# ENC UPDATING WORKING GROUP
# (EUWG)

[A Working Group of the Hydrographic Services and Standards Committee - HSSC]

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|---|---|
| Chairman: | Yves Le Franc (SHOM) |
| Vice-Chairman: | Richard Coombes (UKHO) |

**EUWG Letter: 02/2011**

Date 1$^{st}$ June 2011

**To EUWG Members**
**To TSMAD Chair**
**To DIPWG Chair**

**Subject: drafts for new editions of S-65 and S-52 Appendix 1**

Dear Colleagues,

Following answers to EUWG letters 01/2010, 02/2010, 03/2010 and 01/2011, I have prepared a draft for a new edition of S-65 and a draft for a new edition of S-52 Appendix 1.

- Draft for a new edition of S-65 (Annex A).

This draft incorporates EUWG recommendations for ENC production (see changes highlighted in yellow and comments in Annex A). The recommendations have been established from the summary of responses to letter 02/2010 and letter 01/2011 (Annex B).

Other EUWG recommendations for ENC production are relevant for Encoding Bulletins, UOC or S-57 clarifications. They are identified in Annex B. I bring them to the attention of TSMAD for further actions.

The draft of S-65 also incorporates transfers from S-52 Appendix 1 taking into account responses to letter 03/2010 (Annexe C). An important part is related to the distribution of ENCs, especially for ENC updating as it was the scope of the current Appendix 1 (mainly paragraphs 2 and 3). As the harmonization of practices of the two RENCs PRIMAR and IC-ENC is subject to an ongoing work, the description of the functions that a RENC operates is not more detailed.

The terminology of the Appendix 1 model that has become useless has been removed. Independently of our work, some other parts of S-65 will be transferred into unfrozen UOC by TSMAD (AU leads). As a consequence, the draft will be amended later, when the new UOC is approved.

- Draft for a new edition of S-52 Appendix 1 (Annex D).

Once the above transfer "S-52 Appendix 1 to S-65" is operated, it is proposed to only keep paragraph 3.4 (ECDIS manufacturers) with a new introduction. Paragraph 3.4 is almost unchanged because a lot of its elements are precisely quoted in IEC 61174 and it is

not in the intention of EUWG to review ECDIS requirements or to impact IEC 61174 by changing paragraph references.

After having examined and compared the terminology used in paragraph 3.4 and in IEC 61174 and MSC 232(82), it seems that S-32 (IHO Dictionary) is sufficient, noting that the main document of S-52 also refers to S-32 for terminology. Then, the glossary and other definitions in the appendix have been removed. As a result, the new edition of Appendix 1 will only deal with acceptance and management of updating data by the ECDIS. It may be more suitable for maintenance by DIPWG, like the rest of S-52.

I would be grateful if you would examine the two drafts and give me back your comments ("reply to all" mode). Please send your replies **by 1st July 2011.**


Yours sincerely,

Yves Le Franc,
Chairman

Annex A: Draft for a new edition of S-65

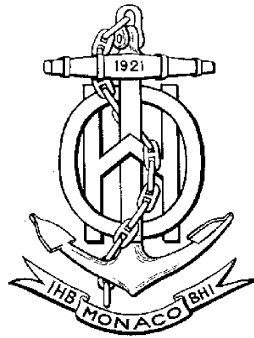Annex B: Summary of responses to 02/2010 and letter 01/2011 – Conclusions

Annex C: Summary of responses to EUWG letter 03/2010
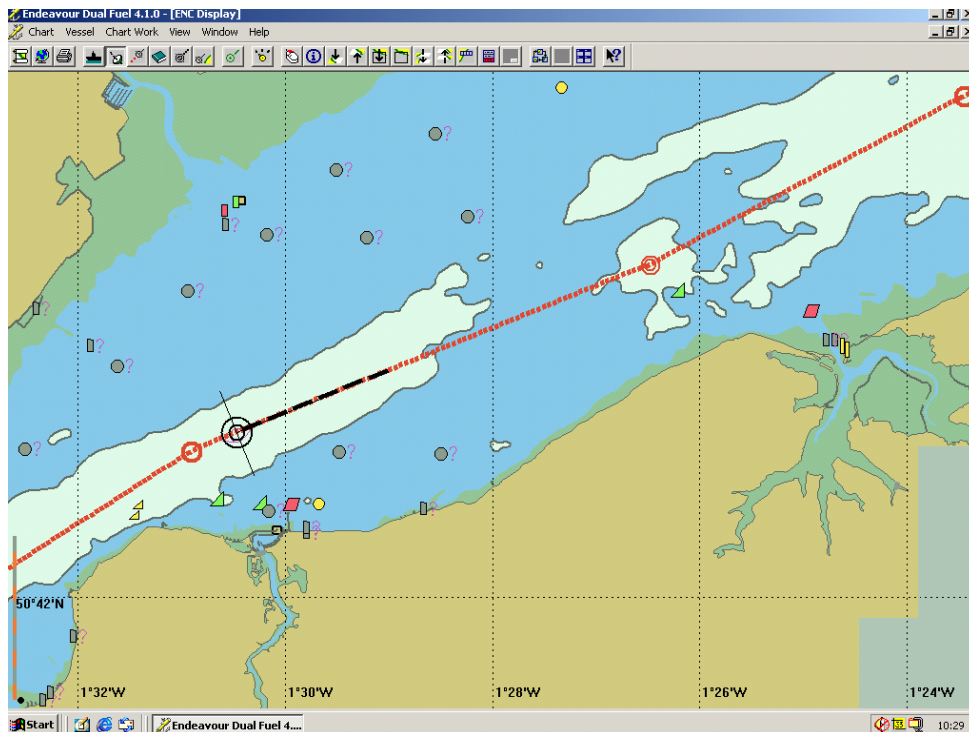
Annex D: Draft for a new edition of S-52 Appendix 1

**INTERNATIONAL HYDROGRAPHIC ORGANIZATION**

# ELECTRONIC NAVIGATIONAL CHARTS (ENCs)

# "PRODUCTION, MAINTENANCE AND DISTRIBUTION GUIDANCE"



**A guide to the requirements and processes necessary to produce, maintain and distribute ENCs**

**IHO Publication S-65**

**Edition 2  month year**

# CONTENTS

# Introduction

## Purpose and Scope

**This document provides a high level guide to the production, maintenance and distribution of Electronic Navigational Charts (ENCs). It offers a framework to inform hydrographic offices of the processes and requirements necessary to produce, maintain and distribute ENCs. It provides references to documentation which can support each stage of the process. It is not intended to serve as a technical reference manual but to enable hydrographic offices to gain an overview of ENC production processes, and the requirements and procedures that need to be in place to set up an ENC production facility.**

## References

### Standards and Conventions

| | |
|---|---|
| A | IHO S-52, "Specifications for Chart Content and Display Aspects of ECDIS" |
| B | IHO S-57, "IHO Transfer Standard for Digital Hydrographic Data" |
| C | IHO S-58, "Recommended ENC Validation Checks" |
| D | IHO S-62, "ENC Producer Codes" |
| E | IHO S-63, "IHO Data Protection Scheme" |
| F | IHO M-3, "Resolutions of the IHO", Resolution K2.19, Principles of the Worldwide Electronic Navigational Chart Database (WEND). |
| G | IHO S-4, "Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO" |
| H | IHO S-8, FIG/IHO/ICA 'Standards of Competence for Nautical Cartographers' |
| I | IMO Resolution A.817 (19), as amended by MSC.64 (67) and MSC.86 (70), Performance Standards for Electronic Chart Display and Information Systems (ECDIS). |
| J | IMO Convention on the Safety of Life at Sea (SOLAS), 2009 |
| K | IHO S-66, "Facts about electronic charts and carriage requirements" |

### Indicative Documentation

| | |
|---|---|
| L | UKHO ENC Product Specification |
| M | UKHO ENC Data Capture Specification |
| N | UKHO ENC Training Documentation and Job Descriptions |
| O | UKHO Quality Procedures for the production of ENCs |
| P | Guidelines for the Implementation of the WEND Principles |

The UKHO can make References L & M and the overview elements of References N & O available on request; due to their complexity more detailed elements of the latter pair would typically form part of the documentation provided as part of an overall training/support package and would be considered on an individual basis.

In addition, various HOs have established their own specifications; certain of them are available.

## Abbreviations

ENC      Electronic Navigational Chart
ECDIS    Electronic Chart Display and Information System
HO       Hydrographic Office
IHO      International Hydrographic Organization
IMO     International Maritime Organization
QMS     Quality Management System
RENC    Regional ENC Coordinating Centre
SOLAS   Convention on the Safety of Life at Sea
WEND   Worldwide ENC Database

# What is an ENC?

## Digitised Data

Electronic Navigational Charts (ENCs) consist of digitised data conforming to the IHO's S-57 ENC Product Specification that records all the relevant charted features necessary for safe navigation, such as coastlines, bathymetry, buoys, lights, etc. The basic unit of geographic coverage (analogous to a paper chart) is termed a cell.

An Electronic Chart Display and Information System (ECDIS) will convert the ENC and its updates into a System ENC (SENC) in an internal format optimised for efficient display.

Within the ECDIS, the features and their attributes (e.g. position, colour, shape) can be selectively displayed and queried, creating the potential to manipulate the chart image displayed on screen. The figures below show various levels of detail displayed from the same cell:

This not only provides ENC users with control over what level and type of
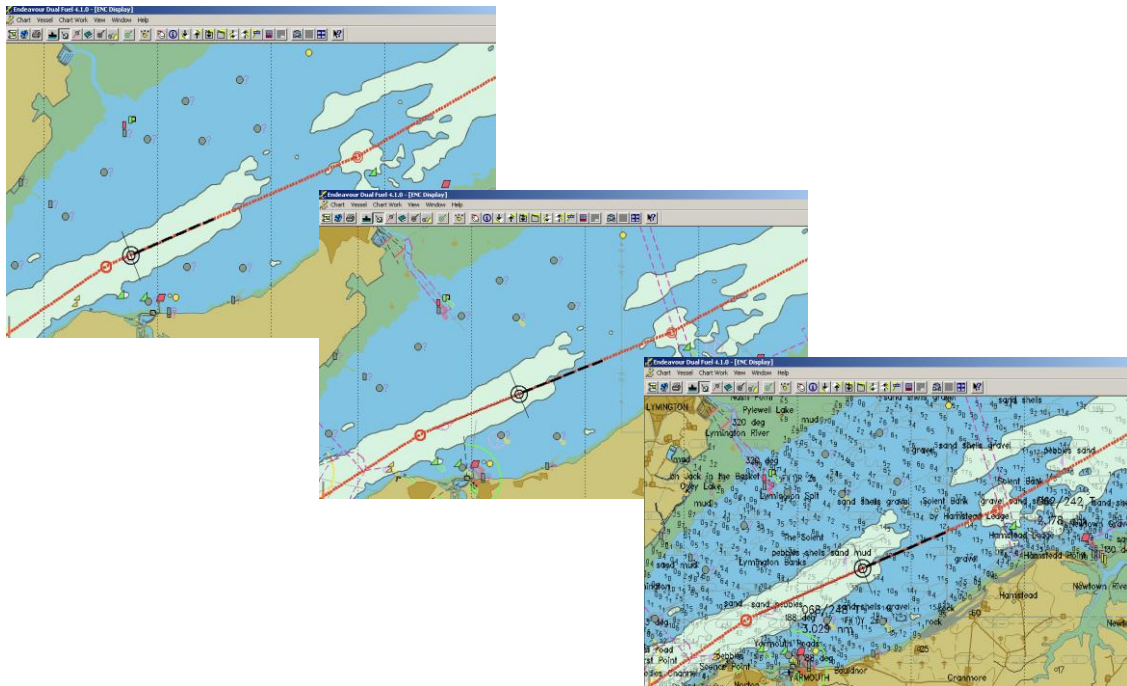


detail they wish to see, but can also be linked to other onboard systems to provide additional features such as automatic warning alarms and indications.

## S-52 Display Standard

While S-57 defines what information can be encoded and how it is to be structured, it says nothing about how that data can be displayed. When ENC data is used in an ECDIS, this is defined within S-52. This specifies not only the symbology to be used but also the full range of conditional rules that govern their use.

## Official Vector Charts

ENCs are official vector-based electronic charts designed to meet the relevant chart carriage requirements of the Safety of Life At Sea (SOLAS) convention.

When displayed within certain parameters, and using a type approved ECDIS, ENCs fully satisfy SOLAS chart carriage requirements, and so can be used as the primary means of navigation.

## Relevant Regulations

The SOLAS convention of the International Maritime Organization (IMO) includes a number of pertinent requirements:

❑ That nations publish nautical information necessary for safe navigation; this includes systematic updating with all necessary safety-critical information

❑ That ships shall carry nautical charts and that use of an ECDIS meets this requirement. It also notes that such charts (paper or electronic) shall be "issued by or on behalf of a Government authorized hydrographic office or other relevant government institution"; in other words they must be 'official charts'.

The IMO's ECDIS Performance Standard further mandates that "The chart information to be used in ECDIS should be the latest edition of that originated by a government authorized hydrographic office, and conform to IHO standards."

In order to be a legal equivalent of paper charts, the ECDIS must be type-approved in accordance with Standard 61174 of the International Electrotechnical Commission (IEC).

## Hydrographic Office Responsibilities For Producing ENCs

The responsibilities of Hydrographic Offices (HOs) for the production and distribution of ENCs are defined in the WEND (Worldwide Electronic Navigational Chart Database) principles. (M-3, Resolutions of the IHO). These note that :

> "The purpose of WEND is to ensure a world-wide consistent level of high-quality, updated official ENCs through integrated services that support chart carriage requirements of SOLAS Chapter V, and the requirements of the IMO Performance Standards for ECDIS."

HOs are responsible for:

❑ The preparation and provision of digital data and its subsequent updating for waters of national jurisdiction.

❑ Ensuring that, mariners, anywhere in the world, can obtain fully updated ENCs for all shipping routes and ports across the world and that their ENC data are available to users through integrated services.

❑ Assuring the high quality of its ENC services through the use of a Quality Management System that is certified by a relevant body as conforming to a suitable recognised standard; typically this will be ISO 9001:2000.

❑ Ensuring compliance with all relevant IHO and IMO standards and criteria (including IHO S-57, IHO S-52, or their replacements).

❑ Providing timely updates to the ENC for the mariner; these should be at least as frequent as those provided by the nation for correction of paper charting.

Reference is made throughout this document to the relevant WEND principles that support some of the stages of the ENC production processes.

For full details of the WEND principles refer to M-3 - Resolutions of the IHO, Resolution K2.19, Principles of the Worldwide Electronic Navigational Chart Database (WEND).

Note should also be taken of the 'Guidelines for the Implementation of the WEND Principles'[1] agreed by the WEND Committee in 2008 and available on the IHO Website.

**Useful References:**      S-66 - Facts about electronic charts and carriage requirements[2]; (Plus those documents listed above).
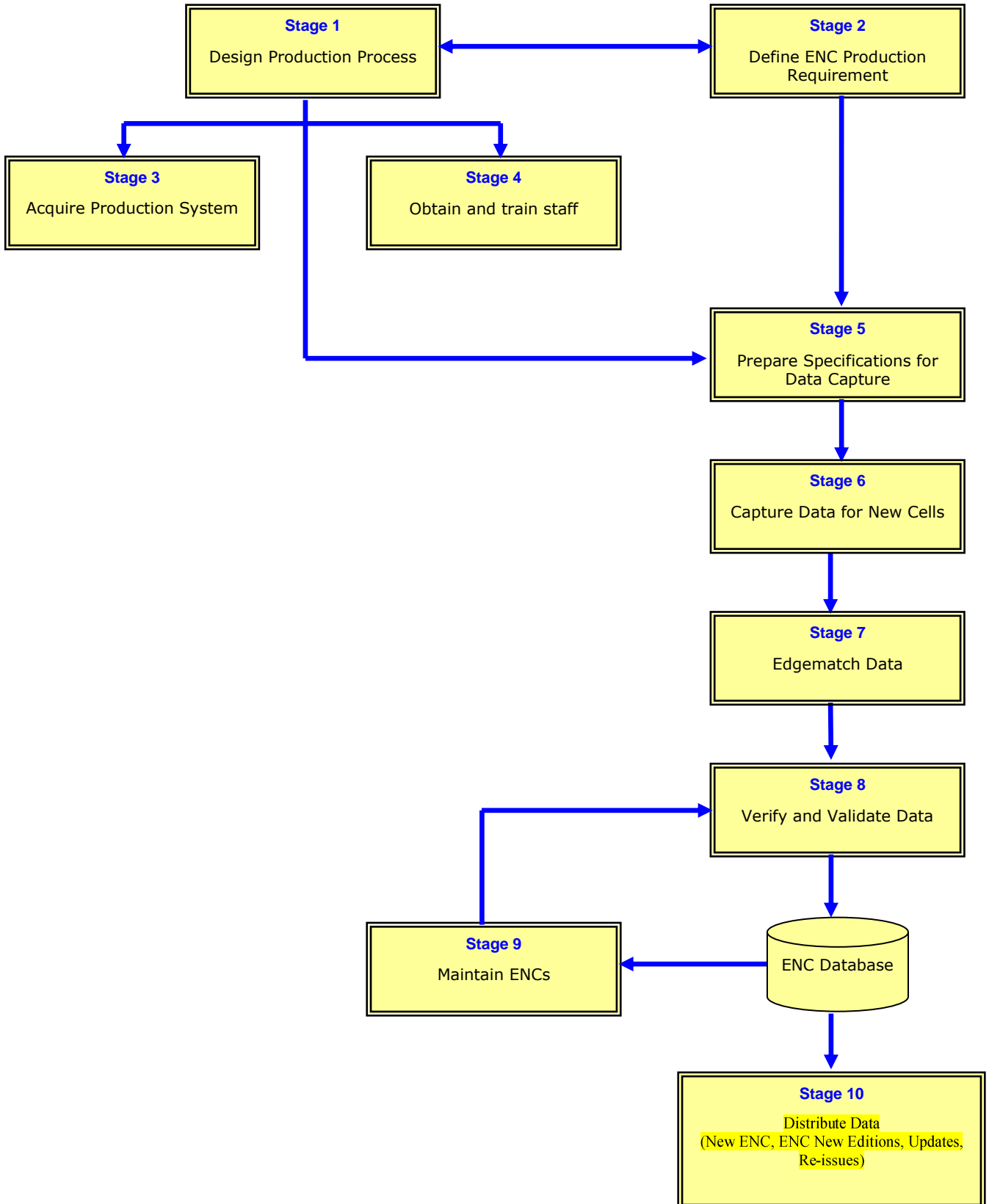
## Flow Chart

A flow chart detailing each stage of the process is shown overleaf.

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[1] Reference P
[2] Reference K

# Key Stages in the Production of ENC

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┌─────────────────────────┐          ┌─────────────────────────┐
│        Stage 1          │ ◄──────► │        Stage 2          │
│                         │          │                         │
│ Design Production Process│          │  Define ENC Production  │
│                         │          │      Requirement        │
└─────────────────────────┘          └─────────────────────────┘

┌─────────────────────────┐   ┌─────────────────────────┐
│        Stage 3          │   │        Stage 4          │
│                         │   │                         │
│ Acquire Production System│   │   Obtain and train staff │
└─────────────────────────┘   └─────────────────────────┘

                              ┌─────────────────────────┐
                              │        Stage 5          │
                              │                         │
                              │ Prepare Specifications for│
                              │      Data Capture       │
                              └─────────────────────────┘

                              ┌─────────────────────────┐
                              │        Stage 6          │
                              │                         │
                              │ Capture Data for New Cells│
                              └─────────────────────────┘

                              ┌─────────────────────────┐
                              │        Stage 7          │
                              │                         │
                              │     Edgematch Data      │
                              └─────────────────────────┘

                              ┌─────────────────────────┐
                              │        Stage 8          │
                              │                         │
                              │   Verify and Validate Data│
                              └─────────────────────────┘

┌─────────────────────────┐   ┌─────────────────────────┐
│        Stage 9          │ ◄─│      ENC Database       │
│                         │   │                         │
│     Maintain ENCs       │   └─────────────────────────┘
└─────────────────────────┘

                              ┌─────────────────────────┐
                              │        Stage 10         │
                              │                         │
                              │     Distribute Data     │
                              │ (New ENC, ENC New Editions, Updates,│
                              │        Re-issues)       │
                              └─────────────────────────┘
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# ENC PRODUCTION AND DISTRIBUTION GUIDANCE

## STAGE 1 – Design Production Process

### STEP 1 – Production Method

- Before the production process can be designed, it has to be decided which source material will be used for the ENCs.

  ENCs can be encoded directly from original survey material, databased information, from existing paper charts or a combination of each.
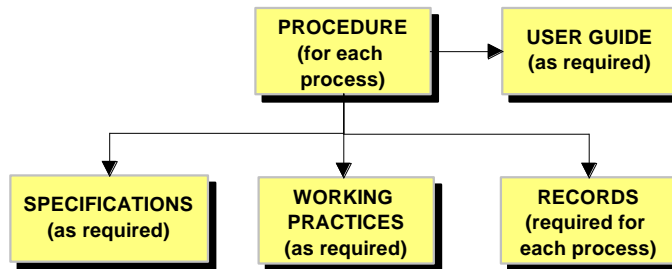
  The decision as to which source material will be used will depend on several factors:

  - The quality and format (i.e. digital or analogue) of existing survey data. For example it may be more efficient and prudent to produce ENCs only from surveys completed to modern surveying standards.

  - The availability of accurate transformations for existing information to WGS-84 where required.

  - The existence of, or facilities to produce, rectified raster images of existing charts.

- Once it has been decided which source material will be used, a production process needs to be designed and a Quality Management System (QMS) for ENC developed to interface with existing production processes.

