

**1st IHO-HSSC Meeting
The Regent Hotel, Singapore, 22-24 October 2009**

Status Report on Inland ENC Development and Standardization

Submitted by:	European - North & South American - Russian Federation Inland ENC Harmonization Group (IEHG)
Executive Summary:	This paper describes the activities of the IEHG as it relates to Inland ENC development/implementation in Europe, North America, Russia and South America. In addition to describing the legal authority, structure, organization, and procedures, an explanation is provided about the activities of IEHG in regard to the new IHO Register, S-100 and IHO Working Groups.
Related Documents:	IHO S-57 Edition 3.1 → IHO S-100
Related Projects:	nil

Objective of IEHG

To develop and to maintain a harmonized standard for an Inland Electronic Navigational Charts (IENC) suitable for inland navigation that is based on the standards of the International Hydrographic Organisation (IHO) for 'maritime' Electronic Navigational Charts (ENC).

Guiding Principles

- a. Goal - To agree upon specifications for Inland ENCs that are suitable for all known inland ENC data requirements for safe and efficient navigation in European, North and South American, and Russian Federation inland waterways. However, it is intended that IENC standards meet the basic needs for Inland ENC applications, worldwide.
- b. The framework for Inland ENC standards includes:
 1. Use of **IHO S-57** (Edition 3.1), including:
 - 'Maritime' ENC Product Specification (Appendix B1)
 - Object Catalogue (Appendix A)
 - Use of Object Catalogue (Appendix B.1, Annex A)
 2. A minimum **Inland ENC Product Specification** that includes mandatory requirements for safety-of-navigation on inland waterways, worldwide.
 3. An **Inland ENC Encoding Guide** that provides guidance on recommended object classes, attributes, and attribute values for encoding IENC data.
 4. Inland ENC **Feature Catalogue**.
 5. Establishment of an **Inland ENC Register** for additional real-world, IENC features, attributes, and enumerations that are not already contained in IHO S-57 Edition 3.1 Object Catalogue.
 6. Use of the **Open ECDIS Forum** (OEF) as a means of communication and to register additional Inland ENC object classes, attributes, and attribute values.
 7. Align with the future **IHO S-100** Standard for Geospatial Data.

Recognition

As the competent international technical group on Inland ENC technical standards development, implementation and maintenance, IEHG is recognized by:

Europe - European Union, Central Commission for Navigation on the Rhine, UNECE, and the Danube Commission.

North America – US Army Corps of Engineers

Russian Federation - Russian Ministry of Transport

South America – Directorate of Hydrography and Navigation of the Brazilian Navy (DHN)

International Hydrographic Organization (IHO) – On 14 April 2009, IEHG became recognized as a Non-governmental International Organization (NGIO) of IHO. IEHG supports, advises and provides input to IHO regarding Inland ENC matters. Specifically, IEHG attends:

- Hydrographic Services and Standards Committee (HSSC)
- Transfer Standard Maintenance and Application Development (TSMAD) WG

Composition, Organization, and Membership

a. Composition - IEHG is a combined government/non-government technical group that works towards the development of international standards meant to facilitate the implementation of inland electronic charting and navigation, worldwide.

b. Regions – IEHG regions are comprised of countries within a continent (North America, South America) or a recognized social-economic region (e.g., Europe, Russian Federation).

c. Organization – By simple majority vote, chairpersons, vice-chairs and technical coordinators are elected.

1) Chair – Two persons (co-chairs) each from a different region. Only representatives of waterway authorities can become chairpersons.

2) One vice-chair from each region, which is not already a chair.

3) Technical Coordinators - One technical coordinator for each region.

4) Core Group – The two Chairs, the Vice-Chairs and Technical Coordinators.

d. Membership

All the members of IEHG should have current expertise in the field of Inland ENCs.

1) Participants – Anyone who is involved in the production of Inland ENCs or the production of Inland ENC applications and representatives of user groups can participate in IEHG, make proposals and take part in the discussions.

2) Members - Representatives of competent authorities involved in the provision of Inland ENCs are entitled to become members. If proposed by a competent authority, membership can also include expert contributors, such as representatives of:

- international governmental organizations in the area of inland navigation and members of the working groups of these organizations that are dealing with Inland ENCs
- inland navigation user groups
- private companies that are producing Inland ENCs or applications for Inland ENCs.

