Chapter 1. A - Introduction

Background

Based on the findings of the European transport R&D project INDRIS (Inland Navigation Demonstrator for River Information Services) and the German project ARGO in 2001, both the Danube and the Rhine Commissions adopted an Inland Electronic Chart Display and Information Systems (ECDIS) standard for Electronic Navigational Chart (ENC) data and system requirements for the Rhine and the Danube Rivers. In 2001, the Economic Commission for Europe of the United Nations (UN ECE) adopted the Inland ECDIS Standard as a recommendation for the European inland waterway system (CCNR 2002).

In the USA, following a 1999 recommendation by the National Transportation Safety Board, the U.S. Army Corps of Engineers (USACE) initiated a program to facilitate the production and implementation of Inland ENCs on major river and inland waterway systems in the United States.

While there are some differences between the North American and European inland waterways, there are far more similarities. A North American - European Inland ENC Workshop was held in 2003 in conjunction with a Conference on River Information Services (RIS) organized by the European R&D-project COMPRIS (Consortium Operational Management Platform River Information Services). In addition to informing participants on the status of standards development and projects being conducted, a key objective was to discuss the benefits of harmonizing Inland ENC data standards between Europe and North America.

The North American - European Inland ENC Harmonization Group (IEHG) was formed in 2003 to facilitate the development of international standards for Inland ENC data. The IEHG is comprised of representatives from government, industry and academia. European participants take part on behalf of the European Inland ECDIS Expert Group. The North American participants are members of the North American Inland ENC Ad Hoc working group that was formed in 2002. The IEHG meets once per year. However, most of the work is accomplished via e-mail correspondence, ~~and~~ the website http://ienc.openecdis.org/ and the Inland ENC discussion forum https://iehg.centralus.cloudapp.azure.com/login.

The goal of the IEHG is to agree upon specifications for Inland ENCs that are suitable for all known inland ENC data requirements for safe and efficient navigation for European and North American inland waterways. However, it is intended that this standard meets the basic needs for Inland ENC applications, worldwide. As such, the Inland ENC standard is flexible enough to accommodate additional inland waterway requirements in other regions of the world.

In September 2005, the Ministry of Transport of the Russian Federation became a member of the IEHG. In 2007, Brazil through its national Hydrographic Service, the Directorate of Hydrography and Navigation (DHN), joined the IEHG as the first South American country. In October 2009, the Waterborne Transportation Institute of the Ministry of Transport, Peoples Republic of China became the first member of the IEHG from the Asian region.

IEHG also works closely with the International Hydrographic Organization (IHO). At the ECDIS stakeholders' forum in 2007, IHO confirmed that compatibility with Inland ENC standards is allowed by the standards that are certified for maritime ECDIS applications.

On 14 April 2009, IEHG became recognized as a Non-Governmental International Organization (NGIO) of IHO. In addition, at the 4th Extraordinary International Hydrographic Conference on 4 June 2009, IHO adopted a resolution to cooperate with the IEHG.

As an NGIO, IEHG supports, advises and provides input to IHO regarding Inland ENC matters. ~~Specifically, IEHG attends:~~

~~1. Hydrographic Services and Standards Committee (HSSC)~~
~~2. Transfer Standard Maintenance and Application Development (TSMAD) WG~~

Inland Electronic Navigational Chart Defined

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. An IENC contains all the chart information necessary for safe navigation on inland waterways 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.

IENC Standards

The framework for Inland ENC standards includes:

1. Use of **IHO S-57** (Edition 3.1), including:
    a. 'Maritime' ENC Product Specification (Appendix B1)
    b. Object Catalogue (Appendix A)
    c. 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**~~ **domain** for additional ~~real-world,~~ IENC features, attributes, and enumerations that are not already contained in ~~IHO S-57 Edition 3.1 Object Catalogue~~other domains of the S-100 registry.
6. Use of the **ienc.openecdis.org** as a means of communication~~, and as an interim means to register additional Inland ENC object classes, attributes, and attributes values~~.
7. Align with the **IHO S-100** Universal Hydrographic Data Model. In particular, this includes the Inland ENC ~~Register~~ domain as part of the overall S-100 Geospatial Information Registry.

~~As of February 2011, t~~The current versions of IENC-related standards are published at http://ienc.openecdis.org~~:~~.

~~1. IENC Product Specification, Ed. 2.3 (February 2011)~~

~~2. Feature Catalogue, Ed. 2.3 (February 2011)~~
~~3. **IENC Encoding Guide, Ed. 2.3.0 (February 2011)**~~

Two other Inland IENC-related standards that are not maintained by IEHG, but are used in Europe include:

1. Inland ECDIS Standard~~, Ed. 2.2~~
2. IENC Presentation Library~~, Ed. 2.2~~
3. ~~[Note: Both are under revision and will be posted on the IEHG website when available].~~

Copies of all IENC-related standards available at: http://ienc.openecdis.org/.