- Any production process will be dependent on whether the Data Capture is to be carried out 'in house' or under contract – see Stages 5 & 6. This decision must be based on the in house production capacity, number of cells to be captured, required timescales, available staff and IT resources, and funding. Each has its own advantages and disadvantages. These include:

  - In house capture should provide a more flexible solution but may require a longer lead time for staff training and may have resourcing issues where a large team is needed for initial capture and a much smaller team to maintain the service thereafter.

  - Contracting out the work should reduce the costs of basic capture, however the time necessary to put the contract in place should not be underestimated nor the effort required to support it; also final validation needs to be carried out by the HO taking responsibility for the product.

- Options such as using external resources to provide an initial 'bulk load' - see Stage 2 - with all further capture and maintenance carried out in-house should be considered.

- Consideration should be given to ensure that the publication of ENCs and updates is co-incident with the publication of the equivalent paper chart information.

## STEP 2 – A Quality System

🔷 Procedures should be put in place to ensure that each stage of the production process is carried out correctly and consistently. These should be approved by a relevant body as conforming to a suitable recognised standard; typically this will be ISO 9001:2000.

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                  ┌─────────────┐        ┌─────────────┐
                  │  PROCEDURE  │───────▶│  USER GUIDE │
                  │  (for each  │        │ (as required)│
                  │  process)   │        │             │
                  └─────────────┘        └─────────────┘
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         ┌───────────────┼───────────────┐
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 │ SPECIFICATIONS│ │   WORKING    │ │   RECORDS    │
 │ (as required) │ │  PRACTICES   │ │ (required for│
 │              │ │ (as required)│ │ each process)│
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**ENC PROCESS DOCUMENTATION**

🔷 The production of ENCs demands a high level of quality control and quality assurance. It is important to bear in mind the difference between these two concepts:

➢ Quality Control – those checks made on a product after production;

➢ Quality Assurance – the overall set of processes, of which Quality Control forms a part, designed to ensure that a product is produced correctly and without errors.

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*The IHO WEND principles* state the following with reference to Standards and Quality Management:

❖ A Quality Management System should be considered to assure high quality of ENC services. When implemented, this should be certified by a relevant body as conforming to a suitable recognised standard; typically this will be ISO 9001:2000.

❖ There must be conformance with all relevant IHO and IMO standards.

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**Useful References:**      UKHO Quality Procedures

## STAGE 2 – Define ENC Production Requirement

### STEP 1 – Identify Requirements

- While each nation has the responsibility for ENCs in its own waters, many aspects of the overall service to the mariner will be improved through their working within the relevant Regional Hydrographic Commission (RHC). This will expedite the completion of small scale coverage and the agreement of cell boundaries between nations. The WEND Task Group recommended that RHCs should:

  - Identify key shipping routes and ports within their regions
  - Identify charts covering these routes and ports to be captured as ENCs
  - Identify producer nations for the ENCs
  - Arrange for their production

  Wherever possible ENCs should be based on INT charts and the producer nations for the ENCs should be the same as the producer nations for the corresponding INT charts.

  If ENCs are to display correctly in an ECDIS it is especially important that there is no overlap of data within the same navigational purpose band. The ENC Product Specification[3] makes it clear that such overlap must not occur. See also section 11 of Annex A.

  In addition to the agreement of boundaries, it is important that neighbouring nations agree, where possible, factors such as use of SCAMIN, contour intervals etc to provide a seamless depiction when possible.

### STEP 2 – Produce Production Plan

- A national production plan then needs to be compiled to define:

  - which geographic areas are to be captured – note that this relates to actual areas of data coverage rather than the rectangular cell limits.
  - which navigational purposes are to be populated for each area
  - how the areas are to be divided into cells for each navigational purpose
  - the order of capture; e.g. larger scale cells first

- The production plan will be dependent on some of the following factors:

  - The reason for the requirement – Defence / SOLAS
  - Priority given to major ports and traffic routes, based on volumes of goods and number of passengers
  - Liaison with bordering countries to maximise production, improve efficiency and coverage, and to ensure cross-border consistency
  - Design considerations outlined below.

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[3] Reference B, Appendix B.1

***The IHO WEND principles*** also state the following with reference to responsibility and ownership.

❖ SOLAS Chapter V, Regulation 9, requires Contracting Governments to ensure that hydrographic data are available in a suitable manner in order to satisfy the needs of safe navigation. Once the carriage of ECDIS becomes mandatory, there will be a consequential requirement to ensure that such data, as agreed by IMO, are available in a form suitable for use in ECDIS.

❖ It is expected that Member States, for waters of national jurisdiction, will have mature supply systems for ENCs and their subsequent updating in place by the earliest date for mandatory carriage of ECDIS.

❖ By the dates established by IMO , Member States will strive to either:

    a   Provide the necessary ENC coverage, or

    b   Agree with other States to produce the necessary ENC coverage on their behalf.

    IHO will address overall coverage on a regional basis through Regional Hydrographic Commissions.

❖ The INT chart system is a useful basis for initial area selection for producing ENCs.

❖ Responsibilities for providing digital data outside areas of national jurisdictions must be established.

❖ In producing ENCs, Member States are to take due account of the rights of the owners of source data and if paper chart coverage has been published by another Member State, the rights of that State.

❖ Responsibility for the production of ENCs can be delegated in whole or in part by a country to another country, which then becomes the producing country in the considered area.

❖ When the limits of waters of national jurisdiction between two neighbouring countries are not established, or it is more convenient to establish boundaries other than established national boundaries, producing countries are to define the boundaries for ENC production within a technical arrangement. These limits would be for cartographic convenience only and shall not be construed as having any significance or status regarding political or other jurisdictional boundaries.

❖ In international waters, the INT chart producer nation shall be assumed to be the producer of the corresponding ENC. Where the offshore limits of waters under national jurisdiction have not yet been established, the clause above should apply.

❖ In areas where the paper INT charts overlap, neighbouring producer nations should agree a common limit of ENC production in the overlapping areas. Cartographic boundaries should be as simple as possible, for example: a succession of straight segments and turning points corresponding to such things as meridians, parallels, or chart limits. Where different producer nations are responsible for INT coverage of the same area at different scales, those nations should agree on a suitable set of boundaries so as to provide the user with the most coherent service possible.

**Useful Reference**:        Guidelines for the Implementation of the WEND Principles

# Cell Schema Design Considerations

## *Limits of ENC Cells*

🔹 The HO has to decide how the limits of the planned ENC cells should be defined. The limits can be based on the existing limits of paper charts, or be defined by a rectangular grid.

🔹 The ENC Production Specification, S-57 Appendix B.1, states that *"the geographic extent of the cell must be chosen by the ENC producer to ensure that the resulting dataset file contains no more than 5 megabytes of data. Subject to this consideration, the cell size must not be too small in order to avoid the creation of an excessive number of cells."*

It also states that "cells must be rectangular". Within this, the actual data coverage can be any shape.

## *Compilation Scales*

🔹 It is recommended that the compilation scales for ENCs are based upon standard radar ranges.

| Selectable Range | Standard scale (rounded) |
|---|---|
| 200 NM | 1:3,000,000 |
| 96 NM | 1:1,500,000 |
| 48 NM | 1:700,000 |
| 24NM | 1:350,000 |
| 12 NM | 1:180,000 |
| 6 NM | 1:90,000 |
| 3 NM | 1:45,000 |
| 1.5 NM | 1:22,000 |
| 0.75 NM | 1:12,000 |
| 0.5 NM | 1:8,000 |
| 0.25 NM | 1:4,000 |

➢ Normally, the nearest larger standard scale should be used, e.g. an ENC produced from a 1:25,000 paper chart should have a compilation scale of 1:22,000

➢ Exceptionally, if source material permits, the next larger scale may be used.

➢ Where the source scale is larger than 1:4,000 or smaller than 1:3,000,000 then the actual scale should be used.

[JW4]

### *Navigational Purposes*

■ Dependent on its intended navigational purpose an ENC is assigned to one of the 6 navigational purposes defined in S-57:

  ➢ Overview

  ➢ General

  ➢ Coastal

  ➢ Approach

  ➢ Harbour

  ➢ Berthing

■ S-57 Edition 3.1 does not define minimum and maximum compilation scales for each navigational purpose.

## STAGE 3 – Acquire Production System

### STEP 1 – Identify Requirement

■ The capacity and capability of the production system required will depend on the production plan (see Stage 2) and on the extent to which data capture will be contracted out.

■ In the broadest terms there are two types of production software:

➢ Those which populate and maintain a database of ENC objects, attributes and attribute values in a format which is compatible with IHO Transfer Standard for Digital Hydrographic Data, S-57 (ENC Product Specification);

➢ Those which create individual flat files each forming a single ENC cell.

■ A Statement of Requirement (SOR) should be written to set out clearly the requirements of any contract. The SOR should include Key User Requirements, capability of the system, the number of workstations required, any support requirements, and any interfaces with other existing production systems. The contract could include hardware as well as software or just the latter for installation on existing infrastructure. See also Stage 4 regarding the potential for including training provision as part of this contract

### STEP 2 – Invitation to Tender

■ Once the required production capacity is known (see Stage 2) then an invitation to tender should be sent out to those companies identified as being capable of supplying a suitable system.

■ The tenders rendered can then be evaluated against the criteria defined in the initial invitation.

■ The contract can then be awarded to the selected company following the evaluation.

### STEP 3 – System Installation and Testing

■ Before acceptance, the system needs to be installed and tested to ensure that all contractual requirements have been met.

### STEP 4 – Live Running

■ When the supplier has demonstrated that the system performs in accordance with the specifications it can be contractually accepted and transferred to live running.

## STAGE 4 – Obtain and Train Staff

### STEP 1 – Staffing Levels

■ Staffing levels need to be defined for the production of new ENC cells and the maintenance of existing cells. The staff requirement will be based on whether the decision is to contract out the data capture or capture data in-house, on the number of cells planned, and the proposed targets to achieve those plans.

■ To assist with this planning the following provide some guidelines on the approximate timescales (based on UKHO ENC production) for the production and maintenance of cells, from initial preparation to final publication. These are based on production of ENC from paper charts with updates matching the paper chart Notice to Mariners service:

  ➤ Production of New Cells = approximately 5 weeks of an operator's time for a full paper chart equivalent.

  ➤ Production of New Editions = approximately 5 weeks.

  ➤ Production of Updates = approximately 1 hour per update.

  Information from other HOs indicates that these figures may vary considerably depending on the complexity of the area, the verification and validation processes adopted and the experience of the staff involved.

  Australia's experience is that if highly detailed ENCs are compiled from source material such as hydrographic data, rather than from existing paper charts, substantial additional time will need to be allowed.  This will depend on the extents of the cells, area of data coverage, depth contour interval adopted and how complex the source data is.  As an example, one degree square ENC cells in the Great Barrier Reef where the seabed is quite complex, compiled from source surveys showing **one** metre depth contours and depth areas, with a navigational purpose of 4, took about 26 weeks to produce, including checking and validation.  Such cells often approach the maximum size of 5 MB after optimisation and grouping of soundings has been carried out.

### STEP 2 – Determine Skill Levels

■ The training needs depend on whether existing staff are to be re-trained or new staff recruited for ENC production.

■ A Skills Analysis and Training Needs Analysis should be employed to determine the skills required for the job and the skill levels of the staff. Commercial companies can assist with this task. Where appropriate, reference should be made to Publication S-8; FIG/IHO/ICA 'Standards of Competence for Nautical Cartographers'.

  The following training may be required:

  ➤ Chart Awareness Training, especially regarding navigational marks

  ➤ ENC/S-57 Awareness training

  ➤ Quality Assurance training, including quality control aspects

  ➤ Production System Training

> ➢ ECDIS training – for displaying ENCs to assess portrayal

## STEP 3 – Identify Training Provider

🔲 Once the requirement for training has been identified, the training provider needs to be determined. For Production System training, the system provider in most cases will provide the initial training and this needs to be specified within that contract. For Chart Awareness, QA and ENC/S-57 training, this could be provided internally by existing staff, or externally. Courses that are available internationally are listed in IHO Publication C-47, "Training Courses in Hydrography and Nautical Cartography".

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*The IHO WEND principles* state that:
- ❖ Member States' HOs are strongly recommended to provide, upon request, training and advice to HOs that require it to develop their own national ENC provision.

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**Useful References:**    S-8 FIG/IHO/ICA 'Standards of Competence for
                          Nautical Cartographers'
                          UKHO ENC Training Documentation;
                          UKHO Job Descriptions;
                          C-47 IHO Training Courses;
                          Guidelines for the Implementation of the WEND
                          Principles

# STAGE 5 – Prepare Specifications for Data Capture

## STEP 1 – Published Specifications

- The IHO Transfer Standard for Digital Hydrographic Data, S-57, defines the content, structure and format of the data for ENC. Appendix B1 of the standard contains the Product Specification for ENC.

- Reference should be made to Appendix A (Object Catalogue) and Annex A to Appendix B1 (Use of the Object Catalogue for ENC), of S-57, which define how charted objects should be encoded for ENCs together with the "Recommendations for Consistent ENC Data Encoding" (Annex A)[JW5].

- It should also be noted that S-57 is maintained by Maintenance Documents and any clarifications within these documents apply to ENCs complying with S-57 Edition 3.1 together with any Supplements that are extant. TSMAD, the IHO group responsible for maintaining and developing S-57, also produces ENC Encoding Bulletins and Frequently Asked Questions (FAQ) about ENC encoding issues.  These are all available on the IHO website.  TSMAD welcomes additional queries from member states or HOs about ENC encoding issues.

  All of these sources need to be searched when collating specifications relating to ENC data capture.

## STEP 2 – Data Capture and Product Specifications

- The S-57 standard, although comprehensive, leaves it to HOs to decide what should be the content of the ENCs, what the limits of the cells should be, and which navigational purposes the cells should belong to.

- Supplementary Data Capture and Product Specifications should be produced to clarify the content and construction of ENC cells and the capture of ENC data, in addition to the recommended and mandatory requirements of S-57. As well as clarifications regarding content, these should include elements such as accuracy requirements and file naming conventions for cells and associated text and picture files.

- Size of data sets should be optimized and only necessary data should be included. This will facilitate remote distribution services.

- Ensure consistency with neighbours wherever possible.

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*The IHO WEND Principles* state that:
- ❖ There must be conformance with all relevant IHO and IMO standards.

---

**Useful References:**          UKHO Data Capture Specification;
UKHO ENC Product Specification;
(Plus those documents listed above).

## STAGE 6 – Capture Data for New Cells

### STEP 1 – Optionally, place external capture contract

- If it has been decided that new cells are to be captured externally, a suitable contract needs to be agreed. This requires:

  - ➤ Definition of a suitable Statement of Requirements.

  - ➤ Identification of companies able to carry out the work; this can include a requirement that they be ISO9001:2000 certified.

  - ➤ Issuing of Invitations to Tender, including possible production of sample cell.

  - ➤ Evaluation of Tenders.

  - ➤ Selection of the contractor.

- Alternatively, other Hydrographic Offices may be able to offer production capacity, either on a commercial basis or as part of a wider bilateral agreement.

### STEP 2 – Capture data

- In order to facilitate capture, a 'package' should be created for each cell containing all the necessary source information (For example, where capture is from paper charts: Raster Files; List of Lights; Overlays for clarification etc) for populating the cell.

- Depending on form of data capture used:

  - ➤ The package will be sent (via a secure route) to external contractor or HO; for facilitating this aspect, consideration should be given to sending such data in batches.

  - ➤ A suitably trained in-house operator will be tasked.

- The data must be captured in compliance with the recommended and mandatory requirements of S-57 and in accordance with any HO clarification or Data Capture Specifications.

**Useful References:**     UKHO Data Capture Specifications;
                           UKHO Quality Procedures

## STAGE 7 – Edge Match Data

### STEP 1 –National data

- Once a New Cell has been captured, or a New Edition of an ENC produced, it is important that the data on the cell border is aligned and matched with the corresponding data in any adjoining cells particularly of the same navigational purpose.

- When editing data on the border of cells to match adjoining data, it is important that the data is edited so that depth contours, depth areas etc. are adjusted on the side of safety.

- Editing should also only be done within a specific tolerance so that the accuracy of the data is not impaired to too great a degree.

### STEP 2 – Between Nations

- In areas which include neighbouring producer nations, HOs should co-operate to agree on cell boundaries. It is recommended that where advantageous, nations agree data boundaries within a technical arrangement based on cartographic convenience and benefit to the mariner.

- Suitable communications with neighbouring nations should be put in place to ensure data consistency across cell boundaries. These will include exchange mechanisms to allow access each other's ENCs.

[JW7]

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***The IHO WEND principles*** state:

- ❖ Member States are encouraged to work together on data capture and data management.

- ❖ ENC duplication should be avoided. A single ENC producing country should exist in any given area.

- ❖ Responsibility for the production of ENC can be delegated in whole or in part by a country to another country, which then becomes the producing country in the considered area.

- ❖ When the limits of waters of national jurisdiction between two neighbouring countries are not established, or it is more convenient to establish boundaries other than established national boundaries, producing countries are to define the boundaries for ENC production within a technical arrangement. These limits would be for cartographic convenience only and shall not be construed as having any significance or status regarding political or other jurisdictional boundaries.

- ❖ In areas where the paper INT charts overlap, neighbouring producer nations should agree a common limit of ENC production in the overlapping areas. Cartographic boundaries should be as simple as possible, for example: a succession of straight segments and turning points corresponding to such things as meridians, parallels, or chart limits. Where different producer nations are responsible for INT coverage of the same area at different scales, those nations should agree on a suitable set of boundaries so as to provide the user with the most coherent service possible.

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**Useful Reference:**      Guidelines for the Implementation of the WEND Principles

## STAGE 8 – Verify and Validate Data

### STEP 1 – Production Systems and Procedures

- Thorough verification and validation procedures need to be in place to verify and validate ENC cells for content and accuracy, ensuring consistency with the IHO Data Transfer Standard S-57 Edition 3.1 together with any Supplements that are extant.

### STEP 2 – Verification

- Cells need to be checked for content and capture accuracy. Typically this will take the form of a 100% check of the vector data against the source information so as to ensure that no charted objects or attributes have been omitted from the cell or captured in an incorrect position.

### STEP 3 – Validation

- Validation software should be used to perform checks on the completed ENC cell. This is to ensure that an ENC is compliant with the S-57 ENC Product Specification. The minimum checks are defined within S-58.

- The validation process used should include software provided by a different supplier to that used for production. Some HOs use more than one validation software package as each tends to pick up different warnings and errors.

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**The IHO WEND principles** state:

- ❖ The Member State responsible for originating the data is also responsible for its validation in terms of content, conformance to standards and consistency across cell boundaries.

- ❖ Member States should recognize their potential exposure to legal liability for ENCs.

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A list of companies supplying ENC Validation Tools is maintained on the IHO website ([www.iho.int](www.iho.int) > External Liaisons > External Links > Industry Links > Search on 'ENC validation').

**Useful Reference**:     Guidelines for the Implementation of the WEND Principles

## STAGE 9 – Maintain ENCs

### STEP 1 – Establish mechanism for ENC updating

- Once an ENC cell has been produced and made available to the end user, then that data has to be maintained.

- The overall Quality Management System must include mechanisms for ENC updating designed to meet the needs of the mariner regarding safety of navigation.

- The processes for updating the paper chart are described in Part B-600 of S-4. The general principles of these processes apply equally to paper and electronic charts. The processes for updating the paper chart will need to have their counterpart in any updating process for the ENC.

- ENC Updates should be synchronised with paper chart equivalents; however, if paper chart production cycles are lengthy, the option of issuing ENC Updates and New Editions earlier should be considered together with any wider implications.

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**The IHO WEND principles** state:

❖ It is expected that Member States, for waters of national jurisdiction, will have mature supply systems for ENCs and their subsequent updating in place by the earliest date for mandatory carriage of ECDIS.

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### STEP 2 – Notice to Mariners (Updates)

- ENC Cells require updating to include details published in paper chart Notices to Mariners. These are in two forms: Chart Correcting Notice to Mariners (NM), and Temporary and Preliminary Notice to Mariners (T&P NM – see Annex B[JW9]). Updating has to be completed within a rigid timescale for cells that have been issued to customers.

- ENC Updates must be produced to provide the ECDIS user with an updated SENC. As a guide, an ENC Update should not exceed 50 Kilobytes in size as some ECDIS experience problems with loading large update data sets.[JW10]

- ENC Updates must be produced so as to replicate the corrections on the equivalent paper chart, and be produced at the same time whether that is weekly, fortnightly or monthly.

### STEP 3 – New Editions or Notice to Mariners (NM) Blocks

- New Editions of the equivalent paper charts or paper chart NM blocks will require an ENC New Edition or an ENC Update. To optimize data transmission, updates are preferred where sufficient. Note: If is it reported from users that it is not possible to load an ENC update properly, a new edition should be created.

### STEP 4 – ENC re-issues

- Where it is considered that the number of updates to be applied to a base cell becomes too large, it is recommended that a Re-issue of the cell be

produced.  A Re-issue will optimise data transmission and avoid the heavy loading process of numerous updates for new subscribers to the ENC.  It is at the data producers discretion as to what constitutes a large number of updates, but as a guide this may be considered to be between 20 and 50, and other factors such as the size of the updates.  Existing subscribers will not be effected by the publication of a Re-issue (i.e. will not be required to load the Re-issue), and both new and existing subscribers will update their SENC from the time of the Re-issue through subsequent updates or New Editions.

## STEP 5 – Distribution of  ENC data

- The timely distribution of the ENC data can be on CD-ROM, through the Internet, over INMARSAT, or by landline communication. However, see Stage 10 regarding wider distribution principles.

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*The IHO WEND principles* also state the following with reference to Updating of ENCs:

- ❖ Technically and economically effective solutions for updating are to be established conforming to the relevant IHO standards. The updating of ENCs should be at least as frequent as that provided by the nation for correction of paper charting.

- ❖ National HOs providing source data are responsible for advising the issuing HO of update information in a timely manner.

