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Status Report on Inland ENC Development and Standardization

Submitted by:	North American – European – Russian Federation Inland ENC Harmonization Group (IEHG)
Executive Summary:	This paper reviews the current status of Inland ENC development and the ongoing initiative to harmonize Inland ENC Standards in North America, Europe, and Russia. This has been accomplished by the adoption a harmonized Inland ENC Encoding Guide that is the framework for an Inland ENC Content/Product Specification. In conjunction with what IHO decides for IHO S-100 and its alignment with the ISO TC211 standards, there will be a separate register for specific Inland ENC features. Once S-100 is released, it is expected that the Inland ENC Product Specification will become a separate application “profile” consisting of a feature catalogue, an application schema, and encoding. Depending on what IHO adopts as a future ‘maritime’ ENC Product Specification, there may be a need for a separate Inland ENC Product Specification as well.
Related Documents:	IHO S-57 Edition 3.1 → IHO S-100
Related Projects:	nil

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 ECDIS Standard for 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 an Inland ECDIS Standard as a recommendation for the European inland waterway system (CCNR 2002). To date, Inland ENC data conforming to the Inland ECDIS standard have been produced for the Rhine, Neckar, Main, Saar and Danube Rivers as well as for the Main-Danube-Canal in Germany, the Austrian portion of the Danube River, the Dutch connection between Rotterdam and the German border for the Scheldt River, the Garonne river in France, and sections of the Danube river in Slovakia, Hungary, Croatia, Serbia and Montenegro and Romania. The Mosel River (Germany) is scheduled to be completed in Oct/Nov 2006. Private companies are co-operating in producing complete Inland ENC coverage for remaining European navigable waterways. In addition, ECDIS and ECS equipment manufacturers that are active on the European inland waterways have upgraded their software to use Inland ENC data. At present, there are more than 2500 vessels in Europe that are using Inland ENC data.

In the USA following 1994 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 USA. To date, 73 Inland ENC cells covering 8,047 miles on the Mississippi, Ohio, Red, Illinois, Cumberland, Monongahela, Arkansas, Tenn-Tom, Green, Kanawha, Atchafalaya Rivers, and the Black Warrior/Tombigbee system have been produced and are available for public access via the Internet (www.tec.army.mil/echarts/). Complete coverage of the inland system is expected by 2009. Similar to Europe, several North American ECDIS and ECS equipment manufacturers now offer systems capable of using Inland ENC data.

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 Nijmegen, The Netherlands

on 30 June – 1 July 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.

Discussion

Inland ENC Harmonization Group

The former North American – European Inland ENC Harmonization Group (IEHG) has been expanded to include the Russian Federation. Comprised of representatives from government, industry and academia, the IEHG meets once per year. The next IEHG meeting (3rd) is 11-13 October 2006 in St. Petersburg, Russia. However, most of the work of the IEHG is accomplished via e-mail correspondence and the *Open ECDIS Forum*. Key persons involved in the IEHG include:

Co-Chairman

Anthony R. Niles, U.S. Army Corps of Engineers (Anthony.R.Niles@erdc.usace.army.mil)

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Framework for International Inland ENC Specifications

The overall framework for international Inland ENC standards includes several components.

- IHO S-57 Edition 3.0/3.1 where applicable.
- Adoption of a harmonized Inland ENC Encoding Guide
- A central register for non-IHO S-57 3.1 object classes, attributes and attribute values.
- A Base Content/Product Specification that includes all known Inland ENC requirements, worldwide.
- An Inland ENC Encoding guide that describes required S-57 objects classes, attributes and attribute values
- Use of the Open ECDIS Forum (www.openecdis.org) as a means for communication and publication.
- Align with the future edition of IHO S-100

