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Technical Specifications for the maintenance of the Inland ENC Register and the digital parts of the IENC standard

Final deliverable

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Authors of the document

Responsible organisation	Principal author
DVS	Peter Kluytenaar (on behalf of DVS)

Contents

1 INTRODUCTION

The Inland ECDIS Standard was developed in the EU 4th Framework project INDRIS and first introduced to the outside world in 2001 when version 1.0 of the standard was accepted by the CCNR. Apart from some experiments on a very limited number of vessels using a very limited data set there was no real world experience. Since then real world experience has slowly been gathered resulting in a continued improvement of the standard. A process that is far from concluded.

Version 1.0 of the standard was mostly a 'paper' version. Very soon however it became apparent that both the manufacturers of tools to draft ENCs and manufacturer of Inland ECDIS software required parts of the standard to be machine-readable. Also the 'paper' version was not suited to the continuing improvement of part of the standard that deals with the data, the ENCs.

The data part of the Inland ECDIS Standard is based on the IHO S-57 Standard, currently version 3.1. IHO however is in the process to move to a next generation of the standard, which will be called S-100. Apart from many other advantages S-100 provides much greater flexibility and provides recognition for the Inland ENC Standard. It is for this reason that the Inland ENC Harmonization Group (IEHG) has offered (and was accepted by IHO) to be one of the test-beds of the S-100 developments. The most relevant part of the S-100 development for this document is the S-100 Registry and Registers, including the Inland ENC Register.

Deliverable 5.2 of SWP 5.2 aims to describe the technical requirements and the specification for the set up and operation of the Inland ENC register and the maintenance of the digital parts of the Inland ECDIS Standard.

The following document starts with a description of the Inland ECDIS Standard followed by a description of the digital parts of the Standard. Along the way it will explain the relation between the IENC Register and the digital parts. Next is a description of the way the maintenance of the Standard is presently organised and its weaknesses. The document concludes with a description of some infrastructure requirements.

2 INLAND ECDIS STANDARD

2.1 Overview

The Inland ECDIS Standard consists of four sections supplemented by Appendices. An overview is shown in Figure 1.
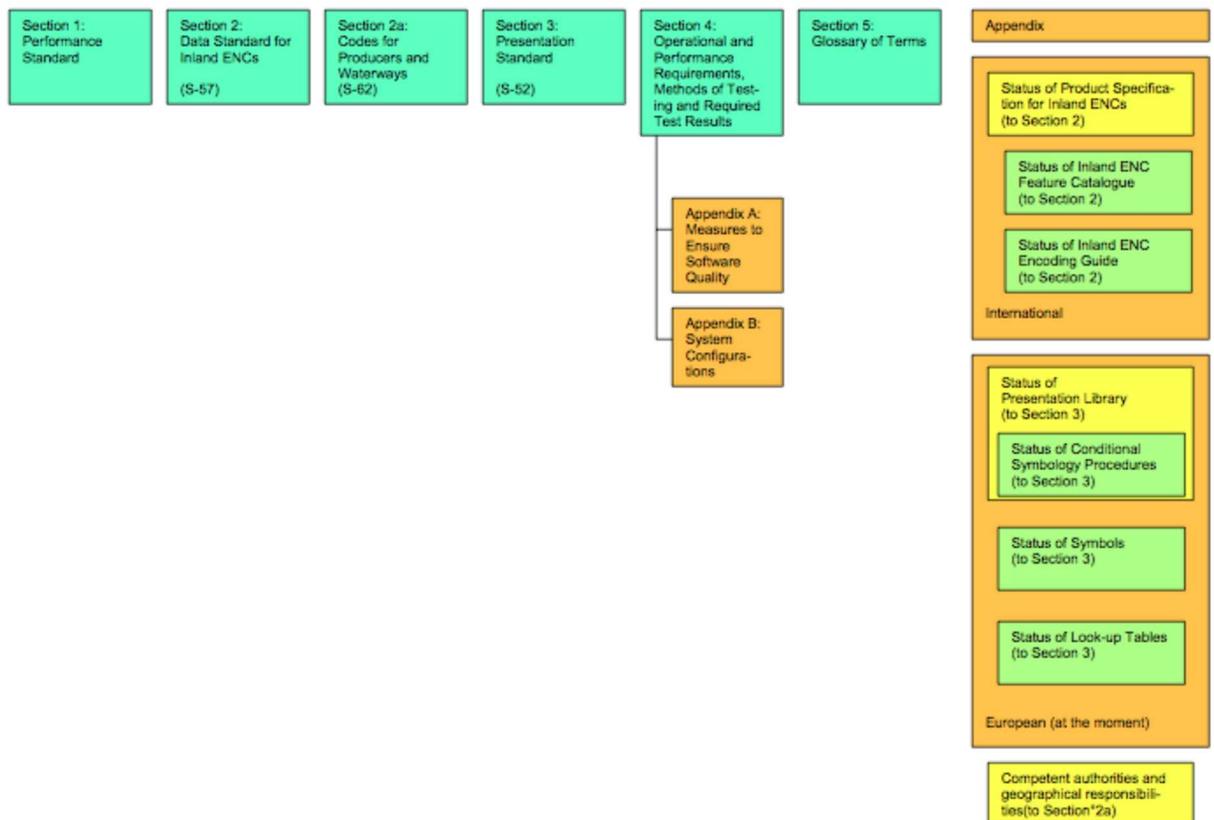
Figure 1 Overview Inland ECDIS Standard

