Paper for Consideration by CHRIS

Dynamic Water Depths in ECDIS

Submitted by:	IHB
Executive Summary:	In response to recommendations from ECDIS Stakeholder representatives, this paper proposes that where ENCs contain an appropriate density of depth data, correction of depths to include tidal information be allowed in the relevant IHO standards governing ENCs and ECDIS.
Related Documents:	S-52 edition 5 – *Specifications for Chart content and Display Aspects of ECDIS* – as revised March 2001
	S-57 edition 3.1.1 – *IHO Transfer Standard for Digital Hydrographic Data*
	IMO ECDIS Performance Standard – as revised December 2006
	IEC 61174 edition 3 - *ECDIS - Operational and performance requirements, methods of testing and required test results.*
Related Projects:	None

Introduction / Background

1.   The benefits of using depths adjusted for tidal heights during digital chart navigation is well recognised in the maritime sector, particularly for use during pilotage and for vessels that are significantly constrained by their draught. The increasing availability and use of dynamic tidal adjustment in Electronic Charting Systems (ECS) contrasts with ECDIS; where the relevant IHO specification governing ENCs and ECDIS specifically prohibits such functionality.

S52- Specifications for Chart content and Display Aspects of ECDIS

7.2   Display Functions

.....

g   Tidal adjustment

Depth information should only be displayed as it has been provided in the ENC and not adjusted by tidal height.

2.   This has led to a situation where pilots and Masters are increasingly referring to ECS rather than ECDIS to assist them during critical navigational situations in areas such as ports and other depth critical waterways.

Most recently, at the IHO S-101 User Requirements Workshop held in March 2008, strong support was expressed by stakeholders that the next generation ENC (S-101) should allow the use of tidal information to adjust charted depth information. Furthermore, there was strong support that this utility should be allowed in ECDIS as soon as possible – well before the advent of S-101 ENCs.

Analysis/Discussion

3.   In ENC data, depth is captured using two object classes – "spot sounding" – SOUNDG and "depth area" - DEPARE. In both cases, the associated depth attribute is referenced to the chart datum. It is relatively simple to adjust the depth attributes associated with these object classes to account for the variations in tide and water level. This in turn could be used to drive both the display of the data and the triggering of relevant alarms and indications in ECDIS.

4.   However, generally, where ENC data has been captured directly from paper charts, the limits of the depth areas correspond to the areas bounded by the isobaths shown on the chart – usually 1, 2, 5, 10, (15), 20, 30, 50 metres, and so on. In such a case, any tidal adjustment of these depth areas would be misleading and potentially confusing and dangerous. However, for ENCs that have been compiled using higher density data sets and in particular using depth areas to indicate contour intervals at metre and sub-metre intervals, applying tidal corrections is both useful and feasible. Indeed, this is being used successfully in an increasing number of portable pilot units (PPUs) and ECS where there are high density datasets available.

5.   The IMO Performance Standard for ECDIS includes a statement concerning altering the content of the ENC:

> *4.3   It should not be possible to alter the contents of the ENC or SENC information transformed from the ENC.*

6.   This statement is intended to refer to the principles of preserving the integrity of the fundamental ENC data rather than its subsequent use in an ECDIS display and software.

7.   The only constraining specification appears to be in S-52. If this was amended to allow tidal corrections to be applied to depth data in high fidelity ENCs and with appropriate indications, then ECDIS manufacturers could enable such functionality in ECDIS.

Conclusions

8.   There is a need to allow tidal information to be used directly with ENC depth information in ECDIS in certain circumstances. Appropriate amendments should be made to the governing IHO specifications to enable this.

Proposal

9.   S-52 Article 4.3 could be amended to read:

> *g   Tidal adjustment*
>
> *Depth information should ~~only~~ <u>normally</u> be displayed as it has been provided in the ENC and not adjusted by tidal height. <u>However, where there is ENC data containing an appropriate range of depth area information, depth areas and depths may be adjusted for tidal height. In this case, it must be made clear to the user that such adjustments are being made.</u>*

Guidance on what is meant by "appropriate range" may require further clarification. Providing guidance on how the mariner should be made aware that dynamic tidal adjustment is in force may also require development.

Justification and Impacts

10.   Enabling dynamic tidal adjustments in ECDIS under controlled conditions will enable the equipment to be used to its full potential. It will enable users who are currently resorting

to alternative (ECS) solutions to use ECDIS where they would otherwise not do so. If dynamic tidal height adjustment is not allowed in ECDIS, mariners and other maritime users, such as Marine Pilots and VTS managers, will increasingly turn to ECS to provide this functionality.

11.   The inclusion of dynamic tidal adjustments in ECDIS will require appropriate testing and validation. This will require appropriate additions to IEC 61174 – *ECDIS - Operational and performance requirements, methods of testing and required test results*.

Action Required of CHRIS

12.   The CHRIS is invited to:

a.   **Agree** that the appropriate use of tidal information to adjust charted depths in ECDIS should be allowed as soon as practicable.

b.   **Task** TSMAD in consultation with CSMWG (for S-52 amendments) and other relevant WGs to develop proposals to enable the use of tidal information to adjust charted depths in ECDIS for consideration by the HSSC at its meeting in 2009.