25th TSMAD MEETING
15-18 January 2013. Tokyo, Japan

Paper for Consideration by TSMAD

S-57 Maintenance Sub-Working Group Report

Submitted by:	S-57 Maintenance Sub-Working Group Coordinator
Executive Summary:	Report on S-57 Maintenance Sub-WG Activities Since TSMAD24/DIPWG4
Related Documents:	S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC; ENC Encoding Bulletins and FAQs
Related Projects:	S-57 Maintenance S-101 Development

Introduction / Background

The TSMAD S-57 Maintenance Sub-Working Group is responsible to TSMAD for the following activities:

- Development of S-57 ENC Encoding Bulletins (and related Frequently Asked Questions as required) as requested by TSMAD;
- Development of responses to questions posted through the S-57 Frequently Asked Questions page of the IHO web site;
- Development of new versions of S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (UOC), as required by TSMAD.

Since the TSMAD24/DIPWG4 combined meeting, developments in regard to all the above activities have been addressed, including receipt of postings on the Frequently Asked Questions page of the IHO web site for the first time in a number of years. The activities of the Sub-Working Group are summarised in the following paragraphs.

Analysis / Discussion

UOC Edition 3.1.0:

As requested at TSMAD24/DIPWG4 (TSMAD24 Action No. 7), the new edition (3.1.0) of the UOC was prepared for TSMAD and subsequently HSSC approval. The document, which includes all extant published ENC Encoding Bulletins since publication of UOC Edition 3.0.0 up to October 2011, is currently subject to IHO Member State acceptance (IHO CL 102/2012 refers).

Pending publication of UOC Edition 3.1.0, new drafts of the ENC Encoding Bulletins and S-57 Frequently Asked Questions pages on the IHO web site have been prepared for incorporation on the web site on publication of the document. These pages are included at Attachment 1 to this Paper for TSMAD consideration.

S-57 ENC Encoding Bulletins:

The following ENC Encoding Bulletins as approved at TSMAD24/DIPWG4 have been published:

- EB42/FAQ40: UOC Clause 9.2.1 Anchorage Areas
- EB43/FAQ41: UOC Clauses 6.1.2 Rocks which may cover; 6.2.1 Wrecks; and 6.2.2 Obstructions, foul areas and foul ground
- EB44/FAQ42: UOC Clause 3.1.1 Magnetic variation
- EB45: UOC Clause 5.8 Areas with inadequate depth information
- EB46: UOC Section 2 Cartographic framework
- EB47/FAQ36: UOC Clause 4.7.11 Vegetation
- EB48: UOC Clause 2.8.1 Wide blank areas

In addition, the following ENC Encoding Bulletins raised as actions from TSMAD24/DIPWG4 were developed and published by correspondence in parallel with UOC Edition 3.1.0 development:

- EB49: UOC Clause 2.3 Textual information
- EB50: UOC Clause 4.8.20 Views and sketches, viewpoints
- EB51: UOC Section 4 Topography
- EB52: UOC Clause 2.7 Multiple objects

A further Encoding Bulletin (EB53: UOC Clause 12.8.1 Description of lights) was developed and published after concerns were raised by the IHB that all-around lights having attributes SECTR1 = *0* and SECTR2 = *360* were resulting in a hazardous display in some ECDIS. As this issue was considered to be critical to safety of navigation, the publication of this EB was accompanied by a corresponding IHO Circular Letter (90/2012).

An action on TSMAD from HSSC4 is to develop an ENC Encoding Bulletin describing an application for the NEWOBJ object in accordance with S-57 Edition 3.1, Supplement No. 2. The draft ENC Encoding Bulletin is the subject of paper TSMAD25-4.10.2.

Recommendations

1. That TSMAD approve the revised draft ENC Encoding Bulletins and S-57 Frequently Asked Questions pages at Attachment 2 for inclusion on the IHO web site on publication of UOC Edition 3.1.0.

Justification and Impacts

The role of the TSMAD S-57 Maintenance Sub-Working Group is important in developing improved encoding guidance so as to react to changing navigational requirements and developments, and provide ENC data that performs optimally in ECDIS.

Action required of TSMAD

TSMAD is invited to:

a. Endorse this report;
b. Note the publication of ENC Encoding Bulletins and FAQs since TSMAD24/DIPWG4, and pending publication of UOC Edition 3.1.0; and
c. Discuss and address items of note raised in this Report, as included in the Recommendations above.

