MARINE INFORMATION OVERLAYS (MIO)
Recommended Procedures for Development

Edition 1.1 – May 2007[1]

1.   Introduction

Marine Information Overlays (MIO) consist of supplementary information to be used with an Electronic Chart Display and Information System (ECDIS) that are not Electronic Navigational Chart (ENC) objects or specified navigational elements or parameters. Supplementary means additional, non-mandatory information not already covered by existing International Maritime Organization (IMO), International Hydrographic Organization (IHO), and International Electrotechnical Commission (IEC) standards or specifications. Examples of MIOs include ice coverage, tide/water level, current flow, meteorological, oceanographic, and marine habitats. Depending on the navigation situation or task-at-hand, the provision and use of MIOs (e.g., ice coverage, weather conditions, etc.) can be crucial in terms of improving both the safety and efficiency of maritime navigation, as well as ensuring the protection of the marine environment.

As defined in the IMO Performance Standards for ECDIS, an "*Electronic Navigational Chart (ENC) means the database, standardized as to content, structure and format, issued for use with ECDIS on the authority of government authorized hydrographic offices. The ENC contains all the chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart (e.g. sailing directions) which may be considered necessary for safe navigation.*" In terms of being "supplementary information", MIOs are not contained within nor are they an integral part of an ENC. Rather, MIOs are separate, supplementary information that are displayed in conjunction with the overall System ENC[2] (SENC). This is similar in concept to adding radar and AIS information to an ECDIS display and is covered in the IMO ECDIS Performance Standards, "*Radar information or other navigational information may be added to the ECDIS display. However, it should not degrade the SENC information, and should be clearly distinguishable from the SENC information*".

The IMO Performance Standards for ECDIS require chart data to conform to IHO S-57 data standards, and that IHO colours and symbols be used to represent the System ENC (SENC) information. While the current edition of IHO S-57 (Edition 3.1) contains an ENC Product Specification, it does not specify the content or format for supplemental information (e.g., MIOs). Similarly, neither the current IHO Colours and Symbols Specifications for ECDIS (IHO S-52, Appendix 2) nor IEC Publication 61174 (*ECDIS - Operational and Performance Requirements, Method of Testing and Required Test Results)* describe how this supplemental information should be displayed.

2.   HGMIO

In order to facilitate the development and implementation of MIOs, IHO and IEC agreed to establish a Harmonization Group on Marine Information Objects (HGMIO) in May 2002. HGMIO ensures the coordination of the relevant IHO and IEC bodies, and the liaison with other competent organizations interested in MIO development and implementation. Additionally, HGMIO may conduct technical exchange on MIOs with type-approval authorities, ECDIS manufacturers and ECDIS user community. It may also recommend changes to the relevant IHO and IEC standards, as a result of HGMIO work.

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[1] Edition 1.0 endorsed at IHO CHRIS 17, 5-9 September 2005. Name change of "Objects" to "Overlays" agreed to at HGMIO4 Meeting, 22-24 May 2007.

[2] System ENC is the data held in the ECDIS system resulting from the transformation of the ENC for appropriate use.

To date, MIO objects and attributes have been developed, based on S-57, for the following categories of MIOs:
- Sea Ice Coverage
- Marine Habitats/Marine Protected Areas
- Status of Aids-to-Navigation

These are currently registered on the Open ECDIS Forum (www.openecdis.org) and available for use.

3.   Competent Organizations

In most cases, development or regulation of MIO data standards is not an IHO responsibility. Examples of other competent organizations that may wish to develop or administer standards for MIOs include:

International Association of Lighthouse Authorities (IALA)
World Conservation Union (IUCN)
World Meteorological Organization (WMO)
North Atlantic Treaty Organization (NATO)

In particular, such organizations would:
   a. Clarify / define the need for a particular category of MIO.
   b. Participate in the development of suitable MIO objects and attributes (if based on IHO S-57).
   c. Take responsibility for the maintenance of those S-57 objects and attributes.
   d. Participate in the development of appropriate colours and symbols for the display of those MIOs.
   e. Participate in any MIO testing and evaluation by ECDIS manufacturers, or during at-sea trials with mariners.
   f. Play an active role in the production and dissemination of MIO data.
   g. Lead any initiative aimed at regulating the use of MIOs with ECDIS (e.g., to IMO and/or IEC).