Section 1 and Section 4 are respectively general requirements for Inland ECDIS and requirements to the hardware and software of Inland ECDIS systems on board of vessels. The digital parts of the Standard however relate to Sections 2 and 3 and deal with the data that is used in Inland ECDIS, i.e. the Inland ENCs. These parts are the following:

- Product Specification for Inland ENCs including:
  - Inland ENC Feature Catalogue
  - Inland ENC Encoding Guide

- Presentation Library for Inland ECDIS

- Codes for producers and Waterways

Contrary to the digital parts of the standard Section 1 and Section 4 have needed only minor revisions since version 1.0 of the Standard.

2.2 Product Specification for Inland ENCs

The Product Specification is a set of specifications intended to enable chart producers to produce a consistent Inland ENC (IENC), and manufacturers to use that data efficiently in an Inland ECDIS that satisfies the Performance Standard for Inland ECDIS (Section 1).

An Inland ENC must be produced in accordance with the rules defined in this Specification and must be encoded using:

- the Inland ENC Feature Catalogue and
- the rules described in the Inland ENC Encoding Guide

The Inland ENC Product Specification, Feature Catalogue and Encoding Guide have been adopted by the Inland ENC Harmonization Group (IEHG) and are applicable in North and South America, Russia and Europe. It is intended, that the Inland ENC Product Specification, Feature Catalogue and Encoding Guide meet the basic needs for Inland ENC applications worldwide.

The valid versions of the Inland ENC Product Specification, Feature Catalogue and Encoding Guide can be found on http://www.ienc.openecdis.org.

Only applicable in Europe and in the Russian Federation and outside the scope of work of IEHG are the Status of Codes for Producers and Waterways (Inland ECDIS Standard, Section 2a) and the Status of the IENC Presentation Library (Inland ECDIS Standard, Section 3). These are maintained under responsibility of the Inland ECDIS Expert Group. Valid versions can be found on http://www.ienc.openecdis.org.

2.3 Inland ENC Feature Catalogue

The Feature Catalogue contains all

- features (previously object class)
- attributes and
- enumerations (previously attribute values)

that are allowed for IENCs. That means, that each feature, attribute and enumeration that is mentioned in the Encoding Guide must be listed in the IENC feature catalogue.

Each item contains a reference to an item in a Feature Data Dictionary (see Chapter 3 IENC Register). Essential information from the dictionary items is also in the feature catalogue. This includes names and definitions. Therefore the feature catalogue is able to solve dictionary queries.

In addition the catalogue contains feature-attribute bindings specific to IENCs. This binding specifies which attribute can be used for a particular feature and which of its enumerations are allowed. Additionally each binding can define constraints like minimum or maximum values, format or units.

2.4 Inland ENC Encoding Guide

The IENC Encoding Guide initially developed by the US Corps of Army Engineers (USACE), was embraced and further enhanced by IEHG. The primary intent of the Encoding Guide is to provide 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 Inland ENC, the Encoding Guide

- provides a basis for its creation,
- describes its relationship to the real-world entity,
- provides criteria for its proper use and
- gives specific encoding examples.

