Basic Steps to Produce Marine Information Overlays (MIOs)
for Marine Environmental Protection
(Version 1)

4 February 2008

Introduction

The IHO-IEC Harmonization Group on MIOs (HGMIO) has published "*Recommended Procedures for Development*"[1] for MIOs. Although this document provides general guidance on the overall process required to develop/implement MIOs, it does not detail how to produce specific types of MIOs. The following briefly describes the basic steps required to produce MIOs for marine environmental protection of critical marine habitats such as coral reefs.

Step 1 - Identify and compile relevant biological/environmental data and regulatory data from existing maps, GIS databases, or regulations.

There are two basic types of information:

1) Biological (e.g., benthic habitat classification).
2) Regulatory (e.g., established zones or marine protected areas (MPAs)

Most likely, maps or databases already produced by a national government agency, research institution/university or non-governmental international organization can be used. The initial challenge is to find out what data exists, how to obtain a copy, and then determine its suitability in terms of being converted into an IHO S-57 dataset. This will require some level of interaction with national marine environmental protection agencies.

Step 2 - Convert existing mapping and/or GIS data into an IHO S-57 data format.

There are several commercial GIS/ENC data production software tools that can be used.

CARIS HOM (and a new CARIS product called: *S-57 Composer)*
ESRI ARC GIS
SevenCs ENC Designer
Jeppesen Marine - C-Map/dKart

All of these manufactures have expressed their intention to provide MIO production software tools.[2]

Step 3 – Encode biological and regulatory information into an S-57 dataset using proposed S-57 object classes.

Two classes have been developed based on IUCN categories and a MPA Functional Classification System developed by USA-NOAA:

Coral Reef objects (v4)
MPA objects (v5)

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[1] Edition 1.1, 24 May 2007. [www.iho.org/committees/HGMIO]

[2] HGMIO Report to IHO CHRIS 19, November 2007.

Both were introduced at HGMIO4 Meeting in June 2007:

Step 4 - Develop MIO Product Specifications based on IHO data standards.

HGMIO has issued three documents dealing with MIO standards and product specifications:[3]

1) "*Relationship on MIOs to Current/Future IHO Standards*, Version 3, 24 May 2007
2) "*General Content Specification for MIOs*", Edition 1.0, 24 May 2007
3) "*Coral Reef/MPA MIO Product Specification*", Prototype version 1.1, 19 July 2007

The first explains how MIOs will be produced based on IHO S-57 and the future S-100 standards. Since many types of MIOs can be produced, there is a benefit of having them conform to a *General Content Specification for MIOs*. Closely based on S-57 ENC Product Specification, it is similar to the approach used by NATO to produce various types of Additional Military Layers (AMLs). The *Coral Reef/MPA MIO Product Specification* is an example of what can be used

Step 5 - Develop suitable method of portrayal (e.g., colors and symbols) based on existing printed publications.

Currently, MIOs are optional, non-mandatory information that supplement the minimum chart and navigation-related information required for safety-of-navigation. To date, HGMIO has not attempted to prescribe how MIOs should be displayed on ECDIS. This has been primarily left up to OEMs and/or ECDIS users. Given the increasing role that MIOs will play in terms of marine environmental protection, consideration must be given to the IHO S-52 colours and symbols for ECDIS. However, based on a recent decision by the IHO Colours and Symbols Working Group[4], new symbology proposed by HGMIO will not become part of IHO S-52 Colours & Symbols Presentation Library. Instead, examples of MIO portrayal are to be registered on the recently established IHO Registry.

Step 6 - Conduct a testbed in which MIOs and used with ENC and RNC data.

Ideally, testing of MIOs with ENC (or RNC) data should conducted using ECDIS or ECS equipment. However, implementation and use MIOs in existing ECDIS and ECS equipment has only recently begun. Several ECDIS/ECS manufactures are willing to implement MIOs, but are currently taking a "wait-and-see" approach.

A possible alternative being pursued is to encourage the providers of existing "freeware" to display MIOs with ENCs. This includes:

SeeMyENC (by SevenCs)
CARIS Easy View

Initial tests can be conducted in a laboratory/test facility, followed by at sea evaluation by users.

Summary of Proposed Coral Reef and MPA objects/attributes, ver. 4, 4 Jan 2007.

[3] www.iho.org\committees\hgmio

[4] Section 3.18 of Draft Minutes to IHO CSMWG17 Meeting, 11-13 June 2007, Stavanger, Norway. [www.iho.org\committees\CSMWG]

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