAD** in consultation with TWLWG, CSMWG and other relevant HO bodies to develop proposals to enable the use of tidal and water height information to adjust charted depths in S-57 based ECDIS equipment for consideration by HSSC-1"*.
Related Documents:	Minutes of the 20th CHRIS meeting.
Related Projects:	SNPWG – Development of nautical publication Product Specifications.

Introduction

One of the conclusions and recommendations of the S-101 ECDIS stakeholders workshop that took place at the IHB between the 4th and 6th of March 2008, was that "*dynamic tides should be implemented A.S.A.P (with appropriate safeguards)".*

A number of objects and attributes for enabling dynamic tides were included in S-57 when it was initially developed, however these have not been implemented. The application of harmonic or non-harmonic prediction methods has been implemented in a few ECDIS however their tidal predictions are not official and hence should not be used for ECDIS. To ensure that the results of tidal predictions are accepted as an equivalent to those in official tide tables, HOs would have to provide their full sets of tidal constituents (e.g. to populate T_HMON and TS_PRH), and their prediction algorithms. Clearly this is not viable, as tidal prediction methods varies greatly between hydrographic organizations. An alternative method may be to make use of generic prediction engine such as the UKHO TotalTide, however it is doubtful that most HOs would accepted this as being sufficiently accurate for their tidal regimes.

It is proposed that tidal predictions data for use in ECDIS should be provided by hydrographic offices and should be delivered to via an appropriate transfer mechanism. Furthermore ENC producers will need to make provision for the inclusion of addition depth areas to enable certain ENC to be "tide aware." A mechanism will also be required to distinguish between these and conventional ENCs.

This paper highlights some of the issues for consideration and discussion.

Issues for TWLWG

If digital tidal predictions are to be delivered to an ECDIS, a suitable data exchange format must be developed. The data format should include comprehensive metadata and should be based on existing

IHO /industry specifications (e.g.S-100 / XML). The data formats presently being used for real time tide gauges should also be taken into account so that both predicted and real time tidal data can be used. It is recommended that this be done in close cooperation with the TWLWG, TSMAD, SNPWG and DIPWG Working Groups.

Issues for TSMAD

The IMO Performance Standards for ECDIS state at clause 4.3 that *"It should not be possible to alter the contents of the ENC or SENC information."* It is argued that the inclusion of tidal data in ECDIS does not violate this clause as changes are only made to the portrayal of data, and not the data itself.

In order to implement the dynamic portrayal of tides within ECDIS, it will be necessary to increase the number of depth areas within a "tide aware" ENC. A greater number of depth areas will result in smaller depth intervals and finer granularity in portraying the influence of the tide. It will however also significantly increase the size of an ENC datasets. Some issues that will have to be considered when preparing specifications for tide aware ENCs may include:

- What cells should be "tide aware" (approaches, harbour, berthing …)?
- What should the ideal depth area interval be?
- What level of "line smoothing" should be applied to depth areas?
- What will be the impact on ENC cell sizes?
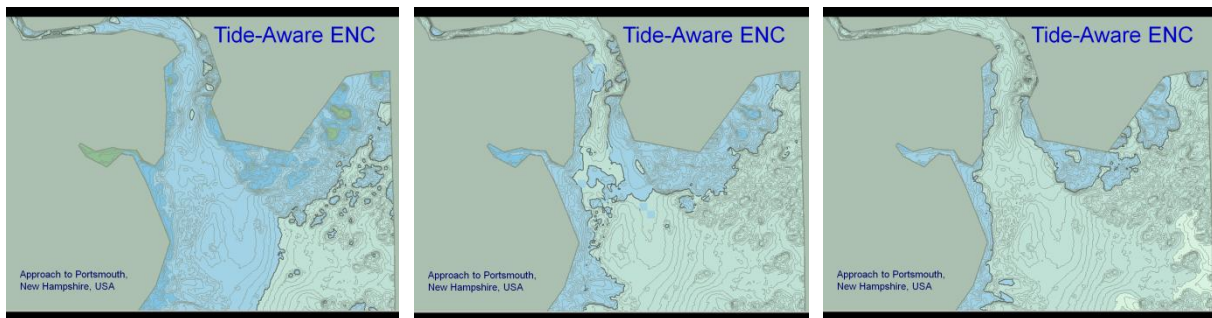- Can semi automated methods of producing depth areas (e.g. gridding or tin derived depth areas)?

Figure 1 – Tide Aware ENC