## STAGE 10– Distribute Data

### STEP 1 – Identify Distribution System

- The distribution system provides the mariner with ENC data, in a timely process from the issuing HO to the end-user to support safe navigation. A considerable reduction in this time interval should be possible by taking advantage of existing digital and telecommunications technology.

- The distribution system ensures data integrity and protection. An S-57 error detection scheme applies for exchange of un-encrypted data. The IHO Data Protection Scheme (S-63) should be used for ENC distribution to end users.

- A Quality Management System should be established for the overall distribution system.

- When a mariner subscribes to an ENC service, the distribution system should provide the mariner with the latest ENC base cell (new cell, New Edition or re-issue) together with all updates which have been issued since the publication of this base cell.

- The distribution system should provide the existing subscriber with the last New Edition or re-issue and any updates issued since the last official update applied to the ENC in the SENC.

- The distribution system should provide information to the mariner as to the last update information (New Edition and update) available.

- The distribution system may use various transfer procedures depending on the media and channels. Transfer procedures should be suitable with end users capabilities to provide the update information to the SENC in the most effective way.

- Transfer procedures may use physical media or telecom (on line), on land or at sea.

- Delivery service may be scheduled on a regular base within a time interval adequate to support safe navigation and known in advance by end users, normally weekly, or on-demand. A nil message should be used if no update information is available.

- ENC data should at least be made available on a common hard media system (e.g. CD-ROM). On-demand and remote services via telecom should also be made available.

- Fully-automatic updating (i.e. the update data reaches the EDCIS directly without any human intervention) may exist. To ensure the integrity of the broadcast update, effective safe transmission mechanisms and/or error detection methods should be employed.

- Updating of the ENC occurs at the ECDIS equipment, and should be accomplished in a user-friendly way by the mariner without the need for assistance of the distributor or manufacturer.

- It is recommended that all ENC data (New ENC, New Editions, Updates and Re-issues) is distributed through a Regional ENC Co-ordinating Centre (RENC).

It is the responsibility of the RENC to establish a distribution network for ENC data. The RENC and its distributors are entities of the distribution system.

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***The IHO WEND principles*** state:

❖ Member States are encouraged to distribute their ENCs through a RENC in order to share in common experience and reduce expenditure, and to ensure the greatest possible standardization, consistency, reliability and availability of ENCs.

❖ Member States should strive for harmonization between RENCs in respect of data standards and service practices in order to ensure the provision of integrated ENC services to users.

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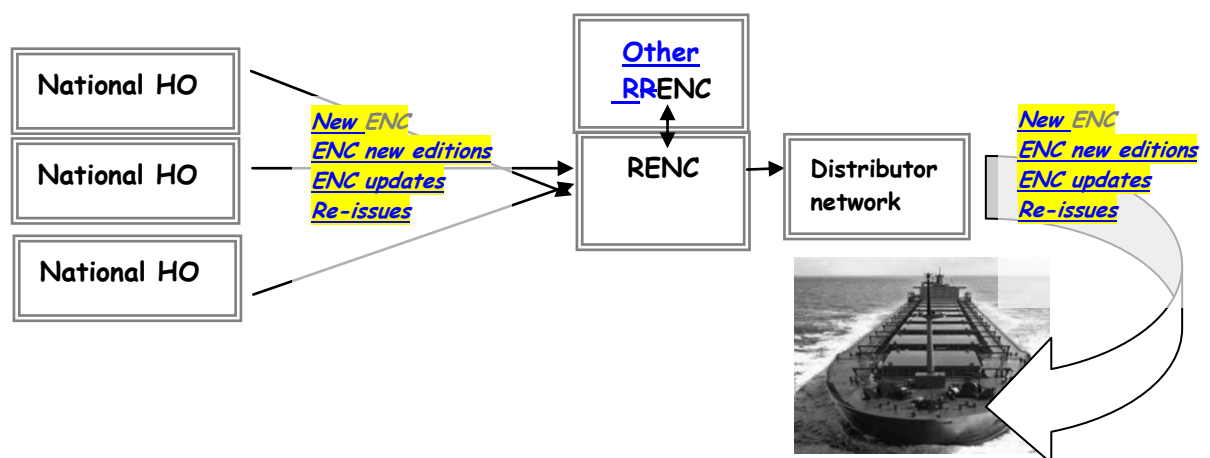


The supply of data through RENCs reduces the overall cost of ENCs by centralising the distribution of the data, thus avoiding the need for each individual HO to invest in developing their own service and distribution network, thus simplifying the purchasing of ENC data. RENCs also act as 'one stop shops'.

RENCs can also ensure that data is of uniform quality (in terms of its validation against S-58) and that there are no gaps, or overlaps or inconsistencies between adjacent cells.

RENCs help promote the production of ENCs around the world, and thus help to ensure that developments in electronic charting are coordinated and meet the requirements of the market.

## STEP 2 – Sign Agreement

Whatever distribution mechanism is adopted, where an outside organisation such as a RENC is involved, the rights and responsibilities of each partner should be detailed in a signed agreement.

## STEP 3 – Distribution Format

Distribution through a RENC is not mandatory. If data is not distributed through a RENC, a security system should be applied to protect the integrity of the data, prove authenticity, and prevent unauthorised copying. Reference should be made to S-63 (IHO Data Protection Scheme).

> In addition to standard S-57 (either encrypted or unencrypted) ENCs can also be distributed directly in the SENC format proprietary to an ECDIS manufacturer.

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***The IHO WEND principles*** also state that:

❖ Member States will strive to ensure that, mariners, anywhere in the world, can obtain fully updated ENCs for all shipping routes and ports across the world.

❖ Member States will strive to ensure that their ENC data are available to users through integrated services, each accessible to any ECDIS user (i.e., providing data in S-57 form), in addition to any national distribution or system-specific SENC delivery.

❖ A Member State responsible for any subsequent integration of a country's data into a wider service is responsible for validating the results of that integration.

❖ Methods to be adopted should ensure that data bear a stamp or seal of approval of the issuing HO.

❖ Member States should work together so that the IHO Data Protection Scheme (S-63) is used for ENC distribution to end users, to ensure data integrity, to safeguard national copyright in ENC data, to protect the mariner from falsified products, and to ensure traceability.

❖ When an encryption mechanism is employed to protect data, a failure of contractual obligations by the user should not result in a complete termination of the service. This is to assure that the safety of the vessel is not compromised.

❖ In order to promote the use of ENCs in ECDIS, Member States are to strive for the greatest possible user-friendliness of their services, and facilitate integrated services to the mariner.

In addition, the ***WEND Committee*** endorsed the following definition of integrated services:

❖ "A variety of end-user services where each service is selling all its ENC data, regardless of source, to the end user within a single service proposition embracing format, data protection scheme and updating mechanism, packaged in a single exchange set."

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**Useful Reference**:  Guidelines for the Implementation of the WEND Principles

# Glossary of Terms

**Terms and Abbreviations relating to ENC/ECDIS**

The following definitions have been principally taken from the Glossary of ECDIS related terms (IHO S-32, Appendix 1, 2007). Reference has also been made to 'The Electronic Chart', Chapter 16, Glossary (Hecht, Berking, Büttgenbach, Jonas, Alexander).

**AIS**

An automatic communication and identification system intended to improve the safety of navigation by assisting in the efficient operation of vessel traffic services (VTS), ship reporting, ship-to-ship and ship-to-shore operations.

A transponder is an example of an AIS. AIS information may be displayed on an ECDIS.

**area**

The 2-dimensional geometric primitive of an object that specifies location.

**ARPA (Automatic Radar Plotting Aid)**

A system wherein radar targets are automatically acquired and tracked and collision situations computer assessed and warnings given.

**attribute**

A characteristic of an object. Attributes are either qualitative or quantitative. Attributes required for ECDIS are defined in Appendix A of S-57, IHO Object Catalogue.

**C-47**

IHO Capacity Building Publication 47, titled "Training Courses in Hydrography and Nautical Cartography"

**cartographic object**

Feature object which contains information about the cartographic representation (including text of real world entities).

The ENC Product Specification prohibits the use of cartographic objects in ENCs.

**cell**

The basic unit for the distribution of ENC data covering a defined geographical area bounded by two meridians and two parallels, the content of which must not exceed 5 Mbytes, and which is intended for a particular navigational purpose.

**chain**

A sequence of one or more edges.

**chain node**

Data structure in which the geometry is described in terms of edges, isolated nodes and connected nodes. Edges and connected nodes are topologically linked. Nodes are explicitly coded in the data structure. Areas are defined by the sequence of edges that comprise their boundaries. Lines are comprised of edges. Point feature objects may only reference isolated nodes.

**CHRIS (Committee on Hydrographic Requirements for Information Systems)**

>A Committee of the IHO tasked with promoting and coordinating the development of official digital products and services. CHRIS has now been superseded by the Hydrographic Services and Standards Committee (HSSC).

**collection object**

>A feature object which describes the relationship between other objects. An example of a collection object in S-57 is "aggregation" which is used, for example, to group together the different objects which together constitute a Traffic Separation Scheme.

**compilation**

>In cartography, the selection, assembly, and graphic presentation of all relevant information required for the preparation of a new map/chart or a new edition thereof. Such information may be derived from other maps/charts, aerial photographs, surveys, new data, and other sources.

**compilation scale**

>The scale at which the ENC data was compiled.

>Note that the consistency recommendations (Ref I) indicate that compilation scale should be considered as the optimal scale for display for that ENC.

**connected node**

>A node referred to as a beginning and/or end node by one or more edge. Connected nodes are defined only in the chain-node, planar graph and full topology data structures.

**data model**

>A conceptual specification of the sets of components and the relationships among the components pertaining to the specific phenomena defined by the model reality. A data model is independent of specific systems or data structures. The S-57 data model defines real world entities as a combination of descriptive and spatial characteristics. These characteristics are defined in terms of feature objects and spatial objects and the relationship between them.

**data set**

>A logical grouping of *S-57* data to which the S-57 data set descriptive records apply. The data set descriptive records contain meta data. The use of data set descriptive records is product specific and is, therefore, defined by a product specification. If the data set descriptive records are repeated for each file in an exchange set, an instance of a file containing the data set descriptive records is called a data set. If the data set descriptive records are encoded generally for the whole exchange set, the exchange set is referred to as a data set.

**data structure**

>A computer interpretable format used for storing, accessing, transferring and archiving data.

**datum (vertical)**

>Any level surface (e.g. mean sea level) taken as a surface of reference from which to reckon elevations.

**display category**

>The ECDIS Performance Standards establish three categories for SENC objects:

>>**display base**: The level of information which cannot be removed from the display. It consists of information that is required at all times in all geographic areas and all circumstances.

| standard display: | The level of SENC information that is shown when a chart is first displayed on ECDIS. It is the recommended minimum level of display for safe navigation. |
| --- | --- |
| all other information: | displayed individually (by class) on demand. |

## edge

A one-dimensional spatial object, located by two or more coordinate pairs (or two connected nodes). An edge must reference a connected node at both ends and must not reference any other nodes.

## electronic chart

Very broad term to describe the data, the software, and the electronic system, capable of displaying chart information. An electronic chart may or may not be equivalent to the paper chart required by SOLAS.

## Electronic Chart Display and Information System (ECDIS)

A navigation information system which with adequate back-up arrangements can be accepted as complying with the up-to-date chart required by regulation V/20 of the 1974 SOLAS Convention, by displaying selected information from a System Electronic Navigational Chart (SENC) with positional information from navigation sensors to assist the mariner in route planning and route monitoring, and if required display additional navigation-related information.

## Electronic Chart Systems (ECS)

Generic term for equipment which displays chart data but which is not intended to comply with the IMO Performance Standards for ECDIS, and is not intended to satisfy the SOLAS Chapter V requirement to carry a navigational chart.

## Electronic Navigational Chart (ENC)

The data base, standardized as to content, structure and format, issued for use with ECDIS on the authority of government authorized hydrographic offices. The ENC contains all the chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart (eg sailing directions) which may be considered necessary for safe navigation.

## ENC Product Specification

Appendix B1 of S-57 which specifies the content, structure and other mandatory aspects of an ENC.

## exchange set

The set of files representing a complete, single purpose (i.e. product specific) data transfer. The ENC Product Specification defines an exchange set which contains one Catalogue file and at least one data set file.

## face

A two dimensional spatial object. A face is a continuous area defined by a loop of one or more edges which bound it. A face may contain interior holes, defined by closing loops of edges. These interior boundaries must be within the outer boundary. No boundary may cross itself or touch itself other than at the beginning/end node. None of the boundaries may touch or cross any other boundary. Faces are defined only in the full topology data structure.

## feature

Representation of a real world phenomenon. For example, a particular cardinal buoy represented through a symbol on a chart.

**feature object**

An object which contains the non-locational information about real world entities. Feature objects are defined in Appendix A of S-57, IHO Object Catalogue.

**feature record**

A feature record is the implemented term used in the *S-57* data structure for a feature object (i.e. a feature object as defined in the data model is encoded as a feature record in the data structure). There are four types of feature records: geo, meta, collection and cartographic.

**geo object**

A feature object which carries the descriptive characteristics of a real world entity. The positional information is provided through the spatial object.

**Geographic Information System (GIS)**

A computer based system for handling and integrating data from a variety of sources which is directly or indirectly spatially referenced to Earth.

**geometric primitive**

One of the three basic geometric units of representation: point, line and area.

**Global Maritime Distress and Safety System (GMDSS)**

A global communications service based upon automated systems, both satellite based and terrestrial, to provide distress alerting and promulgation of maritime safety information to mariners. This system has been developed by IMO through the SOLAS Convention.

**Global Navigation Satellite System (GNSS)**

A world-wide position, time and velocity radio determination system comprising space, ground and user segments of which GPS and GLONASS are components.

**GLONASS (Global Navigation Satellite System)**

A space-based, radio-positioning, navigation and time-transfer system operated by the Government of the Russian Federation. GLONASS to which differential corrections have been applied is known as Differential GLONASS (DGLONASS).

**GPS (Global Positioning System)**

A space-based, radio-positioning, navigation and time-transfer system operated by the United States Government. GPS to which differential corrections have been applied is known as Differential GPS (DGPS).

**HSSC (Hydrographic Services and Standards Committee)**

The technical steering committee of the IHO tasked, among other things, with promoting and coordinating the development of official digital products and services.

**International Electrotechnical Commission (IEC)**

A worldwide non-governmental organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. Committee 80, Working Group 7 of IEC is responsible for developing the Performance Requirements for ECDIS to be published as document IEC 61174.

### International Hydrographic Organization (IHO)

The IHO is an intergovernmental consultative and technical organization that was established in 1921 to support the safety of navigation and the protection of the marine environment. The object of the organization is to bring about:

(a)     The co-ordination of the activities of national hydrographic offices;

(b)     The greatest possible uniformity in nautical charts and documents;

(c)     The adoption of reliable and efficient methods of carrying out and exploiting hydrographic surveys;

(d)     The development of the sciences in the field of hydrography and the techniques employed in descriptive oceanography.

### International Maritime Organization (IMO)

The specialized agency of the United Nations responsible for measures to improve the safety of international shipping and to prevent marine pollution from ships.

### isolated node

An isolated zero-dimensional spatial object that represents the geometric location of a point feature. An isolated node is never used as a beginning or end *node*.

### line

The one-dimensional geometric primitive of an object that specifies location.

### meta object

A feature object which contains information about other *objects*. For example compilation scale or vertical datum.

### navigational purpose

The specific purpose for which a cell has been compiled. There are six such purposes, namely berthing, harbour, approach, coastal, general and overview.

### node

A zero-dimensional spatial object, located by a coordinate pair. A node is either isolated or connected.

### Notice to Mariners (NtM)

A periodical notice issued by maritime administrations, or other competent authorities, regarding changes in aids to navigation, dangers to navigation, important new soundings, and, in general, all such information as affects nautical charts, sailing directions, light lists and other nautical publications.

### object

An identifiable set of information. An object may have *attributes* and may be related to other objects. Also see spatial object and feature object.

### Object Catalogue

The Object Catalogue is the feature schema for *S-57*. Its primary function is to provide a description of real world entities. It contains a list of feature object classes (each relating to a real world entity), attributes and allowable attribute values.

### object class

A generic description of objects which have the same characteristics.

Examples of object classes in S-57 are "buoy, cardinal" and "caution area".

**own ship's safety contour**

> The contour related to the own ship selected by the mariner from the contours provided for in the SENC, to be used by ECDIS to distinguish on the display between the safe and the unsafe water, and for generating anti-grounding alarms.

**Performance Standards for ECDIS**

> Minimum performance requirements for ECDIS, adopted by IMO 5 December 2006 as MSC resolution and published as Annex to IMO Resolution MSC.232(82).

**planar graph**

> A 2-dimensional data structure in which the geometry is described in terms of *nodes* and edges which are topologically linked. A special case of a chain-node data structure in which edges must not cross. Connected nodes are formed at all points where edges meet.

**point**

> The 0-dimensional geometric primitive of an object that specifies location.

**polygon**

> A non-self intersecting, closed chain defining the boundary of an *area*.

**product specification**

> A defined subset of the entire specification combined with rules, tailored to the intended usage of the transfer data. See ENC product specification.

**Presentation Library**

> A set of mostly digital specifications, composed of symbol libraries, colour schemes, look-up tables and rules, linking every object class and attribute of the SENC to the appropriate presentation of the ECDIS display. Published by IHO as Annex A to S-52.

**raster**

> A regular array with information pertaining to each element (pixel) or group of elements.

**Regional ENC Coordinating Centre (RENC)**

> An organizational entity where IHO Member States have established cooperation amongst each other to guarantee a world-wide consistent level of high quality data, and for bringing about coordinated services with official ENCs and updates to them

**Regional Hydrographic Commission (RHC)**

> A body created under IHO Resolution T 1.3 composed of representatives from member states' hydrographic services within a defined geographic area (typically an INT charting area), meeting at regular intervals to discuss mutual hydrographic and chart production issues.

**Re-issue**

> A re-issue of an ENC includes all the updates applied to the ENC up to the date of the reissue. A re-issue does not contain any new information additional to that previously issued by updates. The update sequence is not interrupted by a re-issue. After a re-issue, subsequent updates may be incorporated into the SENC created from this reissue or to the SENC created from the original ENC and kept continuously updated.

**S-4**

IHO Special Publication 4, titled "Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO".

**S-8**

IHO Special Publication 8, titled "FIG/IHO/ICA Standards of Competence for Nautical Cartographers".

**S-52**

IHO Special Publication 52, titled "Specifications for chart content and display aspects of ECDIS".

**S-57**

IHO Special Publication 57, titled "IHO Transfer Standard for Digital Hydrographic Data". S-57 is The international transfer standard for digital hydrographic data.

The major components of S-57 Edition 3.1 are; Theoretical Data Model, Data Structure, Object Catalogue, ENC Product Specification, Use of the Object Catalogue for ENC.

**S-58**

IHO Special Publication S-58, titled "IHO Recommended ENC Validation Checks". S-58 specifies the checks that, as a minimum, producers of ENC validation tools should include in their validation software.

**S-62**

IHO Special Publication S-62, titled "ENC Producer Codes". S-62 provides a list of Agency Codes for all producers of ENCs, in particular Hydrographic Offices.

**S-63**

IHO Special Publication S-63, titled "IHO Data Protection Scheme". S-63 describes the IHO ENC security scheme and provides test data. It is intended for use by all those ECDIS manufacturers and data distributors participating in an ENC service with data encrypted.

**S-66**

IHO Special Publication S-66, titled "Facts about electronic charts and carriage requirements". S-66 provides a high level guide to the production, maintenance and distribution of Electronic Navigational Charts (ENCs).

**S-100**

IHO Special Publication S-100, titled "IHO Universal Hydrographic Data Model". S-100 is a new standard that will eventually supersede S-57. It complies with the ISO 19100 series of geographic standards and will support a greater variety of hydrographic-related digital data sources, products, and customers than S-57.

**safety depth**

The depth defined by the mariner, e.g. the ship's draft plus underkeel clearance, to be used by the ECDIS to emphasize soundings on the display equal to or less than this value.

**SOLAS** (Safety Of Life At Sea)

International Convention for the Safety of Life at Sea developed by IMO. The contracting governments undertake to promulgate all laws, decrees, orders and regulations and to take all other steps which may be necessary to give the present Convention full and complete effect, so as to ensure that, from the point of view of safety of life, a ship is fit for the service for which it is intended.

**spaghetti data**

A *data* structure in which all lines and points are unrelated to each other (i.e. no topological relationships exist in the data structure). This data structure is not permitted for ENC.

**spatial object**

An object which contains locational information about real world *entities*. For example, in *S-57* the location of a buoy or the boundary of a caution area.

**System Electronic Navigational Chart (SENC)**

A data base resulting from the transformation of the *ENC* by ECDIS for appropriate use, updates to the ENC by appropriate means and other data added by the mariner. It is this data base that is actually accessed by ECDIS for the display generation and other navigational functions, and is equivalent to an up-to-date paper chart. The SENC may also contain information from other sources.

**topology**

The set of properties of geometric forms (such as connectivity, neighbourhood) which is defined with the data model remaining invariant when subject to a continuous transformation.

The level of topology chosen for the ENC allows for colour fill, activation of area warnings, e.g. depth area warnings, cautionary areas. The different levels of topology are described in the S-57 Data Model.

**Transfer Standard Maintenance and Application Development Working Group (TSMAD)**

An HSSC working group that is responsible for the maintenance of digital data standards including *S-57* and S-100 to satisfy new hydrographic requirements.

**update**

Either short for update information or, as a verb, applying the update mechanism. An ENC Update (official update) is a data set produced for changing an existing ENC in the ECDIS SENC (automatic updating). An ENC Update must conform to the ER application profile of S-57.

**Use of the Object Catalogue**

Annex A of *S-57* Appendix B.1 describing how to encode information relevant to a specific navigational purpose. Must be used in conjunction with the ENC Product Specification.

Use of the Object Catalogue is maintained by means of new editions, published as required by the Transfer Standard Maintenance and Applications Development Working Group. The contents of a new edition do not invalidate the contents of the previous edition.