As of September 2010, membership and/or participation in the work of IEHG includes:

- 25 Members (government authorities)
- 52 Participants
- 9 International Organizations

Efforts are being made to encourage more governments from South America and South East Asia to participate.

Current Activities and New Procedures

2009 Annual Meeting

The 7th Meeting of IEHG was held on 9-12 September 2009 at the Federal Ministry of Transport – Innovation and Technology, Vienna, Austria. Twenty-one persons attended including representatives from each of the four major regions (Europe, Russia, North and South America). Key topics for discussion included updates on IENC activities in the various regions, review and acceptance of change requests, discussion on need for IENC quality standards, formal definition of an IENC, status of IHO S-100 development, and IEHG participation in IHO GII Register.

Change Request Procedures

IEHG has established a process for submitting proposals for amendments (i.e., Change Requests) to Inland ENC standards. This includes the Inland ENC Feature Catalogue, Product Specification, Encoding Guide, and Validation Checks. Every participant in IEHG is entitled to submit proposals. Proposal submission and review is described in Annex A of the IEHG Terms of Reference. At IEHG7, over 50 Change Requests were reviewed, many of which were adopted. The adopted changes will go into effect in January 2010.

Effective Dates of IENC Standards

At IEHG7, a process was agreed in terms of aligning the edition/version numbers and effective dates of the various IENC standards.

Feature Catalogue & Product Spec	Date effective	Encoding Guide	Date effective	Validation Checks	Date effective
2.0	Oct 2005	1.0	Oct 2005		
	---	1.1	Oct 2006		
	---	1.2	Dec 2006		
2.1	Feb 2008	1.3	Feb 2008		
2.1	May 2008	1.3.1	May 2008		
2.2	Jan 2010	2.2.0	Jan 2010	2.2	Jan 2010
2.2		(2.2.1)			
(2.3)		(2.3.0)			

Definition of Inland ENC

At IEHG7, the need for a formal definition for an Inland ENC was discussed. It was agreed that it would be closely aligned with definition of a 'maritime' ENC that is defined in:

- IMO Performance Standards for ECDIS, Section 3.2
- IHO S-52, Appendix 3 (Glossary of ECDIS-related Terms).

The following definition has been proposed, and following the consensus (or lack of opposition) by all members and participants of the IEHG, will become official, and be included in Inland ENC Product Specification, Version 2.2, to be released in January 2010:

Inland Electronic Navigational Chart (IENC) means the database, standardized as to content, structure and format, for use with inland electronic chart display and/or information systems operated onboard of vessels transiting inland waterways. An IENC is issued by or on the authority of a competent government agency, and conforms to standards initially developed by the International Hydrographic Organization (IHO) and refined by the Inland ENC Harmonization Group (IEHG). An IENC contains all the chart information necessary for safe navigation on inland waterway, and may contain supplementary information in addition to that contained in the paper chart (e.g., sailing directions, machine-readable operating schedules, etc.) which may be considered necessary for safe navigation and voyage planning.

Quality Standards

At IEHG7 the need for quality standards for IENCs was discussed. Proposals included:

- Recommended validation checks (to be based on IHO S-58)
- Guidance on determining what constitutes "minimum content" (to be included in the IENC Encoding Guide)
- Minimum accuracy requirements
- Accuracy information content
- Verification of completeness
- Notices to Skippers/Mariners about invalid depth information

Further discussion and refinement of these procedures will occur during 2010 via the IEHG Discussion Forum.

Minimum content

At IEHG7, consideration was given about the need to more specifically describe in the IENC Encoding Guide what constitutes "minimum content". This would apply to each page listing. Initially, this type of information would be considered guidance, but later as something that could be adopted (e.g., within a region). Further discussion on the best approach or process to accomplish will take place during 2010 via the IEHG Discussion Forum.

Inland ENC Website

Previously, the *Open ECDIS Forum* (www.openecdis.org) was used to host Inland ENC related activities and publications. However, beginning in 2009, all Inland ENC publications and functions are now hosted at a consolidated Inland ENC site [<http://ienc.openecdis.org>].

Key publications include:

- Inland ECDIS Standard, Ed. 2.0/2.1 (16 May 2008)
- IENC Product Specification, Ed. 2.1 (16 May 2008)
- Feature Catalogue, Ed. 2.1 (19 May 2008)
- IENC Encoding Guide, Ed. 1.3.1 (16 May 2008)
- IENC Presentation Library, Ed. 2.1 (16 May 2008)

Two main activities that are conducted include:

- A forum for general discussions on inland ENCs:
Subscription: <http://www.ienc.openecdis.org/cgi-bin/mailman/listinfo/ienc>
Archive: <http://ienc.openecdis.org/pipermail/ienc/>
- A forum for formal Change Requests for the Inland ENC Encoding Guide
Subscription: <http://www.ienc.openecdis.org/cgi-bin/mailman/listinfo/egcr>
Archive: <http://ienc.openecdis.org/pipermail/egcr>.

