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Report of IHO-IEC Harmonization Group on Marine Information Objects (HGMIO

Submitted by:	Lee Alexander, University of New Hampshire (Chair, HGMIO)
Executive Summary:	This report summarizes the activities of HGMIO during the period of 30 September 2005 – 15 September 2006.
Actions to be taken	Note the current activities of HGMIO; encourage more active participation.
Related Documents:	IHO S-57, IHO S-52, and future S-100
Related Projects:	n/a

Introduction

Marine Information Objects (MIOs) consist of chart- and navigation-related information that supplement the minimum information required by ECDIS. As it relates to the use of Electronic Navigational Chart (ENC) data, MIOs are additional, non-mandatory information not already covered by existing IMO, IHO, or IEC standards. Currently, this includes ice coverage, tide/water level, current flow, meteorological, oceanographic, and marine habitats. The supplemental information would primarily be additional S-57 objects/attributes but could also be imagery, graphics, or gridded data. In 2001, a Harmonization Group on MIOs (HGMIO) was established between IHO and IEC to recommend additional data and display specifications that may be incorporated into future editions of IHO and IEC standards. This report provides a brief update on HGMIO-related activities.

Current Status of MIO-related Efforts

a. Ice Coverage **–** Task Leader: John Falkingham (Ice Services Canada)

An *ECDIS Ice Objects Catalogue* (Version 3.0) was published by Ice Services Canada (in cooperation with the Canadian Hydrographic Service) in March 2001. These objects are registered on the Open ECDIS Forum (OEF). Following a meeting of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) Expert Team on Sea Ice (ETSI) in April 2004 in Hamburg, Germany, ETSI agreed to take responsibility for the *ECDIS Ice Objects Catalogue* / Registry. ETSI Points-of-contact on this matter are John Falkingham (Canada) and Capt. Manuel Picasso (Argentinean HO). In 1996, there were informal proposals by *SevenCs* (Germany) on suitable colours and symbols for ice objects. However, they were prepared before the Ice Objects Catalogue was published and need to be revisited. Although there was some interest to conduct an Ice Information Testbed project in the Gulf of St. Lawrence/St. Lawrence River in Canada in conjunction with "Information Seaway Project", nothing has been formally proposed or scheduled.

At the University of New Brunswick (Canada) a Masters thesis was completed that described a process where the daily ice charts that are produced by the Canadian Ice Service are converted into a S-57 format suitable for use as a supplemental layer (i.e., Ice Coverage MIO) with ENCs and ECDIS. A report on this effort will be published in an upcoming issue of *International Hydrographic Review*.

b. Meteorological **-** Task Leader: Michel Huet (IHB)

Object Classes and Attributes for Weather (Version 1.0) were first proposed by *SevenCs* in November 1999. However, only basic colours or symbols for these objects were developed. Liaison was established with a NATO group developing an Additional Military Layer (AML) on weather information with the aim to harmonize NATO and HGMIO developments. It is also

hoped that this group and HGMIO can cooperate to develop appropriate S-57 objects/ attributes and symbology for the display of weather information on ECDIS / WECDIS taking into account edition 3.3 of the IHO Presentation Library published in March 2004. Contact was re-established with the World Meteorological Organization when a Working Group met during *Ocean OPS 04*, Toulouse, France, 10-15 May 04.

c. Tides/Water Levels **–** Interim Task Leader: Lee Alexander (USA – Univ. of NH)
In 2001, *SevenCs* developed a tide-simulation model for a "tide-aware" ENC. Prototype ENC data sets were produced for two ports (Singapore and Schelde/Vlissingen, Netherlands) based on one-meter depth areas. A simulated 10-meter tidal range was then applied, and the display modified based on time and ship's safety contour (depth). Further enhancements included the establishment of designated tidal zones within the overall area.

Research is ongoing at the University of New Hampshire (USA) to develop dynamic tide and water level applications for the "Next Generation ENC". It is a three phase effort:

Phase 1 involved the compilation and processing of high-density bathymetric data into a digital elevation model (DEM) using a combination of *CARIS* and *SevenCs* software tools. From this DEM (called a "Navigation Surface") both S-57 3.1 ENC and gridded datasets were produced.

Phase 2 is investigating various methods to incorporate vertical and time dimensions into existing ENC data. These "next generation" ENCs (i.e., capable of dealing with x,y,z and time) will be tested with existing ECDIS and ECS equipment that are currently installed onboard government and commercial vessels.