IENC Encoding Guide

The IENC Encoding Guide provides detailed guidance on what is required to produce a consistent, uniform Inland ENC.

For all object classes, attributes, and attribute values that are used in conjunction with an IENC, the IENC Encoding Guide:

1. Provides a basis for its creation
2. Describes its relationship to the real-world entity
3. Provides criteria for its proper use
4. Gives specific encoding examples
5. Provides real-world and graphic examples of IENC information (portrayal)

Minimum Contents of an IENC

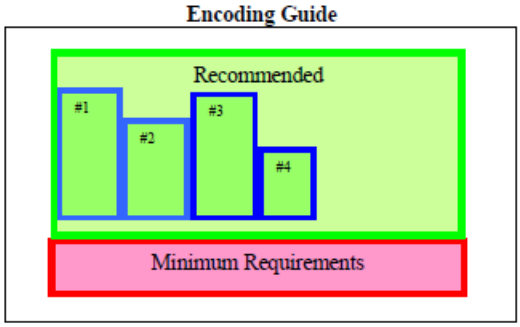
At a **Minimum**, the following objects shall be included in an IENC, if they exist:

1. Bank of waterway
2. Shoreline construction (e.g., groin, training wall)
3. Any facility that is considered a hazard to navigation
4. Contours of locks and dams (i.e., footprint area)
5. Boundaries of the navigation channel (if defined)
6. Isolated dangers in the navigation channel that are either:
    a. under water (obstructions)
    b. above water level (e.g., bridges, overhead cables)
7. Official Aids-to-Navigation (e.g. buoys, beacons, lights, notice marks)
8. Waterway axis with kilometres/hectometres

In addition to these minimum requirements, the Encoding Guide contains **recommended** objects, attributes and attribute values that are suitable for any Inland ENC application, worldwide. Each country or region can decide which of these recommended objects, attributes and attribute values are necessary to meet their requirements. For example, in Europe and the USA, there are different requirements for River Information Services (RIS). (See diagram below for reference.)

When the competent authorities in Europe define the “navigable water” for their individual waterways they should take into account water areas which can be used at mean water level

by vessels with a hull length of 20m or more that are typically used on these waterways. Water areas on which navigation is prohibited are not “navigable water”. If an object which is minimum content when it is situated in navigable water is situated outside of the navigable water, it is recommended to encode it.



#1 = additional requirements of river system for region 1
#2 = additional requirements of river system for region 2
#3, #4, etc.

Changes to the IENC Encoding Guide

The IENC Encoding Guide is a living document that can be modified, as needed, to accommodate future Inland ENC requirements and development, worldwide. ~~As such, two basic procedures have been established for making changes to the document~~The procedures are defined in the Terms of Reference of the Inland ENC Harmonization Group.

1. ~~**Procedure A:** Proposals for copied and new object classes, attributes and attribute values~~
2. ~~Proposals for copied and new object classes, attributes and attribute values need a formal decision by IEHG according to the following steps:~~
    a. ~~Prior to submitting a proposal, it is necessary to check whether an existing S-57 object, attribute or attribute value can be used. If a new object, attribute or attribute value is needed, the proposed acronym should be registered on the IEHG/S-100 Register to ensure that there is no duplication of acronyms.~~
    b. ~~Publication of the proposal, including the necessary changes in the Encoding Guide, should be posted on the IEHG Discussion Forum. [].~~
    c. ~~Discussion and decision at a meeting of the IEHG.~~
3. ~~**Procedure B:** Proposals for all the other changes and amendments~~
4. ~~Proposals for other types of changes and amendments (e.g., additional pictures, coding instructions, or object coding using already existing object classes, attributes and attribute values) are decided upon using the following steps:~~
    a. ~~Posting of the proposal (using the proposal form) on the IEHG discussion forum on the OEF by a member of the IEHG.[].~~
    b. ~~If there are recommendations on how to improve the proposal, the amended proposal is regarded as a new one.~~
    c. ~~If there is no veto within six (6) weeks, the amendment is considered adopted. It then:~~
        i. ~~Is included in the working version of the Encoding Guide that is available on the OEF~~
        ii. ~~Can be used by everyone~~
        iii. ~~Will be included in the next official edition of the Encoding Guide~~

d. If there is a veto, the proposal will be further discussed and decided upon at the next meeting of the IEHG.

Decisions of the IEHG in accordance with Procedure A may result in issuing a new edition of the Encoding Guide and Product Specification for Inland ENCs (e.g., Edition 2.2.0 ◊ Edition 2.3.0). Decision in accordance with Procedure B do not require new edition of the IENC Production Specification, and will be considered version to an existing Edition (Edition 2.2.0 ◊ 2.2.1). The current edition as well as the latest version will both be available at , together with a history of changes.