

**4th IHO-HSSC Meeting
Taunton, UK, 25-28 September 2012**

Paper for Consideration by HSSC

Proposal to add a Magnetic Variation information Product Specification to the TSMAD work program

Submitted by:	TSMAD Chair
Executive Summary:	This paper proposes to develop an S-10X product specification for magnetic variation based on the World Magnetic Model.
Related Documents:	1. S-101 ENC Product Specification
Related Projects:	S-101

Introduction / Background

1. SOLAS regulations require the carriage of a pelorus or magnetic bearing device and associated deviation card (SOLAS Chapter V Reg 19 2.1). As a consequence magnetic variation information is still required in order to support the transfer of bearings between magnetic and true. Currently magnetic variation information is included on paper charts and within ENC cells. However in S-100 ECDIS magnetic variation information could be provided as a separate product which would provide more consistent and readably usable information for the user. Such an approach would also reduce the need for hydrographic offices to include and update this information within S-101 ENCs. This proposal outlines the need for a separate product specification and the advantages of this approach.

Analysis/Discussion

3. Magnetic Variation information may be included in ENC cells using the object Magnetic variation (MAGVAR) this carries the reference year, the rate of annual change and the value of magnetic variation, this follows the information typically included on a paper chart in accordance with S-4 B-270. MAGVAR objects may be encoded as point, line or area objects. Feedback from the IHO Check Dataset indicated variation in practice by different producers. TSMAD has recently issued an Encoding Bulletin to improve consistency and ensure that this information is encoded in ENCs. In ECDIS the value of magnetic variation may be displayed or the user can use the cursor pick to access the information. This information is normally updated as part of a new edition of an ENC cell. This approach suits the paper chart medium but in the digital paradigm the user requirement is to be able to pick for this information and immediately be presented with the applicable value of variation.

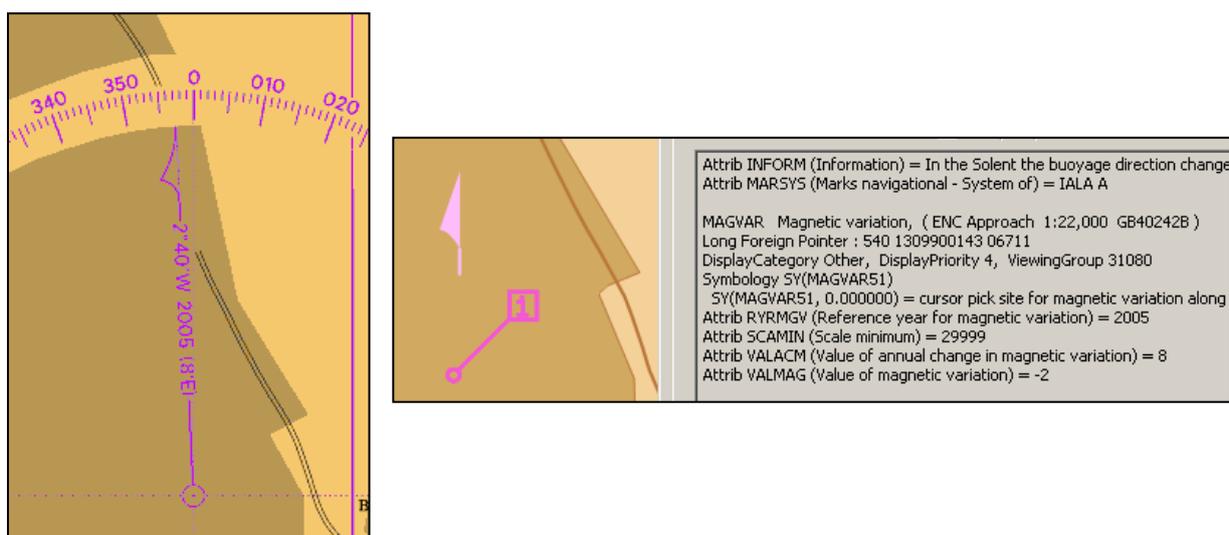


Figure 1 – Magnetic variation information shown on paper charts (left) and ENC (right).

4. The Magnetic Variation product would consist of a single dataset with global coverage which would be issued annually. Consequently S-101 ENCs would not need to include magnetic variation information (magnetic anomalies would still be included). The dataset would consist of area features carrying the value of magnetic variation for that area. This approach would have the following advantages;

- No requirement for HO's to include and update MAGVAR information in S-101 ENC
- The user is presented with current value of variation with no need to adjust for annual change
- Information will be consistent across the globe
- Reduction in overall data volume in ENCs
- Eliminate the need for HO's to update ENC dataset's for annual change on a yearly basis