**vector**

Direct connection between two points, either given as two sets of coordinates (points), or by direction and distance from one given set of coordinates, or a point in a vector space defined by one set of coordinates relative to the origin of a coordinate system.

**WEND (World-wide Electronic Navigational chart Database)**

A common, worldwide network of ENC datasets based on IHO standards designed specifically to meet the needs of international maritime traffic using ECDIS which conform to the IHO Performance Standards for ECDIS.

**World Geodetic System (WGS)**

A global geodetic reference system developed by the USA for satellite position fixing and recommended by IHO for hydrographic and cartographic use.

**World-Wide Navigational Warning System (WWNWS)**

A service established for the purpose of coordinating the transmission of radio navigational warnings in geographical areas using coastal and satellite communication services.

## RECOMMENDATIONS FOR CONSISTENT ENC DATA ENCODING

Note: The final assignment of ENCs to navigational purposes and the values used for individual SCAMIN attribution should preferably be done in consultation with neighbouring HOs, with all nations within a RENC, or with all nations within a Regional Hydrographic Commission, as appropriate; in order to maintain consistency across national or regional boundaries.

1 The[JW34] compilation scale[1] (CSCL sub-field of the DSPM field of the ENC header and the attribute CSCALE on the object M_CSCL) should be considered as the optimum display scale of an ENC and as such should be set based upon the standard radar range scales in the following table (see also 3 below):

| Selectable Range | Standard radar scale (rounded) |
|---|---|
| 200 NM | 1:3,000,000 |
| 96 NM | 1:1,500,000 |
| 48 NM | 1:700,000 |
| 24NM | 1:350,000 |
| 12 NM | 1:180,000 |
| 6 NM | 1:90,000 |
| 3 NM | 1:45,000 |
| 1.5 NM | 1:22,000 |
| 0.75 NM | 1:12,000 |
| 0.5 NM | 1:8000 |
| 0.25 NM | 1:4000 |

**Table 1 - Radar range / standard scale table**

1.1 Normally, the nearest larger standard radar scale should be used, e.g. an ENC produced from a 1:25,000 paper chart should have a compilation scale of 22,000. However the selected scale may take into account the density of data when displayed at the chosen standard scale in addition to the quality and scale of the original source material.

1.2 Where the source material used to produce the ENC is of a scale larger than 1:4000 or smaller than 1:3,000,000 then the actual paper chart / source material scale may be used as the compilation scale for the ENC.

1.3 The use of too many M_CSCL objects within the same cell should be avoided. The values of any M_CSCL CSCALE attributes should be set using the same criteria as those used for setting 'compilation scale' described above.

2 SCAMIN[JW35] should be used for all ENCs.

2.1 SCAMIN values used should be selected from the following list:-

---

[1] CSCALE is defined in S-57 as *The scale at which the data was originally compiled.* This has proved to be misguided and supports too strong an association with the paper chart compilation scale. Paper charts are designed at a scale which enables a designated area to fit on a specific size of paper. Vector data should be scaled to optimize the viewing capabilities in a digital environment, usually a 21 inch monitor.

| |
|---|
| 1:19,999,999 |
| 1:9,999,999 |
| 1:4,999,999 |
| 1:2,999,999 |
| 1:1,499,999 |
| 1:699,999 |
| 1:499,999 |
| 1:349,999 |
| 1:259,999 |
| 1:179,999 |
| 1:119,999 |
| 1:89,999 |
| 1:59,999 |
| 1:44,999 |
| 1:29,999 |
| 1:21,999 |
| 1:17,999 |
| 1:11,999 |
| 1:7,999 |
| 1:3,999 |
| 1:1,999 |
| 1:999 |

**Table 2 – SCAMIN values**

2.2 SCAMIN values for features within an ENC should be set to either 1, 2, 3 or 4 steps smaller scale than the compilation scale of the ENC.

2.3 Appendix 1 lists the step values (i.e. 1, 2, 3 or 4) that should be applied for specific object classes together with any relevant conditions and additional flexibilities.

Following these three rules, offers an automated approach to setting SCAMIN which takes account of the relative importance of different object classes and will achieve sufficient de-cluttering even where there are large gaps in the scales of coverage available.

Unless the step values outlined in Appendix 1 have been manually adjusted, this approach takes no direct account of the relative importance of individual occurrences of an object, and may still result in the unsettling situation where an object disappears and then reappears as the user zooms out. To address these remaining issues, the following additional rules may be applied:-

2.4 Linear and area objects (excluding those objects subject to extensive generalisation e.g. DEPCNT) that extend beyond the coverage of a cell and exist in a smaller navigational purpose cell must be assigned a SCAMIN value based on the compilation scale of the smaller scale cell.

2.5 The SCAMIN value of an individual occurrence of an object should be set to either 1, 2, 3 or 4 steps smaller scale than the compilation scale of the smallest scale ENC that the object would appear on.

3 Inconsistent depiction of the same localities in different navigational purposes should be avoided. For example, outlines of rivers, ports etc. in smaller scale cells should be shown but may be in a simplified outline form.

4   In[JW36] addition to setting the compilation scale and encoding SCAMIN, there should be close liaison between neighbouring HOs when creating ENCs in their border areas, in order to resolve any issues of inconsistent depiction and to avoid gaps and overlaps in data coverage (consult the WEND Principles in IHO TR K 2.19). In particular, the following issues should be investigated and resolved:

- common data limits
- COMF value used (*see 9 below*)
- overlaps / gaps - buffer zone (*see 10 and 11 below*)
- content / data alignment
- depth contour intervals  (*see 6 below*)
- truncated limits and boundaries (areas that cross the cell boundaries)

5   Misalignment[JW37] and inconsistent depiction of data at cell, source and international boundaries should be investigated and rectified.

6   HOs[JW38] should, as a minimum, use standardised depth contour intervals (refer S-4, B-411). Additional depth contours may be added, where required.

7   HOs[JW39] should not leave holes in smaller scale coverage, assuming that the user will have larger scale data available.

8   Wherever[JW40] possible, meaningful and useful values of CATZOC should be used, i.e. values other than CATZOC 6 (data not assessed) for areas of bathymetry (refer S-57 Appendix B.1 – Annex A, clause 2.2.3.1). For areas of unstable seafloors, the M_QUAL attribute SUREND may be used to indicate the date of the survey of the underlying bathymetric data.

9   Coordinates[JW41] should be held in ENC production systems at a resolution of $0.0000001$ ($10^{-7}$) and the COMF value should be set to $10000000$ ($10^{7}$) for all cells.

10  There[JW42] must be no gaps in data between adjoining cells of the same navigational purpose.

11  There[JW43] must be no overlapping data between cells of the same navigational purpose (see S-57, Appendix B.1 clause 2.2), except at the agreed adjoining national data limits, where, if it is difficult to achieve a perfect join, a 5 metre overlapping buffer zone may be used.

## SPECIFIC SCAMIN STEP VALUES FOR OBJECT AND ATTRIBUTE COMBINATIONS

Preliminary Note: This appendix presents a standardised approach to SCAMIN step values for object and attribute combinations. It is acknowledged that more detailed recommendations than those contained in this appendix may be agreed for use in some charting regions.

The final column **SCAMIN STEPS** indicates the number of steps above (smaller scale) the compilation scale that SCAMIN values should be set to.

Notes
1. Producers should be prepared to deviate from the step values specified when the significance of the feature dictates, e.g. the recommended number of steps for a LIGHTS object is 4, but there will be circumstances where a LIGHTS object is so important that no SCAMIN value be applied; alternatively, the light could be so minor that a step value of 1 can be applied.

2. SCAMIN should only be applied to navigational aids where they contribute to "screen clutter" and where their removal from the display does not constitute a risk to safe navigation.

3. It is generally accepted that objects making up a NAVAID will have the same attributes, and therefore those with Master/Slave relationships should be assigned the same SCAMIN value.

| OBJECT | PRIMITIVE | CONDITION | SCAMIN STEPS |
|---|---|---|---|
| ACHARE | Point/ Area | | 2 |
| ACHARE | Point/Area | If RESTRN defined | 3 |
| ACHBRT | Point/Area | | 1 |
| ADMARE | Area | | 3 |
| AIRARE | Point/Area | If CONVIS = 1(visually conspicuous) | 3 |
| AIRARE | Point/Area | | 1 |
| ARCSLN | Line/Area | | 4 |
| BCNCAR | Point | | 3 (see Notes 2 & 3 above) |
| BCNISD | Point | | 4 (see Notes 2 & 3 above) |
| BCNLAT | Point | | 3 (see Notes 2 & 3 above) |
| BCNSAW | Point | | 3 (see Notes 2 & 3 above) |
| BCNSPP | Point | | 3 (see Notes 2 & 3 above) |
| BERTHS | Point/Line/Area | | 1 |
| BOYCAR | Point | | 3 (see Notes 2 & 3 above) |
| BOYINB | Point | | 3 (see Notes 2 & 3 above) |
| BOYISD | Point | | 4 (see Notes 2 & 3 above) |

| OBJECT | PRIMITIVE | CONDITION | SCAMIN STEPS |
|---|---|---|---|
| BOYLAT | Point | | 3 (see Notes 2 & 3 above) |
| BOYSAW | Point | | 3 (see Notes 2 & 3 above) |
| BOYSPP | Point | | 3 (see Notes 2 & 3 above) |
| BRIDGE | Point/Line/Area | Covered by an area DEPARE, DRGARE, or UNSARE object | 4 |
| BUAARE | Point/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| BRIDGE | Point/Line/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) and covered by an area LNDARE | 3 |
| BRIDGE | Point/Line/Area | Covered by an area LNDARE | 1 |
| BUAARE | Point/Area | | 1 |
| BUISGL | Point/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) or FUNCTN = 33 | 3 |
| BUISGL | Point/Area | | 1 |
| C_AGGR | N/A | | NOT SET |
| C_ASSO | N/A | | NOT SET |
| CANALS | Line | | 1 |
| CANALS | Area | | 4 |
| CAUSWY | Line/Area | | 2 |
| CBLARE | Area | If RESTRN defined | 3 |
| CBLARE | Area | | 2 |
| CBLOHD | Line | Covered by an area DEPARE, DRGARE, or UNSARE object | 4 |
| CBLOHD | Line | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| CBLOHD | Line | | 1 |
| CBLSUB | Line | | 3 |
| CGUSTA | Point | | 1 |
| CHKPNT | Point/Area | | 1 |
| COALNE | Line | | NOT SET |
| CONVYR | Line/Area | Covered by an area DEPARE, DRGARE, or UNSARE object | 4 |
| CONVYR | Line/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| CONVYR | Line/Area | | 1 |
| CONZNE | Area | | 3 |
| COSARE | Area | | 3 |
| CRANES | Point/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| CRANES | Point/Area | | 1 |
| CTNARE | Point/Area | | 4 |
| CTRPNT | Point | | 1 |
| CTSARE | Point/Area | | 1 |
| CURENT | Point | | 3 |

| OBJECT | PRIMITIVE | CONDITION | SCAMIN STEPS |
|---|---|---|---|
| CUSZNE | Area | | 2 |
| DAMCON | Point/Line/Area | | 1 |
| DAMCON | Line/Area | If sharing geometry with area LNDARE & (DEPARE or DRGARE) objects | NOT SET |
| DAMCON | Line/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| DAYMAR | Point | If Slave SCAMIN must match that of Master | 3 |
| DEPARE | Area | | NOT SET |
| DEPCNT | Line | If VALDCO = 0 (drying line) or 30 (default safety contour ref S-52) | 4 |
| DEPCNT | Line | | 2 |
| DISMAR | Point | | 2 |
| DMPGRD | Point/Area | If RESTRN defined | 3 |
| DMPGRD | Point/Area | | 2 |
| DOCARE | Area | | 1 |
| DRGARE | Area | | NOT SET |
| DRYDOC | Area | | 1 |
| DWRTCL | Line | | NOT SET |
| DWRTPT | Area | | NOT SET |
| DYKCON | Line/Area | If sharing geometry with area LNDARE & (DEPARE or DRGARE) objects | NOT SET |
| DYKCON | Line | | 1 |
| EXEZNE | Area | | 3 |
| FAIRWY | Area | | 3 |
| FERYRT | Line/Area | | 3 |
| FLODOC | Line | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| FLODOC | Area | | NOT SET |
| FNCLNE | Line | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| FNCLNE | Line | | 1 |
| FOGSIG | Point | If Slave SCAMIN must match that of Master | 3 |
| FORSTC | Point/Line/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| FORSTC | Point/Line/Area | | 1 |
| FRPARE | Area | | 2 |
| FSHFAC | Point/Line/Area | | 2 |
| FSHGRD | Area | | 1 |
| FSHZNE | Area | | 3 |
| GATCON | Point/Line/Area | | 2 |
| GATCON | Line/Area | If sharing geometry with area LNDARE & (DEPARE or DRGARE) objects | NOT SET |
| GRIDRN | Point/Area | | 1 |

| OBJECT | PRIMITIVE | CONDITION | SCAMIN STEPS |
|--------|-----------|-----------|--------------|
| HRBARE | Area | | 3 |
| HRBFAC | Point/Area | | 1 |
| HULKES | Point | | 1 |
| HULKES | Point | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| HULKES | Area | | NOT SET |
| ICEARE | Area | | 3 |
| ICNARE | Point/Area | | 1 |
| ICNARE | Point/Area | If RESTRN defined | 3 |
| ISTZNE | Area | | NOT SET |
| LAKARE | Area | | 1 |
| LIGHTS | Point | If Slave SCAMIN must match that of Master | 4 (see Notes 2 & 3 above) |
| LITFLT | Point | | 4 (see Notes 2 & 3 above) |
| LITVES | Point | | 4 (see Notes 2 & 3 above) |
| LNDARE | Point/Line/Area | | NOT SET |
| LNDELV | Point | If CONVIS = 1(visually conspicuous) | 3 |
| LNDELV | Point/Line | | 1 |
| LNDMRK | Point/Line/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) or FUNCTN = 33 | 3 |
| LNDMRK | Point/Line/Area | | 1 |
| LNDRGN | Point/Area | | 1 |
| LOCMAG | Point/Line/Area | | 3 |
| LOGPON | Point/Area | Covered by an area DEPARE, DRGARE, or UNSARE object | 4 |
| LOGPON | Point/Area | | 1 |
| LOKBSN | Area | | 1 |
| M_ACCY | Area | | NOT SET |
| M_COVR | Area | | NOT SET |
| M_CSCL | Area | | NOT SET |
| M_HOPA | Area | | NOT SET |
| M_NPUB | Area | | NOT SET |
| M_NSYS | Area | | NOT SET |
| M_QUAL | Area | | NOT SET |
| M_SDAT | Area | | NOT SET |
| M_SREL | Area | | NOT SET |
| M_VDAT | Area | | NOT SET |
| MAGVAR | Point/Line/Area | | 1 |
| MARCUL | Point/Line/Area | If EXPSOU = 2 (shoaler than range of the surrounding depth area) & VALSOU ≤ 30m | 4 |
| MARCUL | Point/LineArea | If RESTRN defined | 3 |
| MARCUL | Point/Line/Area | | 1 |
| MIPARE | Point/Area | | 3 |

| OBJECT | PRIMITIVE | CONDITION | SCAMIN STEPS |
|--------|-----------|-----------|--------------|
| MORFAC | Point/Line/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| MORFAC | Point/Line/Area | | 2 |
| NAVLNE | Line | | 3 |
| NEWOBJ | Point/line/Area | | 4 |
| OBSTRN | Point/Line/Area | | NOT SET |
| OBSTRN | Point/ Line/Area | If VALSOU > 30m and EXPSOU <> 2 | 4 |
| OFSPLF | Point | Not covered by an area OSPARE | 4 |
| OFSPLF | Point/Area | | 3 |
| OFSPLF | Area | | 4 |
| OILBAR | Line | | 4 |
| OSPARE | Area | | 4 |
| PILBOP | Point/Area | | 3 |
| PILPNT | Point | Where used to mark position of LIGHTS object in water | 4 |
| PILPNT | Point | If CONVIS = 1(visually conspicuous) | 3 |
| PILPNT | Point | | 2 |
| PIPARE | Point/Area | | 3 |
| PIPOHD | Line | Covered by an area DEPARE, DRGARE, or UNSARE object | 4 |
| PIPOHD | Line | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| PIPOHD | Line | | 1 |
| PIPSOL | Point/Line | Covered by an area DEPARE, DRGARE, or UNSARE object | 3 |
| PIPSOL | Point | Covered by an area LNDARE object | 1 |
| PONTON | Line | | 2 |
| PONTON | Line | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| PONTON | Area | | NOT SET |
| PRCARE | Point/Area | | 3 |
| PRCARE | Point/Area | Sharing geometry with either DWRTCL, DWRTPT, ISTZNE, TSELNE, TSEZNE, TSSCRS, TSSLPT or TSSRON objects | NOT SET |
| PRDARE | Point/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| PRDARE | Point/Area | | 1 |
| PYLONS | Point/Area | Covered by an area DEPARE, DRGARE, or UNSARE object | NOT SET |
| PYLONS | Point/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| PYLONS | Point/Area | | 1 |
| RADLNE | Line | | 3 |
| RADRFL | Point | If Slave SCAMIN must match that of Master | 3 |
| RADRNG | Area | | 3 |

| OBJECT | PRIMITIVE | CONDITION | SCAMIN STEPS |
|--------|-----------|-----------|--------------|
| RADSTA | Point | If Slave SCAMIN must match that of Master | 2 |
| RAILWY | Line | | 1 |
| RAPIDS | Point/Line/Area | | 1 |
| RCRTCL | Line | | 3 |
| RCTLPT | Point/Area | | 3 |
| RDOCAL | Point/Line | | 3 |
| RDOSTA | Point | If Slave SCAMIN must match that of Master | 1 |
| RECTRC | Line/Area | | 3 |
| RESARE | Area | | 3 |
| RETRFL | Point | If Slave SCAMIN must match that of Master | 3 |
| RIVERS | Line | | 1 |
| RIVERS | Area | | 4 |
| ROADWY | Point/Line/Area | | 1 |
| RSCSTA | Point | | 3 |
| RTPBCN | Point | If Slave SCAMIN must match that of Master | 3 |
| RUNWAY | Point/Line/Area | If CONVIS = 1(visually conspicuous) | 3 |
| RUNWAY | Point/Line/Area | | 1 |
| SBDARE | Point/Line/Area | | 1 |
| SEAARE | Point/Area | | 1 |
| SILTNK | Point/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1(radar conspicuous) | 3 |
| SILTNK | Point/Area | | 1 |
| SISTAT | Point | If Slave SCAMIN must match that of Master | 1 |
| SISTAW | Point | If Slave SCAMIN must match that of Master | 1 |
| SLCONS | Point/Line/Area | | NOT SET |
| SLOGRD | Point/Area | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| SLOGRD | Point/Area | | 1 |
| SLOTOP | Line | If CONVIS = 1(visually conspicuous) or CONRAD = 1 (radar conspicuous) | 3 |
| SLOTOP | Line | | 1 |
| SMCFAC | Point/Area | | 1 |
| SNDWAV | Point/Line/Area | | 3 |
| SOUNDG | Point | | 1 |
| SPLARE | Point/Area | If RESTRN defined | 3 |
| SPLARE | Point/Area | | 1 |
| SPRING | Point | | 1 |
| STSLNE | Line | | 3 |
| SUBTLN | Area | | 3 |
| SWPARE | Area | | 3 |
| T_HMON | Point/Area | | 1 |
| T_NHMN | Point/Area | | 1 |

| OBJECT | PRIMITIVE | CONDITION | SCAMIN STEPS |
|--------|-----------|-----------|--------------|
| T_TIMS | Point/Area | | 1 |
| TESARE | Area | | 3 |
| TIDEWY | Line/Area | | 1 |
| TOPMAR | Point | If Slave SCAMIN must match that of Master | 3 |
| TS_FEB | Point/Area | | 3 |
| TS_PAD | Point/Area | | 2 |
| TS_PNH | Point/Area | | 2 |
| TS_PRH | Point/Area | | 2 |
| TSELNE | Line/Area | | NOT SET |
| TSEZNE | AREA | | NOT SET |
| TSSBND | Line | | NOT SET |
| TSSCRS | Area | | NOT SET |
| TSSLPT | Area | | NOT SET |
| TSSRON | Area | | NOT SET |
| TS-TIS | Point/Area | | 2 |
| TUNNEL | Line/Area | Covered by an area DEPARE, DRGARE, or UNSARE object | 4 |
| TUNNEL | Line/Area | Covered by a LNDARE object | 1 |
| TWRTPT | Area | | NOT SET |
| UNSARE | Area | | NOT SET |
| UWTROC | Point | | NOT SET |
| UWTROC | Point | If VALSOU > 30m and EXPSOU <> 2 | 4 |
| UWTROC | Point | Covered by an area OBSTRN object | 2 |
| VEGATN | Point/Line/Area | If CONVIS = 1(visually conspicuous) | 3 |
| VEGATN | Point/Line/Area | | 1 |
| WATFAL | Point/Line | If CONVIS = 1(visually conspicuous) | 3 |
| WATFAL | Point/Line | | 1 |
| WATTUR | Point/Line/Area | | 3 |
| WEDKLP | Point/Area | | 3 |
| WRECKS | Point/Area | | NOT SET |
| WRECKS | Point/Area | If CATWRK = 1 or (VALSOU > 30m and EXPSOU <> 2) | 3 |
| WRECKS | Point/Area | CONVIS = 1 (visually conspicuous) or CONRAD = 1 (radar conspicuous) | |

Optional additional rules that can be manually applied to fine tune the application of SCAMIN after the above values have been automatically applied.

| OBJECT | PRIMITIVE | CONDITION | SCAMIN STEPS |
|--------|-----------|-----------|--------------|
| OBSTRN | Point | The most significant OBSTRN of a group of OBSTRNS within close proximity | NOT SET |
| OBSTRN | Point | For groups of OBSTRNs in close proximity, or within an OBSTRN area | 2 |

| | | | |
|---|---|---|---|
| SOUNDG | Point | SCAMIN should be applied so that the least significant soundings are set to 1 step progressing to 4 steps for the most significant, above the compilation scale in order to achieve a gradual reduction in the sounding displayed as the user zooms out. | 1, 2, 3, 4 |
| UWTROC | Point | The most significant UWTROC of a group of UWTROCs within close proximity and not within an OBSTRN area | NOT SET |
| WRECKS | Point/Area | For groups of WRECKSs in close proximity (the most significant should not have SCAMIN) | 2 |

**GUIDELINES for ENCODING TEMPORARY and PRELIMINARY ENC UPDATES**

**INTRODUCTION**

At its 20th meeting held in Brazil in November 2008, the Committee on Hydrographic Requirements for Information Systems (CHRIS) – replaced by the Hydrographic Services and Standards Committee (HSSC) in January 2009, drew attention to inconsistencies in the promulgation and distribution of Temporary (T) and Preliminary (P) Notices to Mariners (NMs) intended for use in ECDIS. It was identified that:

- about half of all ENC Producer States promulgate the equivalent of paper chart (T) and/or (P) NMs via ENC updates, whereas the other half invite mariners to refer to Notices to Mariners booklets or websites;

- not all paper chart (T) and (P) NMs which relate also to ENCs are in English;

- translation of (T) and (P) NMs intended for paper charts into ENC updates is sometimes difficult and may introduce an additional time delay for the distribution of navigationally significant information;

- it is very difficult for ENC users to comprehend the (T) and (P) NM network and get rapid and seamless information from one region to the other.