In the mean time the role of the IENC Encoding Guide has been extended as a format to a check on the real-world relevancy of proposed changes or new features, attributes and/or enumerations. In plain English if a proposal by its nature does not 'fit' into the Encoding Guide it is likely not to be worth considering (see also § 4.2).

2.5 Status Of Codes For Producers And Waterways

The Status of Codes For Producers And Waterways contains codes of official Producers of IENCs, which are not mentioned in IHO S-62. The Codes for Waterways are recommended for use in the file name of IENCs.

2.6 IENC Presentation Library

S-57 data sets (ENCs) do not contain any information about how the data is going to be presented. The chart presentation is generated online in the Inland ECDIS application. For that purpose, the Inland ECDIS application uses machine-readable symbolization instructions for each feature that is drawn on the screen. For the presentation of ENCs in maritime ECDIS the IHO S-52 standard is mandatory. The S-52 standard contains all rules, which are necessary for the symbolization and presentation of ENCs on the screen.

Since the features, attributes and enumerations for ENCs were extended for Inland ENCs also an extension of the S-52 standard is necessary in order to be able to display also the Inland specific features. All extensions apply to the Edition 3.3 of the IHO ECDIS Presentation Library (Annex A of Appendix 2 of S-52). Different from maritime ECDIS the IENC Presentation Library is only mandatory for 'navigation mode' Inland ECDIS systems and only to the extent that these systems must be able to display objects according to the IHO and IENC Presentation Library, but additionally may use other presentation libraries. In this way manufacturers can gather experience with enhanced presentations to further develop the display of IENCs.

3 S-100 IENC REGISTER

3.1 Registry

The IHO S-100 Standard aims - among others - to align with the ISO/TC211 suite of standards. Perhaps the most significant aspect in terms of alignment with the ISO TC/211 standards is the employment of a "registry" containing one or more "registers" (see Figure 2).

Figure 2 The IHO Registry for S-100 will comprise a collection of registers

A "registry" is the entire information system (or location) in which a collection of registers is located. In the case of S-100, IHO will host a registry that will provide a facility to store various registers of hydrographic-related information such as feature data dictionaries, data types, and metadata.

Unlike S-57, the feature dictionaries will only consist of the definitions for features, attributes and enumerations. Binding between these definitions, units of measure, format and so on, will be included in a feature catalogue which will be specific to each product specification. Initially there will be registers for Hydrographic Information (based on the existing S-57 feature and attribute catalogues), Dynamic Ice Coverage, Nautical Publications and Inland ENCs. Other types of information that do not fit into these categories may be included in the Open ECDIS Forum (OEF) register. For each register there will be an organization that will be responsible for its content and

management. A major benefit of the registry concept is its flexibility. Multiple versions of similar entries in a data dictionary can be maintained using unique identification and classification. For instance, an entry can be classified as being either:

- *valid (latest version),*
- *superseded (previous version/s),*
- *retired (no longer recommended for use),*
- *non valid (proposed but not accepted or no longer acceptable).*

In this way product feature catalogues will reference items that will always remain valid even if a newer version of the referenced item is registered at a later date. This means that if a new item is registered or an existing item upgraded, new versions of existing product specifications are not required. Non valid items will be visible in the Registers to ensure that any future proposals for similar items have not been previously rejected. The S-100 registry entered into use in 2007 when the IHO Standardisation of Nautical publications Working group and the Inland ECDIS Harmonization Group began populating Registers with relevant information in support of Digital Nautical Publications and Inland ENCs respectively. [1]

A more detailed technical and organisational description of the present status of the S-100 Registry and Registers is given in Ch4. Since S-100 is under development this description is bound to change based on the experience that is gathered among others with the maintenance of the Inland ENC Register. It should however be noted that the Inland ECDIS community (represented by IEHG) is only one of the parties involved in the development.

Maintenance Action	Responsible person(s)	Control Body
To follow and contribute to development of S-100 Registry	*IEHG Chairs, Register Manager*	*IEHG Core Group*

3.2 Registry FDDs → Feature Catalogue → Product Specification

The previous paragraph described how the Registers among others contain the feature data dictionaries. A maritime ENC Feature catalogue will be limited to the features, attributes and enumerations in the Hydro Register. An IENC Feature catalogue on the other hand contains features, attributes and enumerations from both the Hydro Register and the IENC Register. Each feature, attribute and enumeration that is mentioned in the Encoding Guide must be listed in the IENC feature catalogue.