Attachment 1

S-57 Edition 3.1 Encoding Bulletins

S-57 Edition 3.1 Encoding Bulletins: S-57 is the IHO standard for the exchange of digital hydrographic data. It has been used almost exclusively for encoding Electronic Navigational Charts (ENCs). However there is a need for S-57 to support additional requirements, which has prompted the IHO to develop the S-100 (IHO Universal Hydrographic Data Model) which will eventually supersede S-57. It is anticipated however that S-57 Edition 3.1 will continue to be used to produce ENCs for the foreseeable future.

In 2000, as S-57 Edition 3.1 was being widely used in both production and navigation systems, the IHO froze the contents of Edition 3.1 and no further changes could be made to it. As increasing numbers of hydrographic organizations began to encode ENC data, it was recognised that variations in the way different producers encode data may lead to inconsistencies. Furthermore unanticipated issues that affect how the ENCs are displayed or used by an ECDIS may arise, and may need to be addressed by changing the way in which the ENC data are encoded.

Because Edition 3.1 was frozen, changes could not be made to the actual standard to address such issues. In order to promulgate IHO approved changes in encoding guidance, "Encoding Bulletins" are developed to communicate how data producers may modify their encoding practices to address those issues that affect the use of ENC data in ECDIS. Each Bulletin explains a particular ENC/ECDIS issue; recommended procedures for addressing the issue; and the consequences of not following the recommended procedures. It should be noted that the procedures described in these Bulletins are not compulsory; however it is strongly recommended that data producers follow them wherever possible to ensure the consistency of ENC production worldwide.

In 2010, the IHO approved the “unfreezing” of S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (UOC). This was done in order to transfer new and revised ENC encoding guidance incorporated in these Encoding Bulletins, and in other IHO publications, into the authoritative IHO ENC encoding guidance document. Encoding Bulletins that have been transferred into the UOC will maintain their reference in the Encoding Bulletins list, and the guidance included in each Bulletin will be replaced with the appropriate UOC clause references. Future new or revised ENC encoding guidance will be added as new Encoding Bulletins, which will subsequently be incorporated in future New Editions of the UOC as required.

These Bulletins have resulted from proposals brought to the attention of the Transfer Standard Maintenance and Application Development Working Group (TSMADWG). **New bulletins must be approved by the TSMADWG.**

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ENC Product Specification (ENC PS), including Use of the Object Catalogue (UOC)

25. UOC Clause 10.2.1 Traffic separation schemes [Updated - May 2010]
26. UOC Clause 12.8.6.1 Sector lights [April 2009]
27. UOC Clause 5.3 Soundings [April 2009]
28. ENC PS Clause 3.5.7 New attribute values in Edition 3.1 [June 2009]
29. ENC PS Clause 3.3 Objects permitted for use in ENC and their geometric primitives [Updated - May 2010]
30. UOC Clause 12.8.7 Various special types of lights [June 2009]
31. ENC PS Clause 5.7 Updating and UOC Clause 2.6 Updating [June 2009]
32. UOC Clause 6.2.1 Wrecks [June 2009]
33. ENC Product Specification Clause 3.1 Feature Object Identifiers [May 2010]
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38. UOC Clause 5.5 Dredged areas [October 2011]
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41. UOC Clause 15 Collection objects [October 2011]
42. UOC Clause 9.2.1 Anchorage Areas [May 2012]
43. UOC Clauses 6.1.2 Rocks which may cover; 6.2.1 Wrecks; and 6.2.2 Obstructions, foul areas and foul ground [May 2012]
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53. UOC Clause 12.8.1 Description of lights [October 2012]

Maintenance Document
MD8 revision to 1.Co.10

Use of the Object Catalogue - Appendix B.1, Annex A - Encoding Bulletins (EB)

EB1 - UOC Clauses 10.1.1 Navigational lines and recommended tracks; 10.2.2.2 Deep water route centrelines; and 10.2.4 Recommended routes

Please note this Encoding Bulletin SUPERSEDES EB1a, EB1b and EB1c below.

Revised encoding guidance regarding the resultant direction of line geometry for one way recommended tracks, deep water route centrelines and recommended route centrelines has been included in UOC Edition 3.1.0 (October 2012) – Clauses 10.1.1, 10.2.2.2 and 10.2.4.