Phase 3 will integrate real-time/forecast water depth information and port information services transmitted via an AIS communications broadcast into both the "Next Generation ENC" and with the "Chart-of-the-Future" (a separate, but related project). Sea trials are planned for the Port of Hampton Roads in spring, 2007 prior to the 2007 US Hydrographic Conference in Norfolk, Virginia.

d. Current Flow **–** Task Leader: [vacant]
In 1997, the Canadian Hydrographic Service, Quebec Region published an *Atlas of Tidal Currents for the St. Lawrence Estuary*, from Cap de Bon-Désir to Trois-Rivières. Based on an April 2004 meeting at the Maurice-Lamontagne Institute, Mont Joli, Quebec, there was interest to convert some of this data into S-57 objects that could be used with existing ENC data and ECDIS systems. Ideally, this would include the development of gridded chart data models that can be used with both tide and current flow information. However, this effort has not begun.

e. Oceanographic **–** Task Leader: Max van Norden (US Naval Oceanographic Office)
A Technical White Paper: O*ceanographic Object Attribution* was prepared by the U.S. Naval Oceanographic Office in June 2002. It summarized the activity and developments being undertaken in the field of oceanography that appear to be related to electronic charting. Several new oceanography object classes and attributes were proposed. Further work that that is needed includes:

1) Recommendations on oceanographic objects that should be addressed in an ECDIS.
2) Develop a suitable method for handling 3-D data in a 2-D environment.
3) How to relate climatological and real-time data.
4) Assign attributes and colour tables to oceanographic objects.
5) Investigate how oceanographic data should be used with other data sets without introducing clutter.
6) Produce a sample dataset of physical oceanographic objects for testing in an ECDIS.

f. Marine Environmental Protection **–** Task Leader: Julia Powell (USA-NOAA)
The Office of Coast Survey, NOAA (USA) is conducting a pilot project to convert existing coral reef, marine protected areas (MPA), and other marine habitat information into MIOs that can be used with ECDIS and ECS equipment. NOAA and the Florida Dept. of Environmental Protection produced a CD-ROM of the *Benthic Habitats of the Florida Keys*. It contains colour imagery and GIS files that describe and show the location of shallow seafloor habitats, such as coral reefs. In support of this effort, *CARIS* prepared a report on

how this benthic habitat mapping data (e.g., *ArcView*™ shapefiles) could be converted into S-57 feature objects using *CARIS HOM* ENC software tools. Work is ongoing to develop new S-57 objects classes and/or feature attributes for coral reef habitats, and for other criteria associated with regulated activities. Once the objects are defined, a Coral Reef/ MPA Product specification will be produced. There are tentative plans to conduct at-sea trials in 2007 using ECDIS/ECS equipment that have the capability to display Coral Reef/ MPA MIO layers. The trials will be conducted onboard government and private vessels operating in the Florida Key National Marine Sanctuary.

g. electronic Aids to Navigation Service Information (e-ANSI) – Task Leader: Michel Huet (IHB)

The International Association of Lighthouse Authorities (IALA) established a Working Group on Aids to Navigation Information Service (ANIS) in 2004. The objective of e-ANSI is to provide real-time information to ships on the status of Aids to Navigation (AtoN) that are critical for the safety of navigation and the protection of the environment. It is planned that Automatic Identification Systems (AIS) will be used to broadcast the relevant e-ANSI information in an appropriate data format.

A Workshop on International Standardization of e-ANSI Information on ECDIS (i.e., e-ANSI as a MIO) was held at IHB in Monaco on 28 June 2005. Five main topics were discussed:

1) What is e-ANSI (i.e., Why important; How expected to operate; How it could become a MIO, Role of AIS in data communication)
2) Determination of data content for e-ANSI
3) Define what S-57 objects and attributes are required
4) Need to establish an e-ANSI S-57 Object Register
5) Display of e-ANSI information (present/future colours and symbols)

Following the Workshop, it was agreed that the IALA e-ANSI WG and HGMIO would work cooperatively on the development of an e-ANSI MIO Product Specification. This effort is ongoing.

IMO Performance Standards for Display of Navigation-related Information

In December 2004, IMO adopted Performance Standards for the Presentation of Navigation-Related Information (MSC 19(79)). The purpose of this Performance Standard is to: *"supplement and in case of conflict, take priority over presentation requirements of the individual performance standards…"* (Sec. 1, Purpose). IEC TC80/WG13 has nearly completed IEC Publication 62288 which will contain the methods of testing and required test results for equipment/systems that conform to this new Performance Standard. It is planned that a CDV for IEC 62288 will be completed in late 2006. Collectively, both performance standards (IMO and IEC) will affect how MIO information will be a component of an overall harmonized display of navigation-related information on ECDIS and potentially, other shipboard systems.

Recommended Development Procedures for MIOs

At CHRIS 17, the *"Recommended Procedures for the Development of MIOs" (Edition 1.0)* was endorsed. It outlines the necessary steps or procedures that were required to develop and implement MIOs. This document is posted at: www.iho.shom.fr/committee/HGMIO.

Work Plan Submission to CHRIS

Due to the relatively few active HGMIO members, the work of HGMIO progresses rather slowly. Chair has contacted current task leaders by e-mail regarding their current activities and work progress. Upon input received either by e-mail or at the upcoming HGMIO 4 meeting (October 2006), a revised Work Plan will be submitted.

Next Meeting

The 4th Meeting of IHO-IEC Harmonization Group on Marine Information Objects (HGMIO) is scheduled for 24-25 October 2006 at Office of Coast Survey, National Ocean Service - NOAA in Silver Spring, Maryland, USA (near Washington, DC). The primary purpose of the

meeting is to review the current status of MIO development and plan further coordination efforts.

Action Required of CHRIS
Note the current activities of HGMIO, and encourage more active participation.