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[1] From: S-100: The New IHO Geospatial Standard for Hydrographic Data, Lee Alexander, Barrie Greenslade, Anthony Pharaoh and Robert Ward, March 2008

4   IENC MAINTENANCE PROCEDURES

4.1   Terms of Reference of the Inland ECDIS Expert Group and IEHG

The procedures for the maintenance of the Inland ECDIS Standard, the IENC Register and the IENC Encoding Guide are laid down in the Standard itself, the Terms of Reference of respectively the Inland ECDIS Expert Group [2] and IEHG [3] and in the Encoding Guide itself. The following paragraphs describe these procedures.

4.2   Inland ECDIS Standard Section 2

Chapter 6 of Inland ECDIS Standard Section 2 states:

This section of this edition 2.x of the standard will be updated by means of the following two documents:

Clarifications Document
This contains improvements to the wording of the standard. These are editorial amendments, which do not result in any substantive change to the standard.

Corrections and Extensions Document
This contains changes to the standard to correct factual errors and to make necessary amendments or extensions to the standard.

These documents, and the associated maintenance mechanism, do not apply to the Product Specification for Inland ENC (including its annexes). The maintenance procedure for the Product Specification for Inland ENC (including its annexes) is described in the Product Specification and its annexes.

Maintenance Action	Responsible person(s)	Control Body
To draft/ extend Clarifications Document and Corrections and Extensions Document	*Appointed Member Expert*	*Inland ECDIS expert group*

4.3   Inland ECDIS Standard Section 2 Product Specification: IEHG

Chapter 7 of the Product Specification states:

Every member of the Inland ECDIS Expert Group or the Inland ENC Harmonization Group (IEHG) is entitled to publish proposals for amendments or changes of

- this Product Specification for Inland ENCs including
- the IENC Feature Catalogue and
- the IENC Encoding Guide

on the IEHG discussion forum at http://ienc.openecdis.org. Each proposal has to contain an explanation, why the amendment or the change is needed.

Proposals for amendments of the IENC Feature Catalogue have to include a proposal for an amendment of the IENC Encoding Guide with regard to the use of these amendments.

The members of the Inland ECDIS Expert Group and the IEHG are requested to react as soon as possible. A veto against a proposal has to contain an explanation for the objection. If there is no veto within six weeks, the proposal is adopted. If there is a veto, there are the following possibilities to proceed:

The party, which has transmitted the proposal, can decide to withdraw the proposal.

If an updated proposal is transmitted, it is handled as a new proposal.

If the party, which has transmitted the proposal, wants to keep up the original proposal without any changes, the proposal will be discussed and decided upon at the next meeting of the IEHG.

The members of the IEHG discussion forum, who have actively participated in the development of the Product Specification and its annexes within the twelve months before a meeting of the IEHG, are entitled to take part in this meeting.

Each new version of the Feature Catalogue for Inland ENC results in a new version of the Product Specification for Inland ENCs.

Maintenance Action	Responsible person(s)	Control Body
To produce a new Feature Catalogue and Product Specification	*Appointed Member Expert*	*IEHG Core Group*
To amend the Encoding Guide for IENCs	USACE	IEHG Core Group

4.4   IENC Encoding Guide: IEHG

The procedure for changes to the Encoding Guide are described in Section A of the Encoding Guide:

The IENC Encoding Guide is a living document capable of accommodating necessary changes that will allow it to accommodate future Inland ENC requirements and development. As such, some procedures have been established for making changes.

A) Proposals for copied and new object classes, attributes and attribute values
Proposals for copied and new object classes, attributes and attribute values need a formal decision by IEHG according to the following steps:

1. Registration at the OEF [http://inland.openecdis.org/].

2. Publication of the proposal including the necessary changes in the Encoding Guide on the Inland ECDIS discussion forum on the OEF.