IHO S-57 3.1 and ENC Product Specification

IHO S-57 Edition 3.1, Appendix B.1 is the Product Specification for the production of “maritime” Electronic Navigational Charts (ENCs) to be used in conjunction with an IMO-compliant ECDIS. However, for Inland ECDIS some additional object classes, attributes and attribute values are required to meet real-world inland navigation requirements. The European Inland ECDIS Expert Group developed a regional product specification based on IHO S-57, Edition 3.1. It was adopted in 2001 by the Central Commission for Navigation on The Rhine (CCNR), Danube Commission (DC), the Economic Commission for Europe of the United Nations (UN-ECE), and the Permanent International Association of Navigation Congresses (PIANC). In parallel, U.S. Army Corps of Engineers (USACE) also adopted in 2002 an Inland ENC Content Specification based entirely on the current IHO S-57 Edition 3.1 ENC Product Specification. The USACE Inland ENC (IENC) Content Specification has recently evolved to become an *IENC Chart No. 1 and Encoding Guide*.

Inland ENC Encoding Guide

On 25 October 2005 at the final *COMPRIS* Conference in Rotterdam, the Harmonized IENC Encoding Guide was finalized, and presented to the European Commission for approval. Current plans are for the Harmonized IENC Encoding Guide to go into full implementation by June 2007. In the interim, based on River Information Systems (RIS) Directive of the European Union, the new edition of the European Inland ECDIS Standard (including the Encoding Guide) will be adopted by 20 October 2006. However, several EU Member states have already begun to use it, while others are using it to produce test IENCs. In North America, the US Army Corps of Engineers will continue to use its current IENC Encoding Guide so as to complete full IENC coverage in US rivers/waterways. However, June 2007 is the common date of application for both Europe and North America.

Another potential use of the Encoding Guide may be the near- and long-term development of a Register for Inland ENC objects and attributes. Since the Inland ENC Encoding Guide is based on a *MS ACCESS* Database,

it may be possible to use this database as the backbone/framework for an Inland ENC Register. In particular, there are any number of tables and legends that can be generated and re-structured as needed. It may also be possible to use the Inland ENC Encoding Guide for the development of an Inland ENC Application Profile that will be required to align with IHO S-100.

Inland ENC Register

Currently, the *Open ECDIS Forum* (www.openecd.org) serves as a central register for Inland ENC extensions based on IHO S-57 Edition 3.1. However, in conjunction with the planned IHO Registry, there will be an Inland ENC Register. The IEHG will be responsible for its content and management. In the future, this activity could be taken over by some other organization (e.g., PIANC). A "Process for Submitting Proposals to the Inland ENC Register" was drafted in April 2006 and will be refined at the next IEHG Meeting in St. Petersburg, Russia.

Alignment with new IHO 100

It is the intention of the Inland ENC Harmonization Group to conform to what is being planned for IHO S-100. Potentially, there will be several benefits:

- a) All real-world Inland ENC-related object classes, attributes, and attribute values can be included with S-100. The current Object Catalogue will become a series of *Feature Data Dictionaries*.
- b) The Inland ENC Register will only those object classes, attributes and attribute values that are not already in the broader IHO 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 Base Product Specification* can become a separate "profile" consisting of a feature catalogue, an application schema, and encoding.

Assuming that it is clear what needs to be done to comply with IHO S-100, the plan is for Inland ENC specifications to conform.

Recommendations

Continued Inland ENC standards development and implementation would benefit from a public statement/communication by IHO CHRIS on what is the current status of development for IHO S-100, and what are the future plans/timeframe.

Impact

In conjunction with what IHO decides S-100 and its alignment with the ISO TC211 standards, there will be a separate register for specific Inland ENC features. Once IHO S-100 is released, it is planned that the Inland ENC Base Product Specification will become a separate application "profile" consisting of a feature catalogue, an application schema, and encoding. Depending on what IHO adopts as a future 'maritime' ENC Product Specification, there may be a need for a separate Inland ENC Product Specification as well.

Action Required of CHRIS

CHRIS is invited to note the activities related to Inland ENC Development.
