

**Information Paper (INF) for Consideration by WENDWG
Singapore, March 3-5, 2015**

Considering a Systemic Approach to Electronic Navigational Chart Schemes

Submitted by: Canada

Executive Summary: Hydrographic Offices and International Standards have supported the tradition of nautical chart schemes as a precursor to chart production and as a means of presenting chart coverage of large geographic areas. As digital chart products, or even ENC databases, increasingly become the dominant navigational tool it is realistic and likely that the digital chart coverage will diverge from its current direct association with the paper chart product. To accommodate this potential maturing of the digital product from its historical parent, the paper chart, it is worth considering how existing and future Electronic Navigational Charts coverage is schemed and coverage communicated to end-users. Canada suggests that the WENDWG encourage and monitor the practice of ENC scheming by WG Members and their associated Regional Hydrographic Commissions and potentially encourage adoption of international protocols.

Related Documents:

1. The New IHO S-102 Standard – Charting a New Frontier for Bathymetry
http://www.iho.int/mtg_docs/IHReview/2012/IHR_November2012.pdf
2. Future of Paper Chart
http://www.iho.int/mtg_docs/com_wg/HSSC/HSSC5/HSSC5-INF7_Future_demand_for_paper_nautical_charts.pdf
3. Chart Standardization and Paper Chart Working Group Work Programme
http://www.iho.int/mtg_docs/com_wg/CSPCWG/CSPCWG_MISC/CSPCWG_WP_2014-15.pdf
4. Proposal To Include A Grid Reference System In S-100
http://www.iho.int/mtg_docs/com_wg/HSSC/HSSC1/HSSC1-06.1C_Grid_Referencing_System.pdf
5. Grid for Greenland ENCs
http://www.iho.int/mtg_docs/rhc/ArHC/ArHC4/ARHC4-3.4.1_INF_paper_Grid_for_Grenlandic_ENC_Denmark.pdf
6. Resolving ENC Overlaps in USCHS
http://www.iho.int/mtg_docs/com_wg/WEND/WENDWG5/WENDWG5-05B_USCHC_ENC%20overlaps%20elimination_rev1.pdf

Related Projects: n/a

Introduction / Background

In the interest of establishing Electronic Navigational Chart (ENC) coverage the majority of Hydrographic Offices opted to create digital products that replicated the traditional paper chart coverage. As the ENC product line matures, there is increasing evidence that these digital products will deviate from their confined and traditional paper chart parents. In order that Producers and Users are fully aware and cognizant of ENC regional coverage it is suggested that consideration be given to the act of chart scheming as it relates to the ENC world.

Analysis/Discussion

The demand for greater information and increased functionality of the Electronic Navigational Chart will inevitably result in ENCs being the preference of commercial Mariners. A systematic approach of accommodating and communicating ENC coverage to the end-user community will enhance their confidence, comfort and safety in making this transition to ENC and Electronic Chart Display and Information Systems (ECDIS).

There has been traditional rigour in most Hydrographic Offices for creation of paper chart schemes for large geographic areas to guide transition to an updated suite of paper chart products. Evidence is beginning to suggest that a scheming approach could benefit the ENC product suite as well. As an example, in the United States-Canada Hydrographic Commission, the ENC Transboundary project (to eliminate ENC overlaps) developed schemes to represent new ENC limits that did not conform to existing paper chart limits. In reality, the ENC equivalent to traditional paper chart coverage in these Transboundary zones are now a mix of both Canadian and USA ENC cells.

In the digital charting context there is potential for ENCs to be schemed using a grid-based system. Some Hydrographic Offices are experimenting with grid-based ENC schemes. Several advantages can result from this style of scheme for digital products:

- A logical naming convention would assist end-users and distributors can be informed of the physical location of the ENC cell such as including components of the latitude and longitude in the cell title
- The simple organization of a grid-based system can be much less chaotic than the traditional overlapping and irregular limits of a typical paper chart coverage
- S-100 auxiliary information layers can be better aligned to the ENC (and thus ECDIS) if it were based on a grid system (e.g. World Meteorological Organization uses a grid system)
- Potential for better alignment to the grid-approach applied in many topographic mapping agencies may have downstream benefits for harmonized onshore-offshore data

It is understandable that the transition from an ENC scheme that matches paper chart coverage to one based on a grid system would be a slow and arduous task for any Hydrographic Office. Therefore it would be prudent to apply this gridded methodology either in areas of limited or sparse ENC coverage or when a new product line is being launched. In this regard, the Polar Regions can be considered as candidates for testing and developing a grid-based ENC scheme. Likewise the design and implementation of a new product or service such as High Definition Gridded Bathymetry in Canada proved to be an ideal setting to create a tile system of product/data cells. (see International Hydrographic Review (IHR) edition November 2012)

Applying a grid-based scheme to nautical products or data is mostly a technical matter as demonstrated by papers on this subject at the International Hydrographic Organization's (IHO) Hydrographic Services and Standards Committee meetings (HSSC) (see Related Documents). However, the WENDWG, with responsibility for monitoring and encouraging quality and appropriate coverage of ENC globally, should engage in discussions and actions that could lead to further development of best practice in the schemes of ENCs. The IHO Chart Standardization and Paper Chart Working Group (CHSPCWG) appropriately identify the WENDWG role in their Work Programme (see Related Documents):

B.3 Develop guidelines for preparation & maintenance of small/medium scale ENC schemes (remarks keep WENDWG engaged)

Reflecting on the HSSC1 paper by TSMAD (Related Document #4) there may be merit for the WENDWG to open discussion with HSSC working groups (e.g. TSMAD and CSPCWG) to better understand the benefits and risks associate with an IHO proposed global grid-approach for ENC coverage. This standard approach would allow Member States to consider and potentially adopt if and when they consider transition to a grid-based scheming of national ENC coverage.

Finally, WENDWG may consider whether the IHO community would benefit from a body of knowledge on experiences and practices in the unique scheming of Electronic Navigational Charts by Member States.

Conclusions

Appropriate ENC schemes and the potential for global grid-based ENC cells have significant potential to enhance achievement of IHO-WEND objectives. Additionally, if ENC coverage in general is made available in an easily understood format, it would better inform the end-user community. Canada encourages the WENDWG to pursue this approach by soliciting examples of practical application by WENDWG Member States and their associated Regional Hydrographic Commission.

Recommendations

1. WENDWG to acknowledge the submission and take any action it deems appropriate.

Justification and Impacts

WENDWG has indicated its intention to monitor and promote ENC scheme discussion at HSSC4. As such, it was added to the CSPCWG Work Programme. It is appropriate that this discussion remains on the WENDWG agenda.

Action Required of WENDWG

The WENDWG is invited to note the Information Paper.