5. This product specification would utilize the World Magnetic Model which is the "standard model used by the U.S. Department of Defense, the U.K. Ministry of Defence, the North Atlantic Treaty Organization (NATO) and the International Hydrographic Organization (IHO), for navigation, attitude and heading referencing systems using the geomagnetic field. It is also used widely in civilian navigation and heading systems. The model, associated software, and documentation are distributed by NGDC on behalf of NGA. The model is produced at 5-year intervals, with the current model expiring on December 31, 2014"

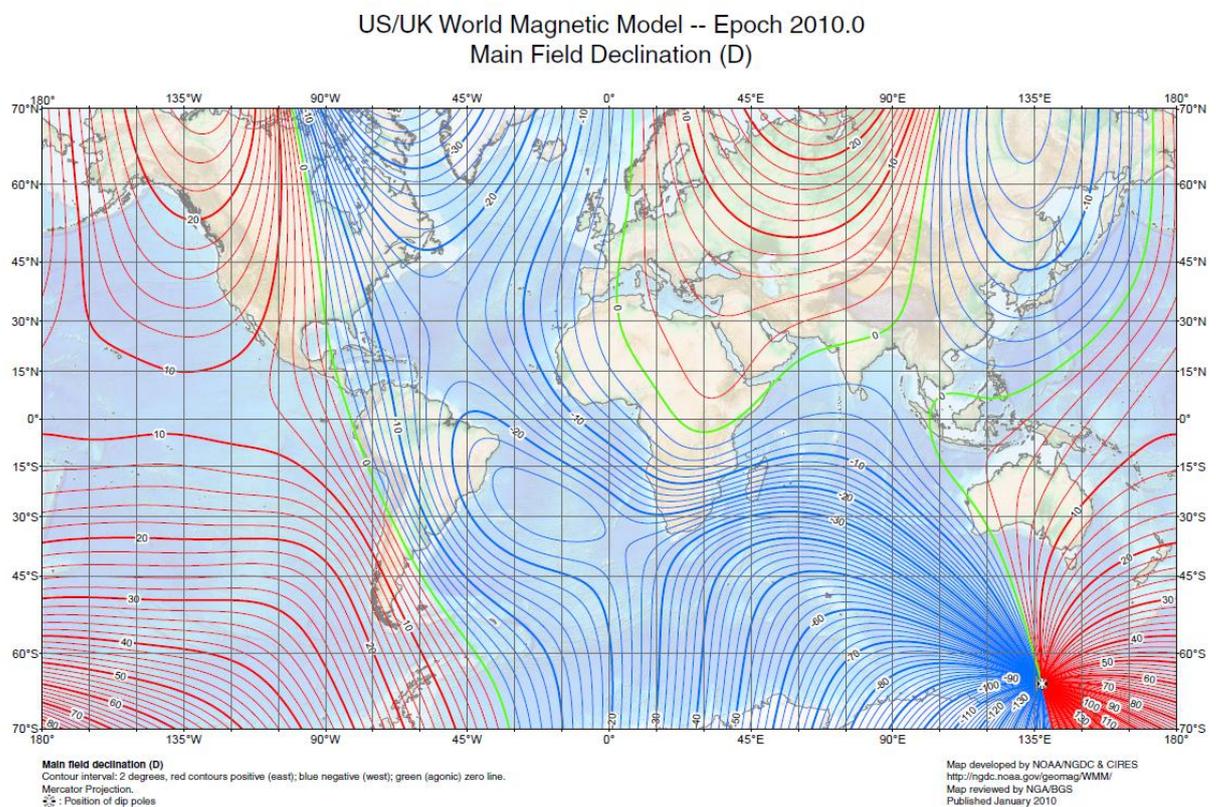


Figure 2 – World Magnetic Model

6. In addition, the NOAA's National Geophysical Data Center already produces vector files of the world magnetic model, which contain the information that is needed to produce a dataset. Creation of the required datasets could therefore be highly automated by utilizing Extract, Transform and Load (ETL) tools and a modified version of the S-101 converter.

Conclusion

7. As the magnetic model is produced every five years it makes sense that in an S-100 based ECDIS, that the magnetic variation be included as a separate product rather than embedded in the ENC. Many Hydrographic Offices, currently encode magnetic variation as a point on the ENC, which is of little use to the mariner. In creating a separate product for magnetic variation it would provide the mariner with a consistent dataset based on the World Magnetic Model and eliminate the need for hydrographic offices to manage this data on a product by product basis.

Recommendations

8. The recommendations of this paper are as follows:
 - a. Magnetic variation information differs from other information within an ENC and should therefore be included in a separate product
 - b. TSMAD should prepare a product specification for magnetic variation information

Action Required of HSSC

10. The HSSC is invited to:
 - a. Add the following item to the TSMAD work program

Task	Work item	Priority H-high M- medium L- low	Milestones	Start Date	End Date	Status P- planned O- ongoing C- completed
A.12	Develop an S-10X product specification for Magnetic Variation information	M		2013		