Development of a IHO-GIS Tidal Records Metadata

1.   In accordance with task 1.2.2 of the IHO Work Programme for 2013, the IHO Geographic Information System (GIS) is being developed to support the work of RHCs, ENC availability, INT chart coordination, C-55 and other related activities. This development contributes to the objective of providing IHO Member States and stakeholders with accurate and relevant information in a timely and accessible manner.

2.   The current version of the specifications is at Annex A. The Tidal Records Metadata requirements are detailed in Appendix 1 to Annex A.

3.   TWLWG 6 is invited to consider a revision of Appendix 1 to Annex A defining the minimum requirements and optional information, taking into account the data presently available in the GLOSS (http://www.gloss-sealevel.org/station_handbook/#.UukBPvk1iHt) and PSMSL (http://www.psmsl.org/data/obtaining/map.html) websites.

4.   Issues/questions which the TWLWG need to address and provide advice/guidance/answers:

   a.   Should an IHO-GIS database be created independently?
   b.   Is the GLOSS data sufficient?
   c.   Is the PSMSL database and format adequate or is there more data available than shown?
   d.   Should the IHO-GIS have a link pointing directly to the PSMSL or GLOSS sites?
   e.   How can short term sites be shown? Are HOs willing to popular a database covering the short term stations to complement the long term stations in the GLOSS and PSMSL sites?
   f.   What metadata is the minimum necessary to meet the user requirement?
   g.   Can/will HOs maintain the site with up-to-date links and make raw tide data and/or harmonic constituents freely available?

**OUTLINE OF THE SPECIFICATIONS FOR THE DEVELOPMENT OF
THE IHO GEOGRAPHIC INFORMATION SYSTEM
Draft V1.4 corr1 – 24 December 2013**

1. Scope

In accordance with task 1.2.2 of the IHO Work Programme for 2013, the IHO Geographic
Information System (GIS) is being developed to support the work of RHCs, ENC availability, INT
chart coordination, C-55 and other related activities. This development contributes to the objective of
providing IHO Member States and stakeholders with accurate and relevant information in a timely
and accessible manner.
More specifically, the IHO GIS should replace, support or enhance, as appropriate, at least the
following IHO Publications and services:

- B-8: *Gazetteer of Geographical Names of Undersea Features*,
- C-16: *National Hydrographic Regulations*,
- C-55: *Status of Hydrographic Surveying and Nautical Charting Worldwide*,
- M-2 - Appendix 4: *Comparison of IMO and IHO Membership*,
- P-5: *IHO Yearbook*,
- S-11 - Part B: *Catalogue of INT Charts*,
[- S-23 - *Limits of Oceans and Seas*,]
- IHO membership page on IHO website,
- IHO ENC Coverage Catalogue.

2. Applicable Standards

The IHO GIS is based on the following standards in decreasing order of priority:
- IHO standards such as S-100 - *IHO Universal Hydrographic Data Model* and associated product
specifications;
- ISO geospatial standards;
- OGC standards.

Reference geospatial layers such as coastlines and depth contours are extracted from the current
edition of the GEBCO Digital Atlas (http://www.gebco.net/data_and_products/gebco_digital_atlas/).
Country names are extracted from the United Nations list of Member States
(http://www.un.org/en/members/ and http://www.un.org/fr/members/).

Countries and their dependencies are identified using the ISO 3166 alpha-2 code (also in Publication
S-62 - *List of Data Producer Codes*).

Country boundaries are extracted from the current edition of the Global Map
(http://www.iscgm.org/cgi-bin/fswiki/wiki.cgi).[1]

Whenever possible, software components are based on open source elements.

3. Functions

The IHO GIS includes the following functions:
(1) Data collection and updating
(2) Data management
(3) Translation services
(4) User services

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[1] The UN database will be considered as an interim solution restricted to IHB internal use.

3.1. Data collection and updating
In the first instance, data will be input by the IHB. In due course, the GIS should allow Member States to upload their national/regional information directly; however, the IHB will act as the administrator for all information uploaded to the GIS, so as to ensure consistency and to prevent malicious entries.