The CHRIS agreed that the situation has implications for safety of navigation and consistency between ENC services and therefore requires urgent study and resolution. As a result, the CHRIS decided to form a Working Group (ENC Updating Working Group - EUWG) tasked with developing contemporary guidance on standardised processes for the delivery and implementation of updates to ENCs. More specifically the EUWG was asked to develop and propose a pragmatic approach to overcome any current shortcomings in the updating mechanisms for (T) and (P) NMs in ENCs.

The following guidance is the result of the work of the EUWG. It was developed through an iterative process of correspondence with all the members of the WG. It provides high level guidance for the promulgation of the equivalent of paper chart (T) and/or (P) NMs via ENC updates (ER application profile). Through a set of recommendations, it provides keys to compile the appropriate ENC updates. The guidance conforms with the current IHO standard (S-57 Edition 3.1). It allows for some latitude in its application and is dependant on the assessment of each particular case, and as such relies ultimately on the judgement of each ENC producer.

**PART A - Temporary Notices to Mariners**

**GENERAL**

1. Temporary Notices to Mariners, (T) NMs, for paper charts are defined in S-4, Section B-600, in particular § B-633 ~~(under development by CSPCWG)~~. A (T) NM promulgates navigationally significant information that will remain valid only for a limited period of time.

   For the paper chart, the convention is for the mariner to insert the update on the chart in pencil, and erase it when the (T) NM is cancelled.

   S-57 provides mechanisms which allow ENCs to be automatically updated (ER application profile[1]). This allows the affected ENC(s) to be continually updated in a timely manner for the duration of the NM without additional workload for the mariner.

   Hydrographic Offices (HOs) should promulgate temporary navigationally significant information by ENC update to provide the ECDIS user with an updated SENC. This service corresponds to the service that (T) NMs offer to the paper chart user.

2. ER encoding for an ENC and (T) NM for the paper chart are two completely different communication processes for promulgating information to the mariner. Since these processes are different (but not supposed to be independent), and the products to which they apply are also different, it is recommended that ENC updates be derived from the source information rather than the paper chart (T) NM. Often the (T) NM for paper chart does not provide enough detail to perform the relevant ENC update.

3. If possible the information should be encoded with the relevant S-57 objects. However, HOs should consider the following:

   - An ENC update must not be initiated if the information will no longer be valid by the time it is received by the mariner; this will depend upon the timescales relating to the producer nation's ENC updating regime. Shorter time periods may be covered by Radio Navigational Warnings (RNW). If known, the ENC update should include an indication of how long the temporary change will remain in force.

   - If it is unlikely that the HO will be notified when a temporary change will revert to its original charted state, the HO should consider an alternative method such as a general note or by issuing an ENC update explaining, for example, that the aids to navigation within an area are reported to be unreliable.

   It is important that HOs should consider constraints of time when identifying the encoding method. Time consuming and unnecessarily complex methods of encoding should be avoided.

4. The overuse of CTNARE objects (especially CTNARE of type area) for temporary information should be avoided. The CTNARE object is used when it is relevant for the situation and/or when a particular change needs a special warning. CTNARE[2] may be used when the relevant objects cannot be encoded, e.g. information cannot be displayed clearly or cannot be easily promulgated due to time constraints.

5. To correctly encode an ENC update the source information is essential in determining which elements of the update are reliable, which are permanent and which are temporary. The STATUS attribute value 7 (temporary) should only be used in an update when it is certain that the status of an object is confirmed as temporary.

6. Use of DATSTA – DATEND:

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[1] The ER application profile only applies to ENC update cell files. S-57 Appendix B.1 - ENC Product Specifications refers

[2] An implementation of "New Object" may be approved in the future (see S-57 supplement no. 2 – June 2009). The use of such objects may be more appropriate than the use of CTNARE in this or in other cases.

The earliest date on which an object will be present (DATSTA) and the latest date on which an object will be present (DATEND) must only be encoded when known. When these dates are encoded for navigational aids, DATSTA and DATEND must be populated on each component of the aid (for FOGSIG, RETRFL and TOPMAR, *refer to S-57 Edition 3.1 Supplement No. 2 - June 2009*).

The ENC update should be issued as close as possible to the earliest date of the change (DATSTA), unless it is appropriate to provide the information well in advance. An object no longer present should be removed by issuing a further update as soon as possible after the return to the original charted state (DATEND). The timing of the issue of these updates will depend upon the producer nation's ENC Updating regime and its corresponding timescales.

When an ENC update promulgates information well in advance and uses DATSTA and DATEND, a CTNARE object may be used in order to inform mariners that temporal information exists at some future point in time.

NOTE: some older legacy ECDIS's may not have the functionality to manage temporal information correctly or may have implemented it incorrectly. Some ENC producers may wish to include additional encoding to safeguard against this. For example, insert a CTNARE describing the changes and timings.

7. The INFORM attribute should be used to provide supplementary or contextual information when encoding temporary (or preliminary) information. When the text is too long to be encoded with INFORM (the INFORM/NINFOM text should not be over 300 characters - *see S-57 MAINTENANCE DOCUMENT, clarification 8.Cl.1*), the attribute TXTDSC should be used. Encoders using INFORM/TXTDSC to provide positional information must express the coordinate values in WGS 84 and in accordance with S-4 §B-131. If it is deemed necessary a picture file (PICREP) may be added. If the relevant object class (e.g. CTNARE) does not have PICREP as an allowable attribute then this may be attributed against a M_NPUB object which shares the same geometry as the relevant object.

8. ENC updates issued for temporary information should be carefully managed and reviewed regularly to consider whether further action is necessary. New information may have been received that necessitates the issuing of a new update to modify or cancel the previous one. HOs should make it easy to recover the original charted state before the temporary changes came into effect.

9. Further verification is recommended to make sure that the encoded ENC update is consistent with the corresponding paper chart NM.

**GUIDELINES FOR TYPICAL CASES**

a. Individual new physical objects (e.g. wreck, buoy) with no associated explicit or implicit area associated (e.g. restricted area):

Encode the relevant S-57 object.

In this instance a CTNARE would not normally be used.

b. Individual new physical objects with an associated explicit area around it:

Encode the relevant S-57 area object (e.g. RESARE). The relevant object is created for the new physical object. However, when the area is an "entry prohibited area" or a CTNARE the new physical object may be omitted to simplify encoding unless it is navigationally significant.

c. Individual new physical object with a notification of caution, e.g. "Mariners are advised to navigate with caution…":

Encode the relevant S-57 object. Additional clarification and advice may, if required, be provided in INFORM or TXTDSC. Exceptionally, a CTNARE may be created to highlight the caution if considered necessary.

d. Obstructions (including wrecks) reported to exist within an area:

Encode an OBSTRN area or WRECKS area.

e. New simple area object (military practice area, dredged area):

Encode the relevant S-57 area object.

Supplementary information is provided in INFORM or TXTDSC.

Normally, a CTNARE is not added.

f. Complex information within an area (e.g. works in progress where the changes are numerous or involve complex changes to the topology):

Encode the area object. It should be encoded with the relevant S-57 object or, if more suitable or by default, a CTNARE. Supplementary or contextual information is provided in INFORM or TXTDSC. When the available information is sufficiently detailed, navigationally significant objects (e.g. navigational aids, obstructions) are created or modified within the area. When the available information does not permit this, a CTNARE defining the area is preferred.

g. Changes to an existing object (e.g. navigational aid):

In these instances it is usually only necessary to change the attributes values. A CNTARE may be used to warn the mariner if it is considered necessary.

h. Buoy temporarily moved:

When a buoy is temporarily moved, then it, and any associated objects, are "moved" to the new position and the STATUS attribute value 7 (temporary) is used. Alternative encodings are possible, for example, if the move is for a fixed period of time. In these cases the object, and any associated components, can be created in the temporary position with DATEND attributed to it and populated with the date corresponding to the end of the fixed period of time. The currently charted object, and any associated components, can be attributed with DATSTA populated also with the date corresponding to the end of the fixed period of time. A Cautionary Area may, if considered necessary, be added. Data producers may wish to consider the NOTE in section 6 under the "General" heading above.

i. Light temporarily extinguished:

The STATUS attribute of the LIGHTS object is encoded with the values 11 (extinguished) and 7 (temporary).

j. Change to a maintained depth in a dredged area:

When information is received from an official or recognised survey authority relating to a dredged area where the dredged depth has changed, the attribute value of DRVAL1 for the DRGARE object should be changed to the value provided by the survey.

When a depth within a dredged area is reported shoaler than the stated maintained depth, then a CTNARE is created covering the shoaler depth area concerned. The depth information is provided in the CTNARE attribute INFORM. Additionally a **SOUNDG** object with attribute EXPSOU = *2* (shoaler than the range of depth of the surrounding depth area) may be created (but see clause 5.3 Note). The value of the shoaler depth may also be populated using the attribute DRVAL1 for the **DRGARE**, with the original dredged depth populated using the attribute DRVAL2. See also S-4. B-414.5~~Additionally a SOUNDG object with the attribute EXPSOU set to the value 2 (shoaler than the range of depth of the surrounding depth area) may be created. See also S-4, § B-414.5.~~

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**Part B - Preliminary Notices to Mariners**

**GENERAL**

1. Preliminary Notices to Mariners, (P) NMs, for paper chart are defined in S-4, Section B-600, in particular § B-634 ~~(under development by CSPCWG)~~. A (P) NM promulgates navigationally significant information early to the mariner e.g. when a paper chart new edition cannot be issued in due time.

   For the paper chart, the convention is for the mariner to insert the update on the chart in pencil, and erase it when the (P) NM is cancelled.

   S-57 provides mechanisms which allow ENCs to be automatically updated (ER application profile). This allows the affected ENC(s) to be continually updated in a timely manner for the duration of the NM without additional workload for the mariner.

   HOs should promulgate preliminary navigationally significant information by ENC update to provide the ECDIS user with an updated SENC. This method of delivery corresponds to the service that (P) NMs offer to the paper chart user.

2. ER encoding for ENC and (P) NM for paper chart are two completely different communication processes for promulgating information to the mariner.

   For example, there are instances when the paper chart needs updating using a NM block (also known as a chartlet or patch) or by issuing a new edition due to the complexity or volume of changes. This could clutter the paper chart unacceptably if amended by hand and/or overburden the chart corrector. The lead time for a NM block correction or a new edition can be lengthy, sometimes several months. In these cases a (P) NM may be issued as an interim measure. The ENC updating mechanisms are more flexible and may allow for ENC updates to be issued in quicker time. However, experience has shown that large updates can cause the ECDIS processing issues and in particular inordinately long loading times. Producing an ENC new edition may be the better option in some cases.

   There may be other instances, when new information is received, where it is not possible to fully update both the ENC and paper chart promptly. For example, not all the information required to produce a chart-updating NM is received by the HO in the first notification (for instance notification of works in progress or projected) or extensive new information requires significant compilation work. In these cases it is still necessary to provide notification of navigationally significant changes to the mariner in a timely manner.

   Since the paper chart and ENC processes are different (but not supposed to be independent), and also the products to which they apply are different, it is recommended that ENC updates be derived from the source information rather than from the paper chart (P) NM. It is often the case that the paper chart (P) NM does not provide enough detail to encode the ENC update exactly as it should be.

3. Simple or more complex encoding methods are possible but it is important that HOs should consider carefully which encoding method is appropriate when creating an ENC update with due consideration for time.

4. Often, information received is too complex, extensive and/or imprecise to be encoded with the relevant S-57 objects. In these instances the use of the CTNARE object and its attribute INFORM is preferred to give a précis of the overall changes together with detailed navigationally significant information. For complex or extensive changes the CTNARE should have an associated TXTDSC file containing precise details of the preliminary information. See also Part A, § 7 above. If the information is less precise then the INFORM attribute should be used to inform users of this fact.

   It is noted that the mariner, if it is considered necessary, has the facility in the ECDIS to add "Mariner Objects" and annotate them. These can be saved in the SENC based

on information provided in textual form by the TXTDSC or INFORM attributes. It is envisaged that these objects would be created at the "Route Planning" stage and act as a prompt during the "Route Monitoring" phase.

When information is issued as advance notification for an ENC it is necessary to provide as soon as possible to the mariner the final and full charted information encoded with the relevant S-57 objects. An ENC update or a new edition of the ENC cell should therefore be issued at a later date when the HO can carry out full encoding of the changes. The period of time will depend on the following:

- the time needed by the HO to undertake the full encoding with relevant objects;

- the time needed to obtain confirmation of details; and

- the date at which the real world situation is stabilized and any forecast changes have been completed.

5. Source Information received may contain some navigationally significant elements that are simple to encode with the relevant objects in a timely manner. In these instances these elements may be encoded with the relevant objects provided that they reflect the 'real world' situation after the ENC update is made available to the user. However, if the changes are subject to continual change these objects should be amended as a consequence and will represent additional work for the HO. In such cases, the ENC update should also warn users that the situation is subject to change. For temporary information, see part A.

6. Use of DATSTA – DATEND: see part A, § 6. For new or amended routeing measures, see ENC Encoding Bulletin number 25.

7. Use of INFORM: see part A, § 7.

8. Diagrams are sometimes very useful to the mariner, e.g. for indicating changes to complex routeing measures or the introduction of new ones. A picture file may be referenced using the attribute PICREP in such cases. As the CTNARE object does not allow PICREP attribution, the picture file may be referenced by a M_NPUB object which shares the same geometry as the CTNARE.

9. ENC updates issued for Preliminary information should be managed and reviewed regularly. For example further source information may have been acquired requiring a further ENC update. This may add, modify or cancel information previously promulgated.

10. Further verification is recommended to make sure that the encoded ENC update is consistent with the corresponding paper notice.

**GUIDELINES FOR TYPICAL CASES**

a. Traffic separation schemes:

*Encoding bulletin E25 – April 2009* and following versions should be applied. For the use of the attributes DATSTA end DATEND, see also, part A, § 6.

b. Complex information within an area of change (e.g. works in progress):

A CTNARE object is created to cover the area. Information is provided in either INFORM, e.g. under construction, or TXTDSC when it is necessary to give more detailed information. If sufficiently detailed information is available, then navigationally significant information such as navigational aids, fairways, regulated areas, etc. can be created or modified within the CTNARE if time permits.

As the CTNARE object does not allow PICREP attribution, the picture file may be referenced by a M_NPUB object which shares the same geometry as the CTNARE.

Alternatively and if considered appropriate a RESARE – "entry prohibited area" object can be used instead the CTNARE object.

c. Simple information which does not need an additional notification of caution:

The relevant object(s) and the appropriate attributes are encoded with any additional contextual information provided in INFORM or TXTDSC. In this case it is not necessary to use a CTNARE object. This could apply, for example, to submarine cables or pipelines being laid (CBLSUB, PIPSOL) or area under reclamation (LNDARE with CONDTN = 3 "under reclamation"). If necessary the encoding should reflect, if appropriate, that positions are approximate.

d. Depths less than those charted within a defined area:

If the depth values and their positions are known, SOUNDG objects may be created or modified. Any affected depth contours and depth areas should also be amended as necessary. The source of the information should be encoded using the attribute SORIND. However, HOs should carefully consider the time needed to update ENC depth information and the complexity of changes to the topology that may be required. The encoding of amended SOUNDG, DEPARE and associated objects could be inappropriate for promulgating this navigationally significant information within acceptable time scales. In this case a CNTARE is the preferred option. In such cases, only the most significant amendments to depth information should be provided in the attribute INFORM or TXTDSC. This method should also be used if the depth values and/or the exact positions are unknown, or if the HO only has information relating to a limited number of depth values.

**Summary of responses to EUWG letter 01/2011 and 02/2010 – Conclusions**

Summary of responses to EUWG letter 02/2010

Chair Conclusion on summary of responses to EUWG letter 02/2010

Summary of responses to EUWG letter 01/2011

Chair comment on Summary of Responses to EUWG letter 01/2011

Action on S-57 documents required (TSMAD)

| Question number | |
|---|---|
| **1.** (letter 02/2010) | **Should the maximum size of an ER be balanced against the maximum number of ER (see ZA question)?** <br> **Note: answers are especially expected from members in contact with end-users or EDCIS manufacturers.** <br><br> *ZA: "Concerning the matter of the size and number of updates to an individual ENC cell. Our update files are very small in digital size, the largest recorded for an ENC update being 35kB in size. We currently have one ENC which has 28 updates issued for it. The total size of these updates is 198kB; of which the 3 largest updates total 86kB. The remaining 25 average 3kB in size each.* <br><br> *My question here is this decision to be based purely on the number of updates not to exceed a certain total , or should this decision whether to amalgamate updates in a new edition be based on the agreed upon ceiling in terms of total digital size of these updates be considered? In other words can one have 30 updates that in total that do not exceed 500kB or being produced or have 7 updates say producing 500kB in total size being produced before a decision is reached to produce a new edition?* <br><br> *My concern is that if we apply to low a threshold on the number of updates that can be allowed before a new edition is "forced" in time to come one could be faced an ENC which has run out of ENC update numbering - some paper charts have been around for many many years and why should it not be different with an ENC."* |
| | Your answer: <br> **AU** <br> AU believes that the IHO should keep the maximum recommended size for an Update and the number of Updates published for a cell before an EN is required as separate issues in its guidance.  If agreement can be reached on a recommended maximum Update file size which is easily handled by the ECDIS but does not restrict the amount of data that can be incorporated in the Update too much, as |

well as a maximum number of Updates before it is considered that the data is becoming difficult to manage by Service Providers and users, then this should not be an issue. HOs should then be able to make decisions regarding their ENC data based on these recommendations and other factors such as the nature of the cell (complexity and frequency of Updates, etc).

In our experience, we have not yet had a circumstance where we have had to consider publishing a New Edition of an ENC cell because we have, in our opinion, had too large a number of extant Updates applicable to the current Edition of the cell.

**CA**

[CHS comments] CHS has not had any feedback from clients or RENC concerning how many updates have been released for a base cell. Currently, CHS only has 5 ENC base cells with more than 5 updates issued, with the most being 7 updates to one base file.

CHS issues new edition ENC if update becomes too complex or with many changes, or if a new edition paper chart is released.

Not sure if a maximum number of updates should be enforced. Have there been issues with ECDIS loading larger number of small updates as well as loading large updates?

**DK**

It is not uncommon for the DKHO to issue a new edition which only contains updates based on the validation tools failure.

**FI**

FI has not seen any reason to adopt limits on the number of updates or the size of an update.

**FR**

It seems logical to balance the number of ERs and the total size of updates.

A very large ER in size could cause more disruption in an ECDIS system than great number of small and simple ERs.

**IT**

IIM usually tries to balance number and size of the updates, but feels that is not necessary to define a specific mandatory rule.

Max number and size of updates can be provided as a suggestion.

**JP**

We feel that it might be worthwhile to consider not only the maximum number but also the total size of cumulative ERs if it is intended to put restriction on the amount of ERs in order to reduce the time taken to load a new cell into an ECDIS.

**KR**

We have not had complian from users about the number of updates or its maximum size problems.

EDCIS manufacturers said that those are not matters number of updates(below 999) or its maximum size problems in ECDIS

**LV**

We have not had feedback from users about the number of updates or its

maximum size problems.


**NL**


At the moment we do not have rules on the maximum number of updates.

We try to keep the size of an update as small as possible, but if the size exceeds the 50 kb (a little bit) we don't issue a new edition.

**NO**

We at NHS are not sure that we need upper limits regarding the total size of ER's for a cell, and amount of updates (ER) before a New Edition. If it's not a problem for the distributor, end-users or the ECDIS, we think that the producers should decide their own limits.

**PT**

IHPT supplies the Portuguese Navy with the entire folio of ENCs and updates from the Portuguese area of responsibility. The systems used by our ships are mainly ECPINS, but we have a few others.

The weekly exchange set produced by IHPT contains 76 ENCs, and in average 369 update files and more than 350 text files. The average number of updates for a single ENC cell are about 11 and the average size of those updates are about 5 kB, but there are a few ENC cells that may contain 25 updates and the size of the biggest doesn't exceed 15kB. Until now, we didn't receive any complaints.

Accordingly with the IHO recommendation in EB No31, an ENC update should not exceed 50 Kilobytes in size, as some ECDIS experience problems with loading large update data sets. Also, every time an update file exceeds 50kB, we are advised by IC-ENC to produce a New Edition for that ENC.