3. Discussion and decision at a meeting of the IEHG.

B) Proposals for all the other changes and amendments
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:

1. Posting of the proposal (using the proposal form) on the IEHG discussion forum on the OEF by a member of the IEHG.

2. If there are recommendations on how to improve the proposal, the amended proposal is regarded as a new one.

3. If there is no veto within six (6) weeks, the amendment is considered adopted. It then:

4. Is included in the working version of the Encoding Guide that is available on the OEF

5. Can be used by everyone

6. Will be included in the next official edition of the Encoding Guide

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

Formal decisions of the IEHG may result in issuing a new edition of the Encoding Guide (e.g., Edition 1.0 à Edition 2.0). However, working documents will be considered versions to an existing Edition (e.g., Edition 1.0 à 1.1). The current edition as well as the latest version will both be available at the OEF, together with a history of changes.

Maintenance Action	Responsible person(s)	Control Body
To amend the Encoding Guide for IENCs	USACE	IEHG Core Group

4.5 Procedures for Changes of the Appendices: EC Regulation

The procedures for changes to the Appendices of the Inland ECDIS standard will in some aspects differ in the European Commission Regulation defining the technical specifications for the electronic chart display and information system (Inland ECDIS) in accordance with Directive 2005/44/EC of the European Parliament and the Council. The procedures will be described in Chapter 6, Data Standard of Section 2 of the Regulation and read as follows:

Proposals for amendments of Appendix 1 Product Specification for Inland ENCs and its Appendices 1.1 and 1.2, Inland ENC Feature Catalogue and Inland ENC Encoding Guide shall be submitted at http://ienc.openecdis.org. They shall contain an explanation why the amendment is needed.

Proposals for amendments of Appendix 1.1 Inland ENC Feature Catalogue shall include a proposal for an amendment of Appendix 1.2 Inland ENC Encoding Guide with regard to the use of these amendments. Each new version of the Feature Catalogue for Inland ENC results in a new version of the Product Specification for Inland ENCs.

The chairperson of the Inland ECDIS Expert Group shall inform the European Commission accordingly.

As regards the Inland ECDIS Expert Group and the Inland ENC Harmonisation Group, the amendment procedure as defined in their respective Terms of Reference shall apply.

The European Commission will proceed with the amendment in accordance with the relevant procedure established in Directive 2005/44/EC. In this context, one shall take due account of the conclusions of the Inland ECDIS Expert Group and the Inland ENC Harmonisation Group.

If a proposal for amendment is adopted, the relevant updated documents are uploaded at http://ec.europa.eu/transport/iw/index_en.htm and at http://ienc.openecdis.org.

Maintenance Action	Responsible person(s)	Control Body
To produce a new Feature Catalogue and Product Specification	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
To amend the Encoding Guide for IENCs	USACE	IEHG Core Group

4.6 Inland ENC Register

The management of the IENC Register is described in Annex B of the Terms of Reference of the IEHG. It closely follows the procedure as has been proposed but adapted for the IENC situation:

1. Any participant of the Inland ENC Harmonization Group can submit a proposal to the Inland ENC Register. But, the proposal must:

    a. be in an established format (available on the OEF Website)

    b. describe how the new object (or feature) will be accommodated in the IENC Encoding Guide

2. The Inland ENC Register Manager(s):

    a. Reviews the submitted proposal for completeness, and may request additional information/clarification from the Proposer. The proposal is also distributed to IEHG Core Group (Control Body) and other Register Managers for review/comment.

    b. Officially posts the proposal on the Inland ENC Register. It is initially flagged as NOT-VALID.

    c. Places the proposal on the IENC Discussion Forum (on the OEF website) to start discussion about the proposal.

    d. This process should be completed within 14 days.

3. Approval Process (6 weeks):

    a. If a consensus is reached to accept, the proposal is then flagged as VALID.

    b. If no consensus is achieved, it remains flagged as NOT-VALID.

    c. When not adopted:

        i. the submitter can decide to withdraw the proposal

        ii. the proposal can be revised and re-submitted

        iii. any participant of the IEHG can ask that the proposal be considered at the next annual meeting of the IEHG

    d. The Inland ENC Register Manager announces the outcome on the IENC Discussion Forum.