3.2. Data management
The IHB fulfil the role of system manager; monitoring the currency of the data, generating and maintaining the database back-up and having responsibility for fault resolution and restoration as a result of system failure or data corruption.

3.3. Translation services
- provision of all information in English and French
- provision of selected information in Spanish

3.4. User services
The GIS should provide read-only and report generation access to the broader maritime user community and provide information transfer to Member States and others by Web Feature Server or similar including:
- discovery services making it possible to search for data sets and services on the basis of the content of the corresponding metadata and to display the content of the metadata;
- view services making it possible to display, navigate, zoom in/out, pan, or overlay viewable spatial data sets and to display legend information and any relevant content of metadata;
- download services, enabling copies of data sets, or parts of such sets, to be downloaded and, where practicable, accessed directly;
- export services, enabling data sets, or parts of such sets, to be exported in current interoperable formats.

4. Structure

The IHO GIS structure is based on six main components:
(1)
(2) data entry interface,
(3) management interface,
(3) browsing interface,
(4) data model,
(5) data bases,
(6) web services.

4.1 Data entry interface
The system should provide appropriate interfaces for data entry and editing. The system should have the functions below;
    (1) direct and easy access from the data editor in HOs through web browser;
    (2) especially easy entry of the geometric information (point, line and/or polygon), including the import of shapefile or other form of geometry data in the SQL database;
    (3) automatically added timestamp of the action;
    (4) Every action, content of the modified information, timestamp and editor ID should be automatically logged and kept in a separated text file to create an event trail;
    (5) notification of the data entry to the data administrator: for instance the data status change from "approved" to "pending".

The interface should consist in the pages below:
    (1) ID Authentication page;
    (2) Page or window to select data to be modified;
    (3) Data input page or window;

(4) Review and confirmation page for the input data.

4.2 Data management interface

The system should have the following functions:

    (1) Receiving the input data from the editor, displaying the content of the entry for confirmation and updating the database with the approved data;

    (2) Automatic backup system of the data in the database and the system itself;

    (3) Recovery system from the backup for both the data and the whole system.

4.3 Browsing interface

The system should provide appropriate interfaces to allow users to carry out zoom, pan and feature interrogate functions via a web browser.

The system should have the following functions:

    (1) GIS viewer displaying the layered geometric information with menu to select the layer to be displayed;

    (2) GIS viewer should be able to zoom in and pan out;

    (3) Switchable viewer in 3 projections (Mercator, Arctic polar stereo and Antarctic polar stereo)

    (4) Background picture of the bottom topography;

    (5) Metadata display for the selected geometric information;

    (6) Free word or key word search for the information. Key word for the search should be selectable from the pull down box or from predicted text;

    (7) Data export in several format (WMS, WFS, kml and so on).

4.4 Data models

The data model distinguishes six categories of information:

- metadata related to individual States, dependencies and associated subordinate areas: the relevant model is described in annex 1;

- metadata related to Regional Hydrographic Commissions and IHO Subsidiary Bodies: the relevant model is described in annex 2;

- metadata related to external liaison or organization: the relevant model is described in annex 3;

- metadata related to personnel: the relevant model is described in annex 4;

- metadata related to address: the relevant model is described in annex 5;

- metadata related to geographic objects (points, lines or areas) defined by a set of coordinates; these objects include at least:

- survey areas,
- INT chart schemas and coverage,
- ENC schemas and coverage,
- CATZOC,
- IHO-IOC GEBCO undersea feature names,
- tidal stations and records,
- users' requirements:
  - ✓ maritime shipping routes,
  - ✓ main ports

The characteristics of the relevant data models are described in annexes 6 to 13.

4.5 Data base

The system should make use of an appropriate spatially enabled database as its primary storage repository, and file based datasets where appropriate.

5. Functional requirements

The initial configuration should offer full GIS functionalities to IHB staff and support export WMS services for the Member States. Data entry and data management will be handled through the IHB on behalf of the Member States.

Tidal records metadata
Tidal Records ID
Name of station
Agency ID of Responsible organization
Date of measurement started
Date of measurement ended
Sample interval (s)
Position
Horizontal datum
Vertical datum
Instrument type
Status
URL of the link to the data portal
Additional information