Theoretically, S-57 allows producers to make 999 update files and after that a re-issue should be made. IHPT hasn't experience on what happens to the ECDIS systems when that number of update files is achieved.

So, in our opinion it should be bearing in mind the end users needs and of course get a balance between the maximum sizes of an ER and the maximum number of ER. If there are ECDIS systems experiencing problems because the size of an ER file is too big or an ENC contain a large number of ER files, it seems reasonable that a new edition should be produced.

**ZA**

Would it be feasible to consider that the time to produce a new edition of an ENC could be when the kB size of total number of Updates in force exceed a percentage (say 10% or whatever percentage of the ENC base cell's size?

Another factor to consider is that IC-ENC, for example, will take longer to process a NE than an Update file, so putting too many NE's in the system may introduce possible delays in distribution to the end user.

**ES**

We believe that the number of updates must be independent of their size.

**UK**

The UK does not see any direct correlation between the size of the ER and the number associated with a particular edition of an ENC. The size of the ER is

directly proportional to amount of information required to encode it. The frequency of the issue of ERs depends on the area covered by the ENC, e.g. busy shipping route in the English Channel compared to a fishing harbour on a small Pacific Atoll. The ENC Product Specifications allows for up to 999 updates which should be sufficient capacity even if an ENC is around for many years. Although I would consider it prudent to re-issue the cell from time to time. Should the maximum number of updates be reached then the only option available is to issue a new edition (see 3 below).

This is not an exact science and each ENC should be considered on its own merits. If the ER is such that it has been derived, for example, from a NM paper block correction then the size of the resultant ER may be quite large. A subjective evaluation needs to taken as to whether this is released as an ER or New Edition (or re-issue). If we are gong to provide recommendations on this subject we first need to look more closely at providing some precise guidelines based on some sort of criteria. This could be related to the content of the ER and its complexity.

Some producer nations do not issue weekly update exchange sets but do so monthly. Under this updating regime the ENCs become more heavily updated over this extended period. This particular country gets around this by issuing either ERs or Re-issues (EN) based on an evaluation of the potential file sizes (see 2 below).

**PRIMAR**

We have not received much feedback regarding problems related to size and number of updates to an individual ENC cell and have therefore not much comments to questions 1-3. We think that too many "new editions" also could be a problem because of larger amount of data. Do we have any feedback from ECDIS manufactures about this?

**US (NOAA)**

In our experience Users have never complained about the number of updates, although we currently only have a couple of cells with 10 updates, and one of the criteria that does trigger a new edition would be a large number of critical corrections to the base cell.

Although, it is not uncommon for the US to issue a new edition that contains just updates due to an export failure.

As to a maximum, number of updates the upper limit is most likely constrained to 999 updates, however, NOAA feels that a hydrographic office will likely never reach that limit and eventually a new edition will be released. When EB 31 was drafted, no consideration was given to the maximum size of all the updates bundled together, only to the size of a single update.

**Conclusion: We are not going to create a rule to balance size and number of ER if there is no real problem nor a solution.**
**This is an issue of describing the variables (number, size and frequency of updates and when to do New Edition or Re-issue\*) and how this may impact on the service delivery including remote updating services and/or the ECDIS system depending on the individual decisions of HOs. We should be including**

| | | **information to provide HOs with the capability to make a more informed decision. Advices to be included in S-65.**<br>(*): S-57 Appendix B1 : "A re-issue does not contain any new information additional to that previously issued by updates." "After a re-issue, subsequent updates may be incorporated into the SENC created from this reissue or to the SENC created from the original data and kept continuously updated." |
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| | | |

| | | Yes | No |
|---|---|---|---|
| New question 1 (letter 01/2011) | Do you agree with this conclusion?<br>**Comments:**<br>**CA** Agree with conclusion. No rule necessary for max update (ER) size or number of updates (ER). CHS would like to hear more about others 'Reissue' experiences before committing to this as a fix for too many updates.<br>**AU** In the draft revision of the S-57 Use of the Object catalogue for ENC (UOC) submitted to TSMAD22 in April this year, new guidance has been included to keep ENC Updates below 50kb, in line with ENC Encoding Bulletin No. 31. There is no mention of the number of ER before a re-issue or new edition of the cell.<br><br>**Chair comment:** The guide "Updates below 50kb" exists and things seem to run well. So, there is no reason to change the guide in **UOC**. | JP, DK, CA, NO, AU, ZA, IT, PT, UK, KR, PRIMAR, NL, LV, FR | |
| **2.** (letter 02/2010) | **If the EUWG decides not to balance size against number of ERs (depends of answers to question 1), do you agree to include in S-65 that an ENC update should not exceed 50 Kilobytes in size as Encoding Bulletin No 31 advises?**<br>**See also question 3 below.**<br><br>**AU**<br>AU experience is that, in general, 50Kb is adequate for the majority of Updates that constitute the equivalent of a textual paper chart Notice to Mariners. In general, for the equivalent of a paper chart Notices to Mariners block correction we will produce a New Edition of the corresponding ENC cell(s). Having said this, some other observations made by AU that effect the decision as to whether to produce ER or EN include:<br>- Whether the amendments require changes to the Skin Of The Earth data for the cell (will sometimes result in changes to many and/or large depth/land areas);<br>- Whether the amendments affect the geometry of the data coverage limit of the cell. AU has had problems in ECDIS where, for instance, a new maritime boundary covering multiple cells and requiring new spatial features is required, which has resulted in new nodes being placed in the data coverage limit. When these changes have been implemented by ER there have been problems with some ECDIS.<br>**CA** | Yes<br>AU<br>CA (may be) DK<br>FI FR IT<br>KR LV<br>NL NO<br>PT ZA<br>ES<br>UK?<br>US | No<br>JP |

| | | | Yes | No |
|---|---|---|---|---|
| | [CHS Comments] CHS feels that the issue of update loading is an ECDIS issue and preferably the ECDIS manufacturers should remedy the issues some ECDIS have loading large updates. However, since update information is crucial to safe navigation, it is important that the HOs ensure that the updates are a "loadable size".<br><br>Some testing should be done to see if 'ratio' would be a better way to go. After all, some ENC cells are not very big (some just over 50KB base cells). In these circumstances, issuing 50KB updates seems redundant… the update would be almost the same size as the base cell. A new edition may be more efficient.<br><br>- Maybe a maximum size for an update is not the only thing to consider. Maybe if the update was a certain percentage size of the base cell, then a new edition should be issued instead?<br>**FI**<br>Yes, as long as it is a 'should'.<br>**FR**<br>Only as a guidance<br>**IT**<br>IIM feels that the value of 50 Kilobytes should be only just as an indication because could be difficult to estimate in advance the size of an update<br>**JP**<br>We think 50KB is too small compared with the acceptable limit for a base cell (5 MB)<br>**NO**<br>Yes, but only as a recommendation.<br>**US**<br>NOAA feels that if it is included in S-65 then the encoding bulletin should be cancelled as it is bad practice to have duplicative information in multiple places.<br>**Conclusion: The upper limit 50 kb must only be an indication. Regarding AU answer, it would be interesting to hear if there are any other Members who have had problems reported with Updates that affect large changes to Group 1 features or change the geometry of the cell limit. Advices to be include in S-57 and in S-65 if necessary.** | | | |
| New question 2 (letter 01/2011) | Do you have had problems reported with Updates that affect large changes to Group 1 features or change the geometry of the cell limit?(see AU comment above)<br>Your detailed answer if Yes: | | | JP, DK, CA, NO, AU, ZA, IT, PT, UK, KR, |

| | | | |
|---|---|---|---|
| | **AU** Comment:  As mentioned in the AU response to EUWG letter 02/2010, we do not issue ER if there are changes to the geometry of the data coverage limit of the cell or there are large skin of the earth changes – we now issue a New Edition of the cell.  Our experience with such changes issued as an ER were found in reviewing our Updates in-house on some ECDIS systems.  AU has not re-tested issuing such changes as ER to see if the ECDIS problems have been fixed in some time.<br>**UK** The UK has experienced problems in the past with changes to the data coverage limits within some ENC as described in the paper previously supplied. These were connected with some older legacy systems. No recent problems reported with our integrated service AVCS.<br><br>**Chair comment:** It appears that only a rule issued from the conclusions of  the UK paper  "A Unique Updating Scenario" should be integrated in **UOC** :  the coverage area of a update must not be outside of the original CATCOV=1. Updates that are completely outside the original coverage object with CATCOV = 1 are prohibited. | | PRIMAR, NL, LV, FR |
| **3.** (letter 02/2010) | **If the EUWG decides not to balance size against number of ERs (depends of answers to question 1), do you agree to advise in S-65 a limitation of the number of ERs for an base ENC cell (see UK arguments)?  What should be the reasonable maximum value suggested to producers (UK suggest 20)?**<br><br>*UK: "Producers should also be advised not to issue too many updates for a specific edition. The UKHO has seen examples where there are in excess of 60 updates associated with an edition of the ENC. S-65 could recommend an upper limit at which time a NE is issued. It can sometimes take longer to install a large number of updates on an ECDIS than it does to install a new cell or a NE. This is because the ECDIS has to add, modify or remove information in the SENC for each update. This is primarily aimed at new subscribers to ENC services loading the ECDIS for the first time. To put a balanced view on this, it is probably better for users downloading updates via an online service to download update files as they are a smaller file size than NEs. The UKHO has a policy to issues a new edition of the ENC if the number of updates reaches 20."*<br>**AU**<br>There does not appear to be sufficient evidence on which to | Yes<br>**AU CA DK FR IT JP KR LV NL PT ZA ES UK US**<hr>Value :<br>**AU: 20<br>CA: 25<br>DK: 20<br>FR: 50<br>IT: 30<br>JP: ?<br>KR: 30<br>LV: 20<br>NL: 20<br>PT: Depends on the total size of ER** | No<br>**FI NO** |

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| | base a conclusive number.  AU would prefer to err on the conservative side so as to try to guarantee no problems with any ECDIS.  As stated in our comment for Q1 above, AU has not yet had occasion to make such a decision.<br>**CA**<br>[CHS Comments] CHS currently does not have any base datasets with more than 7 updates. We have not received any complaints. And in most cases, a new edition would be issued if too many updates accumulated.<br><br>In addition, the 'reissue' datasets in Appedix B1 –ENC Product Specification, are meant to deal with cases where there may be too many updates.  'Reissue' datasets are defined as "including all the updates applied to the original data set up to the date of the reissue.<br>A re-issue does not contain any new information additional to that previously issued by updates."<br>**FI**<br>FI has not seen any reason to limit the number of ERs yet. Currently the highest update number on a FI cell is 59, while the average number of updates is 7. In total 19 (of 204) FI cells have more than 20 updates.<br>Our QC procedures for ENs and ERs are quite different and therefore ENs are issued instead of ERs only as a last option to solve an technical issue.<br>**FR**<br>20 ERs doesn't seem enough, especially for small ERs.<br>Only as a guidance<br>**JP**<br>We don't have enough information to judge the reasonable maximum number of cumulative ERs.<br><br>We don't think that there is any need for applying a limitation to the number of ERs as long as re-issues are provided timely<br>**NO**<br>We think it should not be a limitation of number of ERs for a specific edition of an ENC. We have some end-users (especially Pilots) that prefer to receive ERs for minor updates instead of NE. Another issue is that our production system sometimes produces several small ERs instead of one large for technical reasons.<br>**(\*) ZA**<br>30 (based on the fact that our updates seldom exceed 11kb per update file)<br>**UK**<br>The above example was based on a vessel visit where UK was installing ENCs on a new ECDIS. The system appeared to "hang" when installing a certain country's ENC updates. In | **files (cf 1.).**<br>**ZA: 30\***<br>**ES: 25**<br>**UK: 20**<br>**US: 25** | |

| | | | Yes | No |
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| | some instances a single update took in excess of ten minutes (much too long) to be applied to the SENC.<br><br>It must be said however that this particular system carries out the full suite of S-58 validation checks therefore the system has to cycle through these checks for each update. With a large number of updates associated with a particular ENC edition this can add significantly to the ENC to SENC import times.<br>**US**<br>I have noted that this particular country is now using re-issues to reduce the number of update files.<br>NOAA:  Note that the concept of re-issue was supposed to be used when the amount of updates became too great.<br><br>Conclusion: The interest of the re-issue is highlighted here to reduce the numbers of ER<br>**Conclusion: The utility of the limitation of the number of ER doesn't seem obvious and it is difficult to define a threshold. Here the interest of the re-issue is highlighted. It should to be used when the amount of updates became too great. Note that the re-issued offers benefits for new subscribers not for users who regularly load ER (especially by download online services). Again we should provide a balance approach and list the pros and cons and provide an indication.**<br>**Advices to be included in S-65.** | | |
| | | Yes | No |
| New question 3 (letter 01/2011) | Do you agree with this conclusion?<br>**Comments:**<br>**AU** assumes that the advice in S-65 will be for producing authorities to make their own determination as to when to produce a re-issue in order to make loading of ENCs easier for new subscribers.  Agree that this should be in S-65 rather than in UOC as it is a management rather than encoding issue.  Note that guidance has been included in the UOC only on the maximum recommended size of ER (see AU comment for new Q1 above).<br>**UK** agrees that ENC producers should be advised of the issues which relate to re-issues highlighting the benefits it provides  new subscribers whilst creating larger update files for those using remote updating services.<br>**KR** We have 6 month plans to re-issue.<br><br>**Chair comment:** Advice to be included in S-65 | JP, DK, CA, NO, AU, ZA, IT, PT, UK, KR, PRIMAR, NL, LV, FR | |
| **4**. (letter | **As suggested by UK, do you agree to include in S-65 that** | Yes | No |

| 02/2010) | **an ER must not change the limit of data coverage for the base as Encoding Bulletin No 31 mandates?** | AU CA DK FI FR JP KR LV NL NO PT ZA ES UK PRIMAR US | IT |
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| | **CA** [CHS Comments] Changing the limit is a significant change and a new edition should be issued to change limits. | | |
| | **FR** Agree that an ER must not amend this limit for an appreciable change. It should be acceptable to slightly amend the limit (e.g. to adjust with the limits of adjacent cells) | | |
| | **IT** IIM has sometimes changed the limit of data coverage inside of the cells, for example creating a "no coverage" area in the already published cell overlapping a new edition cell (but the coordinates of the cell were unvaried) and no problem was reported from Distributors. | | |
| | **JP** JHOD has often issued ERs which changed the geometry of M_COVR since 1998, because we think M_COVR is the same in data structure as the other area objects such as DEPARE, LNDARE etc. We will continue to issue such ERs for a while (see comment below). | | |
| | **UK** I have attached a paper that I presented at the joint TSMAD/CSMWG meeting in Cape Town in 2008. This shows the affect of changing the coverage limits in an update and the problems it can cause to ECDIS equipment. | | |
| | **US** NOAA feels that if it is included in S-65 then the encoding bulletin should be cancelled as it is bad practice to have duplicative information in multiple places. | | |
| | **Conclusion: An ER must not change the limit of data coverage because changing the limits can cause some legacy ECDIS to behave abnormally. As S-65 is only "guidance", this should be integrated in UOC. The text of EB No31 "Encoders are therefore advised that an ENC update (ER application profile) data set must not change the limit of data coverage for the base ENC cell, as the update may be rejected by the ECDIS. Where the limit of data coverage for a base ENC cell is to be changed, this should be done by issuing a new edition of the cell." should be more précis to state that an ER must be located within the data coverage and that the shape of the coverage must not be changed via an ER. The geometry could be changed only if new nodes are inserted without change of the shape. This last statement need to be confirmed regarding issue raised by AU at question 2. Note the comment of JP at the end of this summary: The** | | |

| | | Yes | No |
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| | **second paragraph of the EB No 31\* should be modified because it deals with only the cell limit and it doesn't seem to prohibit from changing the data coverage within the cell limit.** (\*): 2nd paragraph of the EB No 31 : "New tests introduced in Edition 3 (2008) of International Electrotechnical Commission document IEC 61174 - Marine Navigation and Radiocommunication Equipment and Systems – Electronic Chart Display and Information Systems (ECDIS) – Operational Performance Requirements, Methods of Testing and Required Test Results, include instruction that an update must be rejected if its extent goes beyond the base cell limit." **Advices to be included in S-57.** | | |
| New question 4.1 (letter 01/2011) | In its response to question 2, AU reported to avoid ER whether the amendments affect the geometry of the data coverage limit of the cell.  AU has had problems in ECDIS where, for instance, a new maritime boundary covering multiple cells and requiring new spatial features is required, which has resulted in new nodes being placed in the data coverage limit.  When these changes have been implemented by ER there have been problems with some ECDIS. Do you have had also such problems reported? **Comments:** **NO** Yes, but only in ENCs without complete coverage (both m_covr with CATCOV=1 and CATCOV=2) when inserted ADMARE that covers many ENCs. In these ENCs we had to do a small editing job on the geometry when making the ER. There has not been any problem since then. **AU**  See AU comment for new Q2 above.  AU has not re-tested recently to see if the problems previously experienced have been rectified.  Note that the contents of ENC Encoding Bulletin No. 31 have been included in the draft UOC.  AU considers that the comment from JP is adequately covered by the statement that "An ENC Update (ER application profile) data set should therefore not change the limit of data coverage for the base ENC cell" – this statement does not distinguish between the internal or external limits if data coverage. **PT** IHPT never tried to change the coverage of our cells by ER. If this happens, we would produce a new cell or a new edition of the cell. Last comment from **AU**: AU has adopted a policy of not releasing amendments that change the geometry of the data coverage limit (without changing the shape) as an internal policy.  Have no problem based on replies to this and previous questions with not including any advice on this in UOC or S-65. | NO, AU, UK, KR | JP, DK, ZA, IT, PT, PRIMAR, NL, LV, FR |

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| | **Chair comment:** it appears that there is no real problem when new nodes are placed in the existing data coverage limit. | | |
| New question 4.2 | Do you agree with this conclusion, in particular to state that "the shape of the coverage must not be changed via an ER"? **Comments:** **JP** are developing an ENC distribution system in order to meet the conclusion; we will not issue ERs which change the shape of the coverage after the end of this year. **CA** Agree. New Edition should be issued to change the cell/coverage shape. **AU** As stated above, AU considers that the existing wording adequately covers this. If the limit of the data coverage for a base ENC cell is changed, it follows that the shape is changed. The current wording does not distinguish between external and internal data coverage limits. If an ENC cell has a "hole" in it which has no data coverage, and this hole is "filled in" at some stage after publication of the base cell, AU considers this to be changing the limit (and therefore the shape) of data coverage for the cell. **IT** Even though we have never had problems when we changed the shape of M_COVR via an ER **KR** We have been issued by the New Edition.<br><br>**Chair comment:** **The shape (area) of the coverage must not be changed via an ER. The geometry could be changed only if new nodes are inserted without change of the shape. To addressed in clause 2.6 of the next edition of UOC.** | JP, DK, CA, NO, ZA, IT, PT, KR, PRIMAR, NL, LV | AU |
| **5.** (letter 02/2010) | **As suggested by PRIMAR and FR, do you agree to include in S-65 advices on the use of re-issues?** **IT** But only as suggestion, not as a rule.<br><br>**Conclusion: S-65 will provide advices on re-issues.** | Yes **AU CA DK FI FR IT JP KR LV NL NO PT ZA ES UK PRIMAR US** | No |
| **6.** (letter 02/2010) | **When do you use a re-issue or in which instances do you think a re-issue is useful?** | | |
| | Your answer: | | |

**AU**

AU does not currently produce re-issues of its ENC data, although we can see how re-issues would be useful for Service Providers and users in terms of data handling and management.

**CA**

[CHS Comments] CHS has never released a 'reissue' dataset.

However, if the number of updates to a base cell became too numerous, and a new edition was not planned, then a 'reissue' dataset may be useful. Although, as NOAA has pointed out, the current draft of S-101 TSMAD has tentatively agreed to remove 'reissue' dataset from the standard.   This should be considered before any addition to S-65 regarding 'reissue' datasets.

**DK**

We have never used Re-issues

**FI**

FI has issued a reissue once. This was done as an experiment and for technical reasons. Normally similar cases would be solved by creating a new edition.

**FR**

Yes, we use re-issues, but in rare cases such as:

- to avoid production issues when an ER crashes in our production workflow (although it has been accepted by validation software and the RENC)
- to minimize the risk when an ECDIS has a problem (for unknown reason) to upload an ER accepted by the RENC. Usually, this situation is known through a feedback from an end-user.

**IT**

In the past IIM used a re-issue to incorporate the updates when they amounted to 30, but now prefers to use a New Edition.

**JP**

JHOD provides a re-issue for every 6 times it provides ERs.

An ER which is small in size could be more convenient than a new edition or a re-issue for a user who has already applied all past cumulative ERs. On the other hand, a new edition or a re-issue could be more convenient than an original base data set with a lot of cumulative ERs for a user who intends to install a new cell into an ECDIS. So there is a need to provide not only an ER but also a re-issue in order to offer the convenience of the both types of users.

**KR**

When we provide ENC to the new users.
We also do a re-issue one time in one year annually.

**LV**

We have never issued a re-issue. We think that when a cell has reached 15 to 20

updates it is possible to issue a new edition with more corrections to a base cell than

only accumulate the updates.

**NL**

Technical problems in the ENC

A large number of changes (NtM block correction)

The release of a new edition of a paper chart.

**NO**
NHS has never produced re-issues.
**PT**
IHPT doesn't use re-issues, but a re-issue might be useful after the production of 999 ER files. As stated before, we do not have experience on that and in principle we try to avoid re-issues.
**ZA**
We avoid Reissues. Have never used this option and probably will not for the present.
**ES**
/
**UK**
UK has, from memory, only released one re-issue since it started producing ENCs. The reason for this was to confirm ECDIS equipment could handle these types of ENCs. JP & KR routinely release re-issues throughout the year and I have not heard of any systems being inconvenienced by this type of EN.