Participants:

Register Owner: IEHG
Register Manager: Appointed by IEHG
Register Users: Anyone interested in Inland ENCs
Control Body: IEHG core group
Submitting Organization: IEHG
Proposers: Any IEHG participant

The Register Manager is responsible for the administration of a register. Since the IENC Register is the official test bed of the IHO Register the managing tasks mainly are:

- Coordinating with other Register Managers, Submitting Organizations, related Control Body, and Register Owner.
- Maintaining items within the register.
- Maintain and publish a List of Submitting Organisations.
- Distributing an information package containing a description of the register and how to submit proposals.
- Providing periodic reports to the Register Owner. Each report shall describe the proposals received and the decisions taken since the last report. The interval between those reports must not extend 12 months.

The coordinating role of the Register Manager involves among others coordinating with other Register Managers whether an IENC proposal is overlapping with other developments, whether it belongs in the IENC Register or in one of the other Registers. Vice versa the coordinating role comprises checking the influence on and compatibility with Inland ENCs/ Inland ECDIS of proposals for the other Registers. Furthermore it involves consultation with the Registry Manager, the other Register Managers, the Control Body and the Register Owner on the S-100 Registry developments.

Maintenance Action	Responsible person(s)	Control Body
To review a submitted proposal for completeness *To request additional information/clarification from the Proposer.* *To distribute proposals to IEHG Core Group (Control Body) and other Register Managers for review/comment* *To input the proposal on the Inland ENC Register (flagged NOT-VALID)* *To flag input VALID if consensus has been reached* *To announce outcome on Open ECDIS Forum*	*Register Manager*	*IEHG Core Group*
To coordinate with other Register Managers, Submitting Organizations, related Control Bodies, and Register Owners *To maintain and publish List of Submitting Organisations* *To distribute an information package containing a description of the register and how to submit proposals* *To provide periodic reports to Register Owner*	*Register Manager*	*IEHG Core Group*

5 NON-EDITORIAL TASKS

5.1 Overview

Besides the documents of the Inland ECDIS Standard there is an appendix that contains the status of those parts of the Inland ECDIS Standard, which are provided in digital form on the official IENC Homepage.
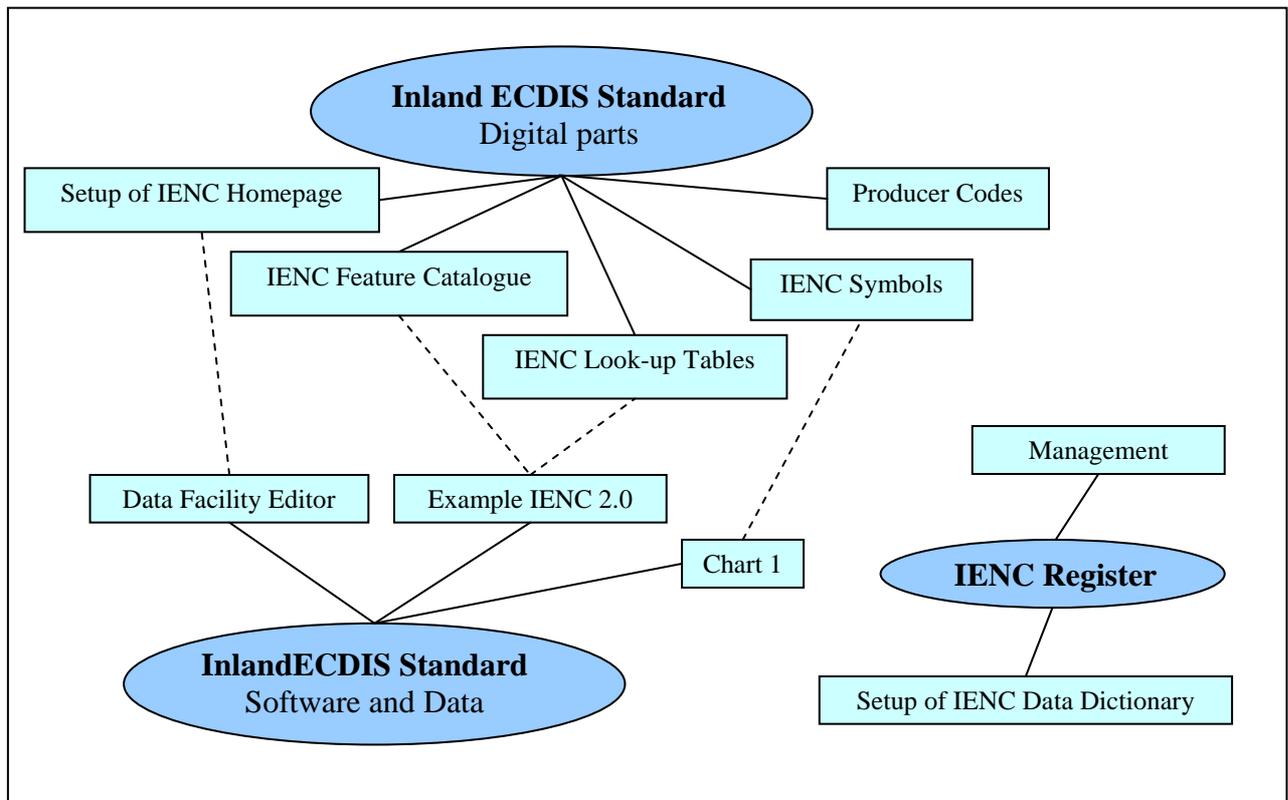
5.2 IENC Homepage