4.   MIO Development Procedure

IHO S-57 has proved to be an effective means to encode chart and navigation-related information for use with ECDIS. As such, competent organizations involved in MIO development are encouraged to develop any new applications using IHO S-57 as the basis. Development should proceed as follows:

1. Define the need for a particular category of MIO. The competent organization (e.g., IALA for Aids to Navigation Status) should identify the requirement and produce a detailed description of the various elements to be considered for encoding, transfer and display in ECDIS. The International Hydrographic Bureau (IHB) may act as interface or facilitator between the competent organization and HGMIO. HGMIO would then inform its parent committees at IHO[3] and IEC[4] of the perceived requirement and request approval to initiate a development process.

2. Develop Objects and Attributes. From the specifications received from the competent organization, HGMIO provides recommendations for the development of appropriate S-57 objects and attributes in liaison with the IHO body responsible for the maintenance of S-57[5], the competent organization and with ECDIS manufacturers. This may be carried out via e-mail and/or during ad hoc workshops. The new S-57 objects and attributes would initially be registered on the Open ECDIS Forum. If formally approved by the parent IHO and IEC committees, as well as the competent organization, these new MIO-related objects and attributes will become incorporated into the IHO Registry for S-57 Edition 4. Potentially, this

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[3] Committee on Hydrographic Requirements for Information Systems (CHRIS)

[4] Technical Committee No. 80 - Maritime Navigation and Radio-communications Equipment and Systems (TC80)

[5] Transfer Standard Maintenance and Applications Development Working Group (TSMAD)

may involve the creation of a separate register for MIOs or several registers for various MIO categories. It is expected that the competent organization that developed these new objects/ attributes would also be willing to assume the responsibility for overseeing their maintenance or future refinement.

3. <u>Develop Colours and Symbols</u>. From the set of objects and attributes, which are developed for the relevant MIO category, HGMIO helps facilitate the development of appropriate colours and symbols. This will be done in liaison with the IHO body responsible for the maintenance of C&S specifications in S-52[6], the competent organization, and ECDIS manufacturers. This may be carried out via e-mail or during ad hoc workshops. During this process, the existing S-52 chart colours and symbols, and those used to display the navigational elements and parameters listed in IEC 61174 or the draft IMO Performance Standards for the Presentation of Navigation-related Information on a Shipborne Navigational Display, would be taken into account. After approval by the parent IHO and IEC committees, and the competent organization, the resulting new colours and symbols would be registered on the OEF. In the same manner as for new S-57 objects and attributes, it is expected that the competent organization would be willing to take responsibility for the maintenance of these specially developed colours and symbols.

4. MIO Test and Evaluation. Before a new category of MIOs can be operated on ECDIS, there would be a suitable period of test and evaluation performed by ECDIS manufacturers or during at-sea trials with mariners. HGMIO, as required, can act as coordinator to help organize this testing / evaluation, in liaison with the competent organization, ECDIS manufacturers, and maritime user groups.

5. Production and Dissemination of MIO Data. The competent organization would be responsible for the production and dissemination / distribution of its relevant MIO data. Some examples include production and issuing of ice coverage information, weather maps, and oceanographic information affecting ships routing (current flow, wave heights, etc.). This type of service could be performed on a daily or other periodic basis via internet, digital cell phone, satellite communications, or as part of an AIS broadcast service.

6. Address Regulatory Requirements. It may be necessary that the use of MIOs on ECDIS be reflected in the relevant IMO and IEC standards. For IMO, this includes the existing Performance Standards for ECDIS and the new Performance Standards for the Presentation of Navigation-related Information on Shipborne Navigational Displays. In either case, the competent organization would lead any initiative on the matter, possibly in association with the IHO. Future editions of IEC 61174 (ECDIS) and/or the new IEC 62288 (Presentation of Navigation-related Information) may require the development of a test data set for the particular MIOs by the competent organization.

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[6] Colours and Symbols Maintenance Working Group (C&SMWG)