A re-issue would be useful when the number of updates reaches a certain level and the producer wants to maintain their ENCs in line with their paper charts series. The UK policy for GB ENCs, as stated previously, is to issue a NE after approximately 20 updates. Opportunity is also taken at this time to include any additional chart information that was not deemed safety critical in terms of an NtoM.
**US**
At one point our office did utilize re-issues, but found that it was not realistic. Also note that in the current draft of S-101 TSMAD has tentatively agreed to remove re-issues from the standard.

Conclusion: It seems that a very few HOs releases re-issues currently. JP and KR are used to produce re-issues. Concept of re-issue should still exist in S-101. TSMAD has been informed*.
Answers to questions 1, 3 and 6 reinforce the interest for re-issue.
1. We need to provide advice on when it is prudent to re-issue an ENC and under what conditions, new user over existing user.
2. Make recommendations on best practice for the management of data flow for online services.
The principles could be:
-    re-issue  : a product for new end-user to avoid heavy loading process of

numerous ER
-    EN + a flow of ER for existing end-user.
Then, re-issue and the ENC+ER should coexist:
- re-issue on the provider side (it replaces the ENC + ER according to S-57 Appendix B1),
- ENC + ER (since the last edition) on the existing end-user side.
For example, a new end-user will load in his ECDIS (SENC) the re-issue instead the EN + 50 ER. With on line service, he will download via telecom the re-issue instead the EN + 50 ER. The accustomed end-user will load in his ECDIS (SENC) only the new ER (ER no 51, 52, …). This supposes that the online service is able to know the level of update the ENC in the SENC of the end-user to only send out those update files required to bring the SENC up to date.
Advices to be included in S-65.
Note from chairman: From the S-57 Appendix B1, § 5.7**, it is not clear when an ER is required to cancel the base cell file (ENC, edition or re-issue).  It appears (to be confirmed) that is required only when a ENC (and all its following editions or re-issue) must be cancelled. When an edition or a re-issue is produced, this type of ER must not be used to cancel previous edition or re-issue of the ENC.  A clarification is needed in S-57.

(*): Extract of the minutes of TSMAD21: "4.2.9 ENC Updating Working Group (EUWG) Report.
JW reported that the EUWG were of the opinion that it is too early to remove "reissues" from S-101. Concern was also raised at HSSC2 concerning the use of temporary updates. The Chairman proposed that TSMAD needs to wait until the completion of the EUWG report before making any decisions about reissues and T&P notices. HB noted that Chartworld would like to retain reissue. Japan also noted that they produce reissues. It was therefore decided to include the concept of reissue in S-101."
(**): S-57 Appendix B1 extract : "In order to delete a data set, an update cell file is created, containing only the Data Set General Information record with the "Data Set Identifier" [DSID] field. The "Edition Number" [EDTN] subfield must be set to 0. This message is only used to cancel a base cell file."

| | | Yes | No |
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| New question 5.1 (letter 01/2011) | Do you agree with this conclusion and principles?<br>**Comments:**<br><br>**CA** Agree. Will there be a maximum number of updates required to force a 'Reissue', or maximum cumulative size of updates (ER)… or will this be up to the HOs?<br>**AU** agrees with the conclusions and principles but is a little unsure as to how the principles have been worded above. From a re-issue perspective, existing subscribers need not know that a re-issue has been produced, as their SENC should be current to all the information contained in the re-issue. They will simply receive all ERs subsequent to the re-issue as they have in the past (in other words, existing subscribers do | JP, DK, CA, NO, AU, ZA, IT, PT, UK, KR, PRIMAR, NL, LV, FR | |

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| | not need to load the re-issue).  New subscribers will load the re-issue and any other ERs produced since the re-issue (which will already have been passed on to existing subscribers), which will synchronise their SENC with existing users.  All subsequent ERs will then be circulated to all subscribers as normal.  As far as AU is concerned, re-issue is merely a more economical way of providing up-to-date ENCs to new end-users.

**UK** – Online services could be configured to make ERs incrementally available to users of on-line services even if a re-issue (EN) is produced by a country.

Note: Re-issues (EN) must not contain any additional information than was otherwise available in the previous set of updates (ERs). Therefore any further ERs after the re-issue would be numbered sequentially so online services need only make the ERs available. New subscribers would get the re-issue (on the CD) when they join a particular service.

Perhaps this should be included in any advice we provide for remote updating services in Appendix 1?

**Chair comment:** Agree with AU that the wording could be changed.
Note the suggestion for advice on online services in S-52 Appendix 1. To be transferred in S-65. |
| **New question 5.2 (letter 02/2010)** | Do you have had problems reported with re-issues?
No: JP, IT, PT, NL

Do you have advices to provide about re-issues?
**JP**: A re-issue must be exactly same as EN + ERs, otherwise the following ERs may not be applied to the base re-issue or EN + ERs and a new-edition must be issued.

Do you have questioning about re-issues?
**No**: JP, DK, NO, IT, PT, NL, LV

**CA** CHS has not used 'Reissue' ENCs.  We are interested in hearing if other HOs have issued 'Reissue' ENCs. Have their clients noticed improved performance (ECDIS loading) with 'Reissue' ENC vs. ENC with many updates?
**AU** As reported in the response to EUWG Letter 02/2010, AU does not currently produce re-issues.
**ZA** To date we have not used Re-issues so cannot comment further on this topic.
**UK** – JP & KR have been issuing re-issues ever since they entered our integrated AVCS service. We have had no reported problems from any of our subscribers.
**KR** We did not report the problem
**PRIMAR** We have re-issues in our database but no problems have been reported by our distributors. |

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| **7** (letter 02/2010) | **Announcement of a new edition (cf. S-52 app1 § 3.2 (m) and S-57 Product Specifications - § 5.7).**<br>**CA**<br>[CHS Comments] Unclear what is being asked.<br>**UK**<br>It is unclear if this issue is about: (i) each producer announcing an ENC NE or (ii) if this question is aimed at service providers operating a fully integrated ENC service.<br><br>i) ENC New Editions are not always produced because the content has changed dramatically due to, for instance, a new hydrographic survey being incorporated. Sometimes they are produced for technical reasons relating the producer's production software. It may also be the policy of the producer to issue a NE as the number of updates associated with an ENC has reached a certain number (see above at 3). For this reason it is considered that this facility serves no useful purpose.<br><br>ii) From an integrated service provider point of view this would be almost impossible to manage. Managing the announcement of NEs from over 40 different producer nations could prove very time consuming and often frustrating. Especially if NEs are issued at the last moment for the reasons mentioned in the previous paragraph. |
| **7.1** (letter 02/2010) | **Do you use ER to announce a new edition or do you know HOs who use this method?** |
| | Your answer:<br>**AU**<br>AU does not produce re-issues, nor are we aware of any HO that does.<br>**CA**<br>[CHS Comments] CHS does not use ER (update) to announce new edition.<br>**DK**<br>No<br>**FI**<br>No, we don't.<br>**FR**<br>No<br>**IT**<br>IIM uses ER to avoid an old edition (cf. S-57, App. B, 5.7). This ER has a date previous of a day as to the new edition and it is delivered at the same time .<br>IIM doesn't use ER to inform a new edition in advance.<br>**JP**<br>JHOD has not used this method.<br>**KR**<br>No<br>**LV**<br>No<br>**NL**<br>No. |

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| | We only announce the release of a new ENC (and the cancellation of the old cell).<br>**NO**<br>No, NHS does not announce a New Edition by use of an ER.<br>**PT**<br>No, IHPT doesn't use ERs to announce new editions, but IHPT publishes that information in the monthly Notices to Mariners and in the website.<br>**ZA**<br>No<br>**ES**<br>Spain does not use ER to announce a new edition<br>**UK**<br>UK does not announce NEs in an ER and is not aware of any producer nations who do. It will be interesting to know if Primar know any differently.<br>**US**<br>NOAA does not use an ER to announce a new edition.<br><br><br>**Conclusion: It is clear that most of the HOs doesn't use an ER to announce a new edition as described is S-57 Appendix B1\*.**<br>**(\*) : "**To inform the mariner that a new edition is available, an update cell file is created, containing only the Data Set General Information record with the "Data Set Identifier" [DSID] field. The "Edition Number" [EDTN] subfield must contain a value one higher than the current edition number." |
| **7.2**(letter 02/2010) | **Do you think that an announcement is actually necessary or should an alternative means of communicating a new edition be considered other than an ER?** |
| | Your answer:<br>**AU**<br>No.  What would be the purpose of such an Update?<br>**CA**<br>*[CHS Comments] No, this is not necessary. HOs have been releasing new edition ENCs for many years without and ER announcement, and there have not been any issues that we are aware of.*<br>**DK**<br>*No*<br>**FI**<br>*No, we don't think it's necessary at all.*<br>**FR**<br>*No*<br>**IT**<br>IIM creates New Editions  for different reasons: essential changes  of data , more of 30 updates and technical problems.<br>IIM feels that an announce in advance could be necessary only for essential changes of data in the cells.<br>**JP**<br>We think that the announcement of a new edition by ER might have some meanings, if a state provides new editions and ERs in different ways, for example in the case that it |

| | sells new editions for a charge and distributes ERs without charge. | | |
|---|---|---|---|
| | **KR** <br> No <br> **LV** <br> No <br> **NL** <br> An announcement is not necessary. <br> **NO** <br> NHS thinks that an announcement is not necessary at all. <br> **PT** <br> If the mariners feel that it would be necessary the announcement of new editions, maybe we should think about an alternative means of communicating that. Actually IHPT makes the announcement of publication of new editions, but doesn't know how many end users consult this type of information made available trough the Internet <br> **ZA** <br> I believe it could add value to the customers if Data Distributors or IHO ENC producers could provide such a service on their websites in addition to any other measures agreed. <br> **ES** <br> We believe that an announcement is not necessary when a new edition is published, although it would be interesting to announce when the first edition of an ENC is published. <br> **UK** <br> UK does not think this facility is necessary given UK's comments in 7. In the paper chart world customers have to buy (purchase) new editions so an announcement is made in the weekly NtoM of the fact so that they can plan their paper chart holdings for the next voyage. Integrated ENC services subscribing to the S-63 DPS licence customers over a subscription period so any ENC NEs come at no extra cost during this subscription period. <br><br> Note: S-63 Edition 1.1 has included a method of flagging cancelled an replaced ENCs. <br> **PRIMAR** <br> It looks like most HOs do not issue an ER to announce that a new edition is available. For us it therefore looks like it is not necessary to issue an update to announce that a new edition is available. <br> **US** <br> NOAA feels that an announcement should be made when a true new edition has been released.  Currently, we utilize an XML catalogue that contains the metadata for our entire ENC suite. <br><br> TSMAD is considering a product specification for this type of metadata to be used in conjunction with S-101. <br><br><br> ==**Conclusion: ER to announce a new edition seems unnecessary. Some other mechanisms exist.**== <br> ==**A clarification is needed in S-57 for such ER.**== | | |
| **8.** (letter | **Do you agree to include in S-65 advice about new or** | Yes | No |

| 02/2010) | **modified Traffic separation schemes (incorporation of encoding bulletin No 25)?**<br>**AU**<br>There will be a proposal put forward to HSSC2 this October to "unfreeze" the S-57 UOC to allow for additional encoding guidance (such as that contained in EBs and parts of S-65) to be incorporated. If this proposal gets up, AU would be more in favour of incorporating this advice in the UOC.<br>**FI**<br>Yes, but only if there is a good reason to duplicate this information in S-65 since it already exists in EBs (or later in UOC)? Would a reference be enough?<br>**FR**<br>It could also be in UOC, as this document could be unfrozen.<br>**NO**<br>Yes, but maybe it belongs in the use of the object catalogue (UOC) when/if it will be unfrozen in the future.<br>**UK**<br>I would be more inclined to take a generic approach to this since TSS is only one example, albeit a very important one, affected by temporal attribution. And TSS is only one example of 'Routeing Measures'.<br><br>We should also bring to the producer's attention that older legacy systems may not handle this type of encoding or they may manage them in different ways to those identified in S-52.<br>**US**<br>This information should go into the Use of the Object Catalogue, however, since it is currently frozen, TSMAD needed to issue an encoding bulletin.<br><br>Conclusion: Since the UOC is unfrozen, EBs will be integrated in UOC (under going within TSMAD by AU) | AU CA DK FI FR IT JP KR LV NL NO PT ZA ES UK PRIMAR | US |
| **9.** (letter 02/2010) | **As suggested by PRIMAR, do you agree that the UADT of a new edition base cell must be equal to or greater than the ISDT of the last update of the previous edition cell?**<br><br>*PRIMAR: We have had feedback about this from a distributor saying that this (UADT of edition 2 is earlier than the ISDT of the last update to the previous edition) might cause problems loading the new edition in some ECDIS.*<br>**FI**<br>In S-57 it is defined that Update Application Date (UADT) is a date, on or before which dated updates must have been applied by the producer. Issue Date (ISDT) is a date when the date was made available. We see no reason why UADT of the | Yes AU CA DK FR IT JP KR LV NL NO PT ZA ES UK PRIMAR US | No FI |

| | new edition base cell could not be before the ISDT of the last update of the old edition.

In our case UADT is automatically set as the date when the data has been extracted from the database. Changes applied to the database after that date are not included in the base cell. The QC cycle of a base cell takes from a couple of days to several weeks. During the QC cycle of the new edition the old edition is still maintained and thus updates issued if necessary (QC cycle of ERs is from a few hours to a couple of days). If it happens that there is an update issued for the old edition during the QC cycle of the new edition, the ISDT of the update is, like it should be, greater than the UADT of the new edition. In these cases the same update information will be included in the new edition in the base cell itself or as a separate new ER depending on how far in the QC cycle the cell has proceeded before the update information is received. In the latter case the base cell and the new update will be issued simultaneously.

The ISDT of the new base cell must be equal or greater than the ISDT of the last update of the previous edition.
**UK**
The example provided in the S-57 Product Specification where UADT < ISDT indicates that this is a re-issue of an ENC. In which case this could cause problems with some ECDIS who use a rule based ENC management utility.

**Conclusion: It seems impossible to state that the data must be applied before it has been issued. Following this principle, UADT should normally be greater or equal to ISDT. As ISDT of a new edition is greater than the ISDT of the last update, in consequence, UADT of a new edition should be greater than the ISDT of the last update. The only exception to "UADT greater or equal to ISDT" should be for re-issue (see example in S-57 Appendix B1 § 5.7, table 5.1) where the UADT should be the UADT of the last ER. Note that UK reports this could cause problems with some ECDIS who use a rule based ENC management utility (UK comment). UK also reports problems with some ECDIS when the ISDT had been set for a week in the future.**
**It will be also strange if UADT (application date) is greater the ISDT.**

**This item is under discussion in RENC to RENC (IC-ENC and PRIMAR) harmonization WG and within RENCs Experts WG.** | | |

| | | | Yes | No |
|---|---|---|---|---|
| | **S-57 Appendix B1 needs clarification on rules for encoding UADT and ISDT.**<br><br>**These rules could be simple :**<br>- **UADT is equal to ISDT, except for re-issue**<br>- **UADT for re-issue is the UADT of the last update**<br>- **ISDT should not be in the future when the data are available for end-users**<br>- **EN/ER has greater ISDT than previous EN/ER.**<br>**A clarification is needed in S-57.** | | | |
| New question 6.1 (letter 02/2010) | Do you agree with this conclusion and with the rules for encoding UADT and ISDT?<br>**Comments:**<br>**JP** For JP, we don't mind if this conclusion applies. We won't be against it.<br>**CA** Disagree with second bullet in these 'simple' rules.<br>    According to Section 5.7 of the S-57 Appendix B1 (table 5.1), a Reissue ENC would take the **ISDT** from the last update and use that as the UADT for the Reissue dataset. Then a new ISDT would be filled in.<br>**AU** agrees with the conclusion, but note that in the second point it should state that "UADT for re-issue is the ISDT of the last update" as UADT is prohibited for ER.<br><br>**Chair comment:** the second bullet must be corrected to be in accordance with table 5.1 of section 5.7 of the S-57 Appendix B1 (UADT prohibited for ER). Then, the corrected second bullet is :<br>- **UADT for re-issue is the ISDT of the last update**<br><br>Then, the rule should be:<br>- **UADT is equal to ISDT, except for re-issue**<br>- **UADT for re-issue is the ISDT of the last update**<br>- **ISDT should not be in the future when the data are available for end-users**<br>- **EN/ER has greater ISDT than previous EN/ER.**<br>**A clarification is needed in S-57.** | JP, DK, NO, AU, ZA, IT, PT, UK, KR, PRIMAR, NL, LV, FR | CA |
| New question 6.2 (letter 02/2010) | From the proposed rules, for re-issue the UADT should be the UADT of the last ER but UK reports this could cause problems with some ECDIS who use a rule based ENC management utility (UK comment).<br>Do you have had problems reported with UADT smaller than ISDT?<br>**Comments:**<br>**CA** CHS New Edition ENCs have identical ISDT/UADT. | | JP, DK, NO, AU, ZA, IT, PT, UK, KR, PRIMAR, NL, LV |

| | | | | |
|---|---|---|---|---|
| | And for the Updates, as per the S-57 ENC Product Specification, only the ISDT changes, the UADT is not modified and stays the same as the base ENC UADT. Does this not mean that the UADT is always smaller than the ISDT for updates (ER)? CHS has not had any complaints about how the UADT and ISDT has been used in our past updates.<br>**Chair comment:** UADT for ER is prohibited (table 5.1 of section 5.7 of the S-57 Appendix B1). The second bullet of the rules is fault.<br><br>**AU** cannot see how this could cause a problem (noting AU comment for new Q 6.1 above). As a re-issue cannot include any changes to the ENC that have not been incorporated in previous ER, it makes sense for the UADT for the re-issue to be the date that the last ER was issued (ISDT of the last ER), as this is effectively the last time that the ENC data was updated.<br>**ZA** on the basis that we haven't produced Re-issues<br>**UK** – To clarify the ENC Product Specification example for a re-issue shows the UADT less that the ISDT. Therefore any manufacturer implementing a rules based management function would see this as permissible.<br>UK understanding is that the UADT can be less than or equal to the ISDT as an ER could be issued before or on the same day as the re-issue is published.<br><br>**Chair comment:** Example in table 5.1 of section 5.7 of the S-57 Appendix B1 is clear. No action required. | | |
| **10.**<br>(letter 02/2010) | Incorrect update<br>*PRIMAR : If it is reported from a user that it is not possible to load an update properly (ER file) into an ECDIS system due to errors in the file, it is then recommended that the HO creates a new edition of the cell(not a new update). The reason for producing a new edition is suggested, is that if an error(in update 001) is fixed in a new update (in update 002) it might be a*<br>*problem to load the new update because of the original problem in update 001.*<br>*UK : We have come across instances in our AVCS service where countries have issued updates with no update information contained in the file. This is probably the result of their production software failing. Instead of creating a blank update (no add/modify/remove info) producers should be encouraged to create a re-issue or new edition. Blank update can cause some ECDIS problems as they are expecting some form of command in the 8211 file* | | |
| **10.1**<br>(letter 02/2010) | **Do you agree that the producer should check updates to avoid "blank updates" (except for updates cancelling a cell or announcing a new edition of a cell (see question 7.1 above))?** | Yes<br>**AU CA DK FI FR IT** | No |

| | | | Yes | No |
|---|---|---|---|---|
| | | **JP KR LV NL NO PT ZA ES UK PRIMA R US** | | |
| | **Conclusion: HOs should check updates to avoid "blank updates" except for updates cancelling a cell or announcing a new edition of a cell.** <br>**A clarification is needed in S-57.** | | | |
| **10.2** (letter 02/2010) | **If is it reported that it is not possible to load an update properly, do you agree that the producer should create a re-issue or new edition?** <br> **AU** <br> Are there any other options? <br> **FI** <br> Such cases should be caught before they reach the user – either by the HO or RENC. <br> **IT** <br> Only when it is strictly necessary.. <br> **Conclusion: If is it reported that it is not possible to load an update properly, the producer should create new edition.** <br> **A re-issue doesn't work because:** <br> **- a re-issue must not be used for incorporating a change to the data that has not previously been incorporated by ER,** <br> **- ECDIS with SENC already loaded with the ENC and its subsequent ER will not load the re-issue.** <br> **Advices to included in S-65** | Yes <br> **AU CA DK FI FR IT JP KR LV NL NO PT ZA ES UK PRIMA R US** | No <br> **PT** |
| **11.** (letter 02/2010) | **As suggested by PRIMAR, do you agree that after a cancel cell update is issued, the name of the cancelled cell should not be re used?** <br> *PRIMAR: The main reason for this is that the cancellation update that are released can be applied to newer editions as well.* <br> **NO** <br> We at NHS would like to be able to re-use cell names after a cancellation, but if appropriate the name could be put into quarantine for a period of time, for instance 1 year before it is re-used? <br> **UK** <br> Some ECDIS equipment allows users to retain ENCs in the SENC even though it has been cancelled. For this reason alone it would be dangerous to reuse cell names as it could cause all types of conflicts, e.g. sequential updating would be compromised. <br> **Conclusion: Some ECDIS equipment allows users to retain ENCs in the SENC even though it has been cancelled. Due the potential for serious issues in the ECDIS by re-use of a cancelled cell name, the name of the cancelled cell should not be re used.** | Yes <br> **AU CA DK FI FR IT JP KR LV NL PT ZA ES UK PRIMA R US** | No <br> **NO** |

| | **A clarification is needed in S-57.** | | |
|---|---|---|---|
| | | Yes | No |
| New question 7 (letter 01/2011) | The paper "Barriers to the use of ENC remote updating services" (Annex B) makes the following considerations: « To promote the use of remote updating services ENC producers need to ensure that only necessary data is included in the ENC or its updates. The UK has identified a number of issues that can affect these sizes and which ENC producers have control over. These include:<br><br>• Generation of a New Edition where an update would be sufficient – this is a known constraint on some HOs whose production systems force this.<br><br>• Inclusion of picture files that appear unnecessary (eg the same picture of a can buoy linked to every occurrence of the object)<br><br>• The resolution of picture files. There is currently no guidance on resolution or compression within encoding guidelines and there is a wide range of file sizes (eg > 30 Mb for a single image in one case)<br><br>• Excessive and unnecessary points encoded on lines. This is often an issue caused by automated capture methods. Many ENCs contain point position vertices that are in excess of that need in the encoding guidance; this 'inflates' the size of ENCs and updates considerably<br><br>There is considerable variance in approach by ENC producers to these issues and it seems that in some cases additional guidance is required. These matters will be taken forward through the relevant IHO Working Groups.»<br><br>Do you agree with these considerations and with their integration in S-65 for the first one and in UOC for the others? Comment:<br><br>**CA** Agree with these considerations. Would the size of a 'Reissue' be a factor?  Would this mean that the clients would rather have updates vs. Reissue?<br>**AU** After discussion at TSMAD22 (April 2011), UK (IC-ENC) has taken actions to prepare a paper for TSMAD23 with proposals to include guidance on the last 3 bullet points in the UOC.  Note, however, that there is a statement in S-57 | JP, DK, CA, NO, AU, ZA, IT, PT, UK, KR, PRIMAR, NL, LV, FR | |

| Appendix B.1 (clause 3.8) mandating that linear features must not be encoded at a point density greater than 0.3mm at compilation scale (note also that this has been amended t a recommendation in the S-57 Maintenance Document (MD8) at 1.Cl.33 and 1.Co.26). **Chair comment:** the last 3 bullet points should be address in the UOC. | | |
| --- | --- | --- |

**Other comments received following EUWG 02/2010:**
**JP**
Regarding the question 4, we feel the second paragraph of S-57 Encoding Bulletin No31 should be deleted because the paragraph might be misleading information. The paragraph describes:

*"New tests introduced in Edition 3 (2008) of International Electrotechnical Commission document IEC 61174 - Marine Navigation and Radiocommunication Equipment and Systems – Electronic Chart Display and Information Systems (ECDIS) – Operational Performance Requirements, Methods of Testing and Required Test Results, include instruction that an update must be rejected if its extent goes beyond the base cell limit."*

The above paragraph deals with only the cell limit and it doesn't seem to prohibit from changing the data coverage within the cell limit. So we had incorrectly taken EB No 31 as a rule intending to prohibit from changing cell limit, not data coverage, until we saw UKHO's answer to this questionnaire.