All parts of the current Inland ECDIS Standards, the documents as well as the digital parts, are published at http://ienc.openecdis.org. The homepage provides the possibility to download all documents and files.

Additionally the homepage serves as a central place for the provision of any Inland ECDIS expert group related documents, e.g. minutes.

The maintenance comprises of the introduction of new sides in case of a new edition of the Inland ECDIS Standard and the updating of the downloadable documents and files.

Maintenance Action	Responsible person(s)	Control Body
To maintain the IENC Homepage	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*

5.3 IENC discussion forum

The maintenance of the Inland ECDIS Standard is a bottom-up process. Changes of the standard are a result of experience with encoding or using IENCs. Encoders find errors in the standard or have problems with encoding real-world situations in IENCs. Or feedback from users indicates important information missing in ENCs or existing encoding solutions unsatisfactory.

Feedback with regards to the encoding of IENCs is provided to IEHG. IEHG meets once per year. However, most of the work is accomplished via e-mail correspondence. To this end there are two e-mail based discussion forums:

A forum for general discussions on inland ENCs is found on:

- Subscription: http://www.ienc.openecdis.org/cgi-bin/mailman/listinfo/ienc,
- Archive: http://ienc.openecdis.org/pipermail/ienc/

and 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

Maintenance Action	Responsible person(s)	Control Body
To provide technical support for IENC e-mail based discussion forums	*Appointed Member Expert*	*IEHG Core Group*
To moderate general IENC discussion forum	IEHG Chairs	IEHG Core Group
To moderate IENC Change Requests forum	*Register Manager*	*IEHG Core Group*

5.4 IENC Feature Catalogue

A revised IENC Feature Catalogue (FC) has to be created by collecting all features, attribute and enumerations of the IENC Encoding Guide. The FC is provided in XML format. Additionally to the XML file an xml schema definition file (XSD) has to be created. For a printable output of the XML FC a style sheet file (XSL) has to be created as well.

Maintenance Action	Responsible person(s)	Control Body
To revise the IENC Feature Catalogue and produce new versions of XML, XSD and XSL files	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*

5.5 IENC Look-up Tables

Revised IENC Look-up Tables have to be created in the S-52 ascii format.

Maintenance Action	Responsible person(s)	Control Body
To produce revised IENC Look-up Tables	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*

5.6 IENC Symbols

New or revised symbols that are introduced for the Inland ECDIS Standard have to be created as raster symbols in the S-52 ascii format.

Maintenance Action	Responsible person(s)	Control Body
To produce new or revised IENC symbols	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*

5.7 Producer Codes

A list of all producer codes has to be created in XML format. Additionally to the XML file an xml schema definition file (XSD) has to be created.

Maintenance Action	Responsible person(s)	Control Body
To produce a revised list of Producer Codes XML file. To produce and maintain the XSD file.	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*

5.8 Software and Data

Following software and data do not necessarily belong to the Inland ECDIS Standard itself but provides vital support for Type Approval Organisations, application builders or IENC producers.

5.8.1 Data Facility Editor

The Data Facility Editor (DFE), developed in the 5th Framework Project COMPRIS, is made available on the IENC Homepage and needs to be maintained. The DFE is a form in which the necessary information for the external "time schedule" and "contact information" files can be typed in and exported to an XML file using a standardized schema. This guarantees that these files can be displayed by each application in the same way using a standardized style sheet. Additionally to the xml files the necessary xml schema definition files (XSD) and the style sheet files (XSL) have to be provided.