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EB1a - UOC Clause 10.1.1 Navigational lines (NAVLNE) and recommended tracks (RECTRC)

Please note that item EB1a, EB1b and EB1c have been SUPERSEDED by EB1 above

The third bullet point of clause 10.1.1 of Edition 2.1 (April 2002) of the Use of the Object Catalogue (S-57 Appendix B1, Annex A) states: "*When the traffic flow is one way, the direction of digitising of an object of type line **should** be the same as the direction of the traffic flow*".

The use of the word **'should'** in this sentence means that the advice is only recommended and not mandatory. However, if this rule is not followed and navigation lines and recommended tracks are digitised in the opposite direction, the direction arrows shown on ECDIS displays will show the direction of traffic flow incorrectly.

Encoders are strongly advised, therefore, to follow this rule and digitise such lines in the direction of the traffic flow thereby avoiding possible ECDIS display problems.

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EB1b - UOC Clause 10.2.2.2 Deep Water Route Centerline (DWRTCL)

As per 1.a above, the first remark, in clause 10.2.2.2 needs to have its obligation changed from "should" to "must" i.e. *"When the*

*traffic flow is one way (attribute TRAFIC = 3), the direction of digitising ~~should~~ **must** be the same as the direction of traffic flow, thereby avoiding possible ECDIS display problems."*

This is required as the S-52 Presentation Library (Edition 3.3) actually calculates the bearing of the digitised line and displays the bearing text based on this calculation. (The PL does NOT use the attribute ORIENT to display this text).

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EB1c - UOC Clause 10.2.4 Recommended Route Centerline (RCRTCL)

As per 1.a above the first remark, in clause 10.2.4 needs to have it's obligation changed from "should" to "must" i.e. *"When the traffic flow is one way (attribute TRAFIC = 3), the direction of digitising ~~should~~ **must** be the same as the direction of traffic flow, thereby avoiding possible ECDIS display problems."*

This is required as the S-52 Presentation Library (Edition 3.3) actually calculates the bearing of the digitised line and displays the bearing text based on this calculation. (The PL does NOT use the attribute ORIENT to display this text).

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EB2 -UOC Clause 6.2.1 - Wrecks

Please note that this item has been SUPERSEDED as the result of changes made to the Conditional Symbology Procedure for displaying this object class in ECDIS.

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EB3 - UOC Clause 6.2.2 – Obstructions and foul areas

Please note that this item has been SUPERSEDED as the result of changes made to the Conditional Symbology Procedure for displaying this object class in ECDIS.

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EB4 - UOC Clause 4.8.5 – Dams (DAMCON)

Revised encoding guidance regarding a dam that has its seaward edge coincident with the coastline was included in UOC Edition 3.0.0 (October 2011) – Clause 4.8.5.

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EB5 - UOC Clause 11.9.1 - Fishing facilities

New encoding guidance regarding fishing facilities located in deep water was included in UOC Edition 3.0.0 (October 2011) – Clause 11.9,1.

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EB6 - UOC table 6.2 Wrecks

Revised encoding guidance regarding the population of the attribute QUASOU on WRECKS objects was included in UOC Edition 3.0.0 (October 2011) – Clause 6.2.1.

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EB7 - UOC table 6.3 Obstructions

Revised encoding guidance regarding the population of the attribute QUASOU on OBSTRN objects was included in UOC Edition 3.0.0 (October 2011) – Clause 6.2.2.

EB8 - UOC Clause 6.6 Caution areas

New encoding guidance regarding lines demarcating collision regulation areas was included in UOC Edition 3.0.0 (October 2011) – Clause 11.13.5.

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EB9 - UOC Clause 12.8.6.5 Directional lights (LIGHTS)

Revised encoding guidance regarding the orientation of directional and moiré effect lights was included in UOC Edition 3.0.0 (October 2011) – Clauses 12.8.6.5 and 12.8.6.6.

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EB10 - UOC Clauses 4.6.6.2 Floating Docks (FLODOC)

Revised encoding guidance regarding temporal attribution for floating docks was included in UOC Edition 3.0.0 (October 2011) – Clause 4.6.2.2.

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EB11 - UOC Clauses 4.6.7.3 Pontoons (PONTON)

Revised encoding guidance regarding temporal attribution for pontoons was included in UOC Edition 3.0.0 (October 2011) – Clause 4.6.7.3.

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EB12 - UOC Clause 4.1 Land Area (LNDARE)

Revised encoding guidance regarding portrayal of names for land areas was included in UOC Edition 3.0.0 (October 2011) – Clause 4.7.1.

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EB13 - UOC Clause 4.8.14 Built-up areas (BUAARE)

Please note that this item has been SUPERSEDED as the result of changes made to the IHO Presentation Library Look-Up Tables for displaying this object class in ECDIS.

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EB14 - UOC Clause 12.1.2 Relationships

Revised encoding guidance regarding the role of the object class DAYMAR in a master to slave relationship was included in UOC Edition 3.0.0 (October 2011) – Clause 12.1.2.

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EB15 - UOC Clause 11.2 Maritime jurisdiction areas

New guidance regarding the encoding of "linear" maritime jurisdiction areas was included in UOC Edition 3.0.0 (October 2011) – Clause 11.2.

EB16 - UOC Clause 11.2 Maritime jurisdiction areas: Disputed claims

New guidance regarding the encoding of overlapping Territorial Sea and Exclusive Economic Zone areas due to the areas being in dispute between two or more Coastal States was included in UOC Edition 3.0.0 (October 2011) – Clause 11.2.4.

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EB 17 - Automatic Identification System (AIS) in ENC

New guidance regarding the encoding of AIS used as aids to navigation was included in UOC Edition 3.0.0 (October 2011) – Clause 12.14.1.

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EB18 - ENC PS Clause 2.2 Cells: 180º Meridian of Longitude

New guidance regarding the production of ENC cells that may span the 180° Meridian of Longitude was included in UOC Edition 3.0.0 (October 2011) – Clause 2.1.8.2.

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EB19 - UOC Clause 12.4.1 Buoys: Emergency Wreck Marking Buoy

New guidance regarding the encoding of IALA emergency wreck marking buoys was included in UOC Edition 3.0.0 (October 2011) – Clause 12.4.1.1.

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EB20 - ENC PS Clause 5.6 File naming: Use of _ (underscore)

Clause 5.6 of edition 2.0 (November 2000) of the ENC Product Specification (S-57 Appendix B.1) is not prescriptive as to the characters allowed for ENC data set file naming, resulting in some ECDIS rejecting ENC files containing the _ (underscore) character in the file name. The S-57 Maintenance Document MD8 (March 2002) lists both a Clarification (1.Cl.37) and a Correction (1.Co.32) explaining the allowable character format to be as described in ISO 9660, level 1. The existence of both a Clarification and a Correction in MD8 has resulted in confusion as to whether the _ (underscore) character is allowable in S-57 Edition 3.1 file names.

Encoders should note, therefore, that ENC data set file names must be composed from the upper case alphanumeric characters A to Z and the digits 0 to 9 only. The use of any other character, such as _ (underscore) is prohibited.

[Jan 2008]

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EB21 - External text files in national language

New guidance regarding the character encoding used for external text files in national language (referenced by NTXTDS) was included in UOC Edition 3.0.0 (October 2011) – Clause 2.3.

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EB22 - ENC PS Clause 5.4.1 Content of the exchange set

Revised guidance regarding the formats to be used for text and picture files was included in UOC Edition 3.0.0 (October 2011) – Clauses 2.3 and 4.8.20.

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EB23 - UOC Clause 5.4.1 Geo object depth areas

Revised guidance regarding the encoding of DEPARE objects of type line was included in UOC Edition 3.0.0 (October 2011) – Clause 5.4.1.

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EB24 - UOC Clause 2.1.5.1 Seasonal objects and Clause 2.6.1 Issuing updates in advance

NOTE: The guidance included in this Encoding Bulletin applies only when it is required to indicate seasonality, or to issue update information in advance, and the temporal attributes introduced for some navigational aid equipment objects in S-57 Supplement No. 2 are not available on the ENC production system used by the Producing Authority.

Clause 2.1.5.1 of Edition 2.1 (April 2002) of the Use of the Object Catalogue for ENC (S-57 Appendix B.1, Annex A) provides guidance on the use of the attributes PEREND and PERSTA for the encoding of seasonal objects in ENC. Clause 2.6.1 of the Use of the Object Catalogue for ENC provides guidance on the provision of advance update information, including the use of the attributes DATEND and DATSTA.

New tests introduced in Edition 3 (2008) of International Electrotechnical Commission document IEC 61174 - Marine Navigation and Radio communication Equipment and Systems – Electronic Chart Display and Information Systems (ECDIS) – Operational Performance Requirements, Methods of Testing and Required Test Results, have resulted in the implementation of the use of these time varying attributes by ECDIS manufacturers in their ECDIS systems.

S-57 Appendix A, Chapter 1 – IHO Object Catalogue (November 2000) contains the list of allowable attributes for S-57 Object Classes. For some navigational aid equipment objects the following time varying attributes are not included in the allowable list:
FOGSIG – PEREND, PERSTA;
RADSTA – PEREND, PERSTA;
RETRFL – DATEND, DATSTA, PEREND, PERSTA;
RTPBCN – PEREND, PERSTA;
TOPMAR – DATEND, DATSTA, PEREND, PERSTA.

Encoders are therefore advised that where a seasonal or periodic navigation aid contains at least one of the equipment objects FOGSIG, RADSTA, RETRFL, RTPBCN or TOPMAR, the time varying attributes PEREND and PERSTA should not be populated for any object comprising the navigation aid. To indicate seasonality for such navigation aids to the mariner, the attributes STATUS = 5 (periodic/intermittent) and INFORM containing details of the period should be populated.

Where a navigation aid contains one of the equipment objects RETRFL or TOPMAR, advance update information should not be issued. Therefore the attributes DATSTA or DATEND should not be populated for any object comprising the navigation aid. An update applying the temporal change to the navigation aid should be issued as close as possible to the date of the change.

Alternatively, if time varying attributes DATSTA and/or DATEND have been populated for components of a navigation aid that contains at least one of the equipment objects RETRFL or TOPMAR, a separate update applying the temporal change to these equipment objects should be issued as close as possible to the date of the change.

[Updated - March 2012]

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EB25 - UOC Clause 10.2.1 Traffic separation schemes

New encoding guidance regarding advance notification of changes to traffic separation schemes was included in UOC Edition 3.0.0 (October 2011) – Clause 2.6.1.1.

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EB26 - UOC Clause 12.8.6.1 Sector lights

New guidance regarding the encoding of oscillating light sectors was included in UOC Edition 3.0.0 (October 2011) – Clause 12.8.6.1.

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EB27 - UOC Clause 5.3 Soundings

Revised encoding guidance regarding the population of the attribute EXPSOU on SOUNDG objects was included in UOC Edition 3.0.0 (October 2011) – Clauses 5.3 and 5.5.

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EB28 - ENC PS Clause 3.5.7 New attribute values in Edition 3.1

Revised encoding guidance regarding the population of the attribute INFORM to describe the meaning for attribute values which appeared for the first time in S-57 Edition 3.1 was included in UOC Edition 3.0.0 (October 2011) – Clause 1.1.

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EB29 - ENC PS Clause 3.3 Objects permitted for use in ENC and their geometric primitives

New guidance regarding features for which the encoding combination of object class and geometric primitive results in no display of the feature in ECDIS was included in UOC Edition 3.0.0 (October 2011) – Clauses 2.5; 4.6.6.6; 4.7.4; 4.7.7.1; 4.7.7.2; 4.7.11; 4.8.3; 4.8.5; 4.8.8; 4.8.10; 4.8.12; 4.8.13 and 11.6.1.

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EB30 - UOC Clause 12.8.7 Various special types of lights

New guidance regarding the encoding of strip lights serving the purpose of an aid to navigation was included in UOC Edition 3.0.0 (October 2011) – Clause 12.8.7.

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EB31 - ENC PS Clause 5.7 Updating and UOC Clause 2.6 Updating

New guidance regarding changing the area of data coverage of a published ENC cell and the maximum recommended file size for an ENC Update (ER) cell was included in UOC Edition 3.0.0 (October 2011) – Clause 2.6.

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EB32 - UOC Clause 6.2.1 Wrecks

Revised encoding guidance regarding the population of attributes for WRECKS objects to aid in enhanced ECDIS portrayal was included in UOC Edition 3.0.0 (October 2011) – Clause 6.2.1.

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EB33 - ENC PS Clause 3.1 Feature Object Identifiers

New encoding guidance regarding the population of the Feature Object Identifier (FOID) field was included in UOC Edition 3.0.0 (October 2011) – Clause 2.1.8.1.

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EB34 - UOC Clause 12.1.2 Relationships

Revised guidance regarding the encoding of master to slave relationships for navigational aids, and the encoding of navigational aid base structures (on land or in the water) where the nature of the base structure is unknown, was included in UOC Edition 3.0.0 (October 2011) – Clause 12.1.2.

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EB35 - UOC Clause 6.2.2 Obstructions, foul area and foul ground

New encoding guidance regarding the distinction between areas considered to be “foul areas” and areas considered to be “foul ground” was included in UOC Edition 3.0.0 (October 2011) – Clause 6.2.2.

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EB36 - UOC Clause 11.7.4 Offshore production areas

New guidance regarding the encoding of offshore wind turbines and wind farms, wave energy devices, underwater turbines, and wave or current farms was included in UOC Edition 3.0.0 (October 2011) – Clause 11.7.4.

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EB37 - UOC Clause 1.1.1 References within S-57 to other IHO publications

New advice regarding outdated references to IHO publications within S-57 documentation was included in UOC Edition 3.0.0 (October 2011) – Clause 1.1.1.

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EB38 - UOC Clause 5.5 Dredged areas

Revised guidance regarding the encoding of the date of dredging for dredged areas was included in UOC Edition 3.0.0 (October 2011) – Clause 5.5.

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EB39 - UOC Clause 6.6 Caution areas

New encoding guidance regarding the avoidance of the overuse of CTNARE and the geographic extent of encoded CTNAREs was included in UOC Edition 3.0.0 (October 2011) – Clauses 2.5 and 6.6.

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EB40 - UOC Clauses 10.2.2.1 Deep water route parts; 10.2.3 Traffic separation scheme systems; and 10.2.6 Two-way routes

New guidance regarding the encoding of relationships between deep water routes, traffic separation schemes and two-way routes, and other routeing measures was included in UOC Edition 3.0.0 (October 2011) – Clauses 10.2.2.1; 10.2.3 and 10.2.6.

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EB41 - UOC Clause 15 Collection objects

Revised guidance regarding the encoding of navigationally relevant information on C_AGGR and C_ASSO objects was included in UOC Edition 3.0.0 (October 2011) – Clause 15.

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EB42 - UOC Clause 9.2.1 Anchorage Areas

New guidance regarding the encoding of anchorages such that the name displays in ECDIS has been included in UOC Edition 3.1.0 (October 2012) – Clause 9.2.1.

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EB43 - UOC Clauses 6.1.2 Rocks which may cover; 6.2.1 Wrecks; and 6.2.2 Obstructions, foul areas and foul ground

New guidance regarding the encoding of the attribute EXPSOU on underwater rocks, wrecks and obstructions so as to improve ECDIS display has been included in UOC Edition 3.1.0 (October 2012) – Clauses 6.1.2, 6.2.1 and 6.2.2.

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EB44 - UOC Clause 3.1.1 Magnetic variation

New guidance regarding the encoding magnetic variation information as areas in ENCs has been included in UOC Edition 3.1.0 (October 2012) – Clause 3.1.1.

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EB45 - UOC Clause 5.8 Areas with inadequate depth information

New guidance regarding the encoding of bathymetry where source data is limited to satellite imagery has been included in UOC Edition 3.1.0 (October 2012) – Clause 5.8.1.1.

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EB46 UOC Section 2 Cartographic framework

New guidance regarding the encoding of features in their true position where they may be displaced on the paper chart for cartographic reasons has been included in UOC Edition 3.1.0 (October 2012) – Clause 2.7.

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EB47 UOC Clause 4.7.11 Vegetation

New guidance regarding the encoding of mangroves in the intertidal area has been included in UOC Edition 3.1.0 (October 2012) – Clause 4.7.11.

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EB48 - UOC Clause 2.8.1 Wide blank area

New guidance regarding the spatial extent of the M_COVR objects comprising an ENC data set has been included in UOC Edition 3.1.0 (October 2012) – Clause 2.8.1.

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EB49 - UOC clause 2.3 Textual information

New guidance clarifying the use of the attributes INFORM, NNFOM, TXTDSC and NTXTDS has been included in UOC Edition 3.1.0 (October 2012) – Clause 2.3.

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EB50 - UOC clause 4.8.20 Views and sketches, viewpoints

- **New guidance regarding the recommended format and content of the associated picture files referenced by the attribute PICREP has been included in UOC Edition 3.1.0 (October 2012) – Clause 4.8.20.**