**Conclusion included at point 4.**

**PT**
From the perspective of IHPT, this issue of updates, ER files, size and number of ER files, is not as simple as appears. There are lots of other factors that can influence the behaviour of the systems. It is important that we supply the end users with all the updated information about EN and ER files, in order to simplify their work in the data management on board.

**Summary of responses to EUWG letter 03/2010**

| Question | | Yes | No |
|---|---|---|---|
| 1 | Do you know other IHO, IMO or IEC documents which cover item of S-52 Appendix 1 (e.g. describing RENC) or which refer to it? <br> *If you know another document, please indicate which paragraphs of appendix 1 are concerned.* | CA <br> KR <br> PT <br> ZA <br> ES <br> UA <br> JEPE <br> SSEN <br> PRI <br> MAR | AU <br> DE <br> IT <br> JP <br> LV <br> NO <br> US |
| | Comments: <br> **CA** : The S-65 Stage 10 (Distribute Data) recommends that all data be distributed by RENC. <br> **KR** <br> The S-65 Stage 10 (Distribute Data) <br> **ZA** <br> S65 Stage 10 <br> **ES** <br> IHO Publication S-66 (Electronic Facts about Charts and Carriage Requirements) <br> **UK** <br> S-66,  ENC Distribution <br> **JEPESSEN** <br> Data Supply Chain Certification Correspondence Group (DSCC CG) is working on a review of the distribution process. There are overlaps in S-52 Appendix 1 with those efforts. <br> **PRIMAR** <br> S-66,  ENC Distribution page 32 <br> **US** Note that MSC 232(82) replaces A.817(19) and therefore A.817(19) should no longer be a reference. | | | |
| 2 | Do you have some other comments about Annex A? | AU <br> CA <br> IT <br> JP <br> LV <br> ZA <br> ES <br> JEPE <br> SSEN <br> US | DE <br> KR <br> NO <br> PT <br> UA <br> PRIMAR |
| | Comments: <br> **AU** | | | |

Agree with comments throughout that when developed, S-52 Appendix 1 was mostly conceptual. This has been well covered by the work that EUWG has done so far in relation to the production of ENC Updates (refer EUWG Letter 02/2010), and will need to be continued when looking at the ENC distribution processes.

**CA**
- As FRANCE has already pointed out; much of Annex A is covered in S-65.
- In S-65 – Stage 10 – Step 2 it states:

*Whatever distribution mechanism is adopted, where an outside organisation such as a RENC is involved, the rights and responsibilities of each partner should be detailed in a signed agreement.*

These rights & responsibilities should be detailed in S-52 Appendix 1, so that all RENCs are operating in a uniform way.

**IT**
1.1.3 _ S52 Appendix 3 should be replaced by S-32 Appendix 1
2.3_ It isn't clear the definition of Issuing Authority because in SOLAS V and MSC 232(82) HOs are the authorities that issue ENCs and their updates.

**JP**
It is described in the section 2.3 of S-52 Appendix 1 that RENC is the issuing authority under the WEND system and an originating HO is a source provider. However, SOLAS V Regulation 2 provides that nautical chart is issued officially by or on the authority of a Government, authorized Hydrographic Office or other relevant government institution. So, JHOD thinks that the description of S-52 Appendix 1 should be amended to make consistent with SOLAS V.

**LV**
To keep it simple, the annex A (I understand that it has not been examined at this stage, but probably we even shouldn't) of S-52 App 1 could go into S-32 App 1(if all the terms are not there already). Easier and more accurate to keep the terms updated - HDWG. Otherwise we agree with FR comments.

**ZA**
1.2 Scope and Objectives -last paragraph reads "Some requirements may be satisfied by one of a variety of service options." This statement should be made less ambiguous as in its present form it is confusing.
Annex B to Appendix 1- Is there a need for such an Annex. S-4 B600 should certainly be referenced in S52 where applicable but to exist in such detail seems to be duplication?.
Annex C to Appendix 1- as interesting as this study is does this document have a purpose as part of S52 Appendix 1.

**ES**
IHO Publication S-66 (Electronic Facts about Charts and Carriage Requirements) containing acronyms such as ENC, SENC ... to supplement the definitions Annex A.

**JEPESSEN**
- b.1; Yes this does exist, Jeppesen has this service and it is called Real-time updating. Furthermore, with at least two ECDIS systems being type approved this year with direct internet connection, more will follow.

**US**
Because this appendix is cited specifically in IEC 61174, the rewrite will have to account for this. For example, either the clause numbering will have to remain the same or a crosswalk will have to be developed between the old version of S-52 Appendix 1 and the redraft. In addition, in those cases the wording should not be changed.

| | | | |
|---|---|---|---|
| | The United States would like it noted that in clause 3.2 it appears that only a RENC is an Issuing Authority, however, in some cases the Hydrographic Office is also the issuing authority and is responsible for the distribution of the data. | | |
| 3 | Do you agree that, currently, the peculiarity of S-52 Appendix 1 is the service delivery/distribution process? | **AU** **CA** **DE** **IT** **JP** **KR** **LV** **NO** **PT** **ZA** **ES** **UA** **JEPE SSEN** **PRI MAR** **US** | |

Comments:
**ZA**
**Nil**
**JEPESSEN**
Keep in mind that the more detailed and regulated this part is, the less innovative service providers can be when it comes to providing customers with the service they need and desire.
**US**
As it currently, stands there is guidance on the service delivery process, but this appendix should be about how the ECDIS handles and portrays the update. The United States feels that the service and delivery process should be handled as guidance and placed into a separate document.

| 4 | Do you agree that the description of the service delivery/distribution process should be developed in S-65? | **AU** **CA** **DE** **IT** **JP** **KR** **LV** **NO** **PT** **ZA** **ES** **UA** **PRI** | **AU** **JEPESSEN** **US** |

|  | | **MAR** | |
| --- | --- | --- | --- |

Comments:

**AU**
Given that in the "Purpose and Scope" in the Introduction of S-65, it states that the distribution of ENCs is also covered at a "high level"; it appears that this would be a logical place for such a description to go.
It is recommended, however, that the title of S-65 should be amended similar to "ENC Production, Maintenance and Distribution Guidance". Consideration will need to be given, however, to the effect of the possible "unfreezing" of the S-57 UOC on S-65, and the fact that most of the information included in S-65 was developed from a non-IHO (RENC) perspective in consideration of the fact that S-57 is frozen.

**CA**
- If some of the details from Annex A were incorporated into S-65, this could potentially eliminate the need for Annex A, and remove duplication. It would be much simplier if there was only one document providing guidance on Updating, for both data producers, data distributors and data users.

**PT**
The name of S-65 is "ENCs Production Guidance", and it refers "A guide to the requirements and processes necessary to produce ENCs". So, to include the description of the service delivery/distribution process we should propose to change the name. Otherwise, the introduction of S-65 states that "…It offers a frame work to inform Hydrographic Offices of the processes and requirements necessary to produce, maintain and distribute ENCs." So, the description of the service delivery/distribution process should be detailed.

**ZA**
S65 should serve as an overview of the requirements and steps needed to provide these services, however care should be taken not to duplicate the information or include too much technical detail.

**JEPESSEN**
S-65 is for *"This document provides a high level guide to the production, maintenance and distribution of Electronic Navigational Charts (ENCs).......*
*It is not intended to serve as a technical reference manual but to enable hydrographic offices to gain an overview of ENC production processes, and the requirements and procedures that need to be in place to set up an ENC production facility."*
The service delivery and distribution process is reviewed in detail and discussed in the Data Supply Chain Certification Correspondence Group (DSCC CG), and there will be a proposal for this group to become a full working group at the next HSSC. I would strongly recommend EUWG recommend that DSCC CG be tasked with adding this development to their current tasks which nicely compliment/overlap the service delivery/distribution process.

**PRIMAR**
(Service delivery/distribution process is not reflected in the document name "Production Guidance" A guide to the requirements and processes necessary to produce ENCs).

**US**
The United States (NOAA) feels that this may be better handled by the free market. If EUWG goes down this path, it should only be a recommendation.

| 5 | What are our views on the content of such a description? | | |
|---|---|---|---|
| | *Please, use the outline below to introduce our elements.* | | |
| | **AU** | | |
| | Given that many producer nations do not distribute through a RENC; or distribute internationally through a RENC and nationally directly to distributors (or to certain customers such as national Defence agencies); or deal directly through distributors without use of a RENC for all ENC distribution, the outline presented may need a significant amount of work. | | |
| | **ZA** | | |
| | Agree in principal with the outline provided in the Questionaire (titled Q5 Outline for service delivery/distribution process). | | |
| 6 | Do you agree that, very schematically, the new S-52 Appendix 1 could be referenced with the S-65 (new edition with ENC service delivery included) and composed of elements relating to ECDIS to minimise the impact on IMO and IEC publications? | **CA** **DE** **IT** **JP** **KR** **LV** **NO** **PT** **ZA** **ES** **UA** **PRI** **MAR** **US** | **JEPESSEN** |

Comments:

**AU**
We are not entirely sure what is meant by this question. Is it being suggested that information currently referenced by IMO and IEC publications remain in a new S-52 Appendix 1 and cross-referenced in S-65, or vice versa? Either way, we do not think it makes sense to have some information in one location and other information in another location.

**ZA**
Support the views of the USA.

**JEPESSEN**
S-65 should be kept for ENC Production, and not taken off topic with ENC service delivery.

**US**
The US agrees that this publication needs updating; however, we need to be clear what the objectives are and do not want to impact outside publications. For example, we do not want to change the existing mechanisms and processes – that will be done with S-101.

The United States feels that this should be a two phase process.

Phase 1: Update S-52 Appendix 1 by removing obsolete content, updating figures and references.

Phase 2: Explore re-writing the content in alignment with S-101

| 7 | Do you agree view of the EUWG chairman reported to the WWNWS ? <br> *Ref: WWNWS2/3/5/1A & 4A* Report on e-Navigation and GMDSS Review *(§ 3).* | AU <br> CA <br> IT <br> JP <br> KR <br> LV <br> PT <br> ZA <br> ES <br> JEPE <br> SSEN <br> US | |
|---|---|---|---|
| | Comments: <br><br> **AU** <br> Our only concern is the possibility that it will be possible for the SENC to be amended without any input or approval of the official national source provider (e.g. national HO). We would have no problem, however, if such information was to be presented in the form of an overlay in the ECDIS or a back-of bridge system. <br><br> **ZA** <br> The picture is well painted in the document and comments put forward by the Chairman in this Report on e-Navigation. Much work and harmonization of thought needs to be done before changes can be fully integrated into S52. As a start, eliminating the clearly obsolete contents from S52 should be our immediate priority and including best practice recommendations to cover what is happening in the real world at present should be concluded by this working group before addressing futuristic requirements that are clearly needed. For this reason we support the comments of the USA. | | |

**Comment from Chair :**
- EUWG won't explore and design distribution models and methods for the future (no redundancy with Data Supply Chain Certification Correspondence Group). I think that EUWG works to improve or clarify the "present".
- The distribution of data and the end-user service are in the perimeter of HOs responsibility (cf. SOLAS + WEND principles) even if they are operated by RENC or private company.
- S-65 guidance (or description) on these topics should be not too much detailed (from a technical point of view of example) to not compromise innovative service.
- As IHO (WEND principles) recommends supplying data via RENC, S-65 should focus on this way. I don't expect that EUWG will develop guidance for HOs which choose to not follow the first recommendation of IHO. Note HOs could deduce advice from general requirements (we should write it in S-65) for their particular case.
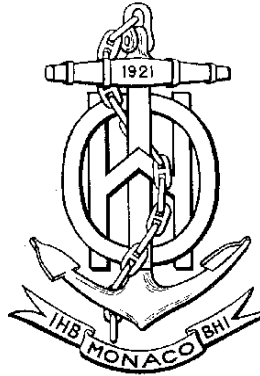
**INTERNATIONAL HYDROGRAPHIC ORGANIZATION**
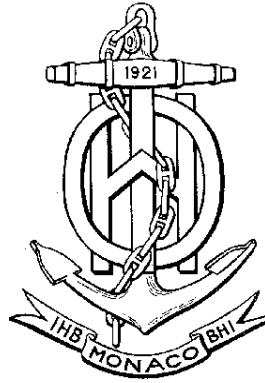
# GUIDANCE ON UPDATING THE ELECTRONIC NAVIGATIONAL CHART

**~~4rd~~ 4th Edition, …2011**

Special Publication No. 52
APPENDIX 1

~~published~~ Published by the
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**MONACO**

**INTERNATIONAL HYDROGRAPHIC ORGANIZATION**

# GUIDANCE ON UPDATING THE ELECTRONIC NAVIGATIONAL CHART

**4rd 4th Edition, December 19962011**

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# 1 INTRODUCTION

In its previous edition (3$^{rd}$ Edition, December 1996), this Appendix of publication S-52 provided the guidance, for the updating service and the ECDIS, to support the updating of ENCs issued through a Regional ENC Coordinating Centre (RENC).

The guidance provided in 1996 applied to ENC updates production by HOs, their distribution and their acceptance by the ECDIS. In 2009, the ENC Updating Working Group (EUWG) of the IHO Hydrographic Services and Standards Committee (HSSC) was asked to review this Appendix to consider its relevance in S-52 and the possibility of incorporation of some of the guidance into other existing IHO publications such as S-57 and S-65.

As a result, guidance related to ENC updates production by HOs and their distribution has been reviewed  and mainly integrated into the Edition 2.0 of IHO publication S-65 "ENC Production, Maintenance and Distribution Guidance" and Edition 3.0 of IHO Publication S-57 Appendix B.1, Annex A "Use of the Object Catalogue for ENC".
It is now advisable to refer to S-65 and S-57 for ENC updates production guidance and data delivery.

Parts of the former Edition of this Appendix which are related to the acceptance of updates by the ECDIS are quoted as references in IEC61174 and MSC232(82). To avoid any impact on theses documents, the EUWG decided to not modify the paragraphs concerned, including paragraph numbering. This is why the  paragraph "3.4 ECDIS Manufacturers" of the former Edition is retained (with changes are underlined) in the present Edition and the content of previous numbered paragraph amended to "Not currently used[JW47]".

The Terminology used is explained in the IHO publication S32 "Hydrographic Dictionary" (http://hd.iho.int/en (for the English version) or http://hd.iho.int/fr (for the French version))

Reference: IHO Publication S-57 "IHO Transfer Standard for Digital Hydrographic Data"

Note: The detailed process for updating ENCs is described in S-57 Appendix B.1 "ENC Product Specification". If, in the following clauses, if there are conflicts between the requirements of S-52, Appendix 1 and the ENC Product Specification, the requirements of the ENC Product Specification shall be used.

**2.** *Not currently used*
**3.**        **SPECIFIC UPDATING GUIDANCE**
*3.1 Not currently used*
*3.2 Not currently used*
*3.3 Not currently used*

**3.4      ECDIS Manufacturers**

3.4.1      <u>General</u>

(a)      **Data Integrity**. The ECDIS should be able to process ENC Updates without degradation of the information content of the ENC or ENC Update.  For example, all information regarding attributes, logical relationships, geometry, and topology must be accounted for.

(b)      **Verification of Application**. The ECDIS should provide a method to ensure that updates have been correctly applied to the SENC. Those updates are either an Official ENC Update integrated into the SENC display or temporary information that was entered manually.

(c)      **Integrated/Non-integrated Updates Distinction**. Updates should be clearly distinguishable on the display. Once accepted, integrated updates should be indistinguishable from ENC data. Non-integrated updates (i.e., those entered manually) shall be distinguishable as described in IHO S-52, <u>clause 2.3.3.d</u>..

(d)      **Storage Separation**. ECDIS should store all updates separately from the ENC. However, such separate storage may utilize the same data storage device.

(e)      **Recall for Display.** It should be possible on demand to review previously installed updates.

(f)      **Compatibility**. ENC Updates comply with the ENC Product Specification of IHO S-57.

(g)      **Non-interference**. ECDIS should be able to receive updates without interfering with its current operation.

(h)      **Log File**. ECDIS should keep a record of updates, including time of application and identification parameters described in ~~paragraph 3.2 (i~~<u>the Product Specification of S-57</u>~~)~~, through a logfile. The logfile should contain, for each update applied to or rejected by the SENC, the following information:

   .1      date and time of application/rejection;
   .2      complete and unique identification of update as described in the S-57 Product Specification;
   .3      any anomalies encountered during application;
   .4      type of application: manual/automatic.

(i) **Update out of sequence**. The ECDIS should warn the user when an ENC Update is applied out of sequence, terminate the update operation and restore the SENC as it was before the application of the Update File.

3.4.2    Automatic Update

(a) **Interface**

(i) **Fully Automatic Updates.** The ECDIS should be capable of being interfaced to an appropriate telecommunication network.

(ii) **Semi-automatic Updates.** The ECDIS should be capable of receiving ENC Updates in standard IHO format by a common hard media system (e.g. CD-ROM) and through telecommunication.

(b) **Reception of ENC Updates**

(i) ENC Update data shall be recorded automatically in the update storage of the ECDIS.

(ii) The identification of the Issuing Authority of the ENC Update should be checked for conformance with the corresponding identifier of the ENC.

(iii) If any errors are detected from the receiving device, the reception procedure shall be terminated and the ENC Update flagged invalid in the record of updates. The user should be informed of the corruption.

(c) **Sequence Check**. The following sequence number checks should be performed at the time of application, for sequential and cumulative updates:

.1    File extension of the ENC Update
.2    Update number of the ENC Update
.3    Update sequence number of the individual records in the ENC Update

Refer to the ENC Product Specification of S-57 for details on how the sequence numbers are encoded in the ENC Update.

(d) **Consistency Check**. The mariner should be warned of any previous ENC Updates which have not been successfully applied.

(e) **Geographic Applicability**. ENC Updates not relating to a cell within the set of ENCs in the ECDIS may be discarded.

(f)     **Summary Report**. A summary report for each of the Issuing Authority's Official Update Files should be given after completion of receipt containing at least:

    .1    identification of Issuing Authority;

    .2    update numbers of the Update Files;

    .3    Cell Identifiers of cells affected;

    .4    Edition Number and date of cell involved;

    .5    number of updates in the affected cells.

(g)     **Review of ENC Updates**. It should be possible for the mariner to review the updates applied through displaying the SENC contents with the updates highlighted.

(h)     **Modification of Updates**. Rejection or amendment of an update by the mariner shall be achieved by the manual update method. The questionable update should be noted as an anomaly in the Log File [See 3.4.1 (h)].

(i)     **Formatted Non-integrated Updates**, for example a temporary military exercise area, will be processed as manual updates.

3.4.3    <u>Manual Update</u>

(a)     **Keying and Symbology**. The ECDIS should enable manual entry of updates for non-integrated presentation on the display.  A capacity should exist to enable the mariner to:

    .1    enter the update so it can be displayed as described in <u>S-52.</u>

    .2    ensure all update text information relevant to the new condition and to the source of the update, as entered by the mariner, is recorded by the system for display on demand.

(b)     **Indications and Alarms**. The ECDIS should be capable of sensing indications and alarms related to non-integrated (manual) updates, just as it does for integrated ENC Updates.

(c)     **Presentation**. Manual updates shall be displayed as described in <u>S-52, § 2.3.3.d</u>.

(d)     **Text**. It should be possible to enter text into the ECDIS.

(e)     **Archiving of Manual Updates**. It should be possible to remove from the display any manual update. The removed update should be retained in the ECDIS for future review until commencement of the next voyage, but will not be otherwise displayed.