The site also contains:

- Information about the work of the IEHG (Terms of Reference, Meeting Minutes, presentations, etc.)
- Papers related to Inland ENC matters.

IENC Register

In conjunction with the planned IHO GII Registry, it is expected there will be an Inland ENC Register. As reported to CHRIS 20, the IEHG is willing to take responsibility for its content and management. In this regard, a "Process for Submitting Proposals to the Inland ENC Register" was agreed at IEHG4, and is described in Annex B of the IEHG Terms of Reference. However, IEHG seeks advice on current intentions for the IHO Registry, and the desired means/process for registering Inland ENC extensions and related Product Specifications.

Clarification was provided by TSMAD regarding changes in the Register that will affect Product Specifications. TSMAD confirmed that, "when the IENC register is merged with the Hydro register all duplicate entries [e.g., "UPPER CASE" in the Hydro Register and "lower case" in the current Inland ENC Product Specifications] would be retired (from the Inland ENC Register)." Lower case objects and attributes would still be allowable in charts produced to the current standards, however they would no longer be available in future IENC standards (once S-100 has been adopted). Additionally, all attribute values that presently conflict with current S-57 attribute values will be reconciled so that IENC attributes (soon to be enumerations) would fit with the existing hydro numbering system.

Currently, examples of portrayal of IENC features are contained in the IENC Encoding Guide. Consideration is being given to compiling portrayal guidance for IENCs. In the meantime, IEHG will monitor IHO S-100 developments as they occur related to a Portrayal Register.

Alignment with new IHO S-100

It is the intention of IEHG to conform to what is being planned for IHO S-100. There will be several benefits:

- a) All real-world Inland ENC-related object classes, attributes, and attributes values can be included with S-100. The current Object Catalogue will become a series of *Feature Data Dictionaries*.
- b) Ideally, the Inland ENC Register will contain only those object classes, attributes and attribute values that are not already in the Hydrographic Register.
- c) An *application schema* will specify how:
 - features, attributes and associations are used to specify a data model
 - the various components are 'glued' together (i.e. a feature and its spatial component)
 - to use a register as part of an overall registry.

These rules can then be applied to develop a product-specific application schema (e.g., Inland ENC) that in turn forms the basis of the product specification.

- d) The *Inland ENC Product Specification* is separate "profile" consisting of a feature catalogue, an application schema, and encoding.

Relationship to IHO Committees/Working Groups

CHRIS/HSSC – Beginning in 2005, IEHG has submitted an annual Status Report. In addition, a member of the IEHG Core Group has attended each annual CHRIS meeting.

TSMAD – A formal letter inviting IEHG to participate in TSMAD was received from IHB on 27 September 2007. Depending on the meeting location, at least one member of the “Core Group” of IEHG (Chairs, Vice-Chairs, or Technical Coordinators) will attend.

IHO Working Group on Hydrography and Cartography of Inland Waters (HCIWWG) – As stated in IHO CL 62/2007 (10 July 2007):

“The purpose of the Working Group will be to analyse and recommend the level and nature of IHO involvement in Hydrography and Cartography of Inland Waters.”

Further:

“The Working Group should involve all relevant non-IHO international bodies in its deliberations, including the Inland ENC Harmonization Group (IEHG).”

Since there were several issues that were related to IEHG and its future work, IEHG Core Members (Co-Chairs and Technical Coordinators) actively participated in this Working Group.

The primary focus of this Working Group was on policy -- not technical -- issues related to legal and regulatory responsibilities for navigation products and services on inland waterways that have vessels on international voyages. The 4th Extraordinary International Hydrographic Conference adopted the report of the working group and the proposed resolution which ensures that IHO will continue to deal with hydrography and cartography on inland waterways in the future, and will cooperate with IEHG.

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Action Required of HSSC

HSSC is invited to:

- Note the activities related to Inland ENC development and implementation.
 - Advise on current intentions for the IHO GII Registry, and means/process for registering Inland ENC extensions and related Product Specifications.
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