Maintenance Action	Responsible person(s)	Control Body
To maintain the Data Facility Editor and publish revised versions on the IENC Homepage.	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*

5.8.2 Example IENC

An Example IENC with all features and their different attributes and enumerations has to be created. Additionally this IENC will contain links to external files (see 3.1) and the external files themselves.

This example IENC is necessary for the standardization work (testing and verification of the Feature Catalogue (see 2.3) and the Look-up Tables (see 2.6)) and for the type approval of applications.

Maintenance Action	Responsible person(s)	Control Body
To maintain the Example IENC and publish revised versions on the IENC Homepage.	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*

5.8.3 Chart 1

The Chart 1 is a collection of IENCs that are used to show the user all existing symbols in a sorted order like in a legend. This Chart 1 is also necessary for testing and verification of the IENC symbols (see 2.6).

Maintenance Action	Responsible person(s)	Control Body
To maintain the IENC Chart 1 and publish revised versions on the IENC Homepage.	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*

6 DIVISION OF TASKS

6.1 General

Following is a summary of the necessary tasks for the maintenance of the IENC and Inland ECDIS Standard and the responsible persons. The tasks in black require no action. **The tasks in *blue italics* require a sustainable solution.**

With regard to the Register Manager and the Appointed Expert Member it is important to note that owing to the strong relation to safety of navigation of the IENC standard these positions - lacking day to day supervision - require a great amount of trust and therefore are appointed by, casu quo need consent from the relevant Control Body.

6.2 Summary of task

Maintenance Action	Responsible person(s)	Control Body
To provide technical support for and maintain the IENC Homepage	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
To provide technical support for IENC e-mail based discussion forums	*Appointed Member Expert*	*IEHG Core Group*
To moderate general IENC discussion forum	IEHG Chairs	IEHG Core Group
To moderate IENC Change Requests forum	*Register Manager*	*IEHG Core Group*
To review a submitted proposal for completeness *To request additional information/clarification from the Proposer.* *To distribute proposals to IEHG Core Group (Control Body) and other Register Managers for review/comment* *To input the proposal on the Inland ENC Register (flagged NOT-VALID)* *To flag input VALID if consensus has been reached* *To announce outcome on Open ECDIS Forum*	*Register Manager*	*IEHG Core Group*
To draft/ extend Clarifications Document and Corrections and Extensions Document	*Appointed Member Expert*	*Inland ECDIS expert group*
To amend the Encoding Guide for IENCs	USACE	IEHG Core Group
To produce a new Feature Catalogue and Product Specification	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
To revise the IENC Feature Catalogue and produce new versions of XML, XSD and XSL files	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
Maintenance Action	Responsible person(s)	Control Body

To produce revised IENC Look-up Tables	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
To produce new or revised IENC symbols	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
To produce a revised list of Producer Codes XML file. To produce and maintain the XSD file.	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
To maintain the Data Facility Editor and publish revised versions on the IENC Homepage.	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
To maintain the Example IENC and publish revised versions on the IENC Homepage.	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
To maintain the IENC Chart 1 and publish revised versions on the IENC Homepage.	*Appointed Member Expert*	*Inland ECDIS expert group/ IEHG Core Group*
To coordinate with other Register Managers, Submitting Organizations, related Control Bodies, and Register Owners *To maintain and publish List of Submitting Organisations* *To distribute an information package containing a description of the register and how to submit proposals* *To provide periodic reports to Register Owner*	*Register Manager*	*IEHG Core Group*
To follow and contribute to development of S-100 Registry	*IEHG Chairs, Register Manager*	*IEHG Core Group*

REFERENCES

[1] S-100: The New IHO Geospatial Standard for Hydrographic Data, Lee Alexander, Barrie Greenslade, Anthony Pharaoh and Robert Ward, March 2008

[2] Terms of Reference Inland ECDIS Expert Group February 2008

[3] Terms of Reference Inland ENC Harmonization Group October 2006

**ANNEX 1   S-100 - IHO GEOSPATIAL STANDARD FOR MARINE DATA
                 AND INFORMATION VERSION 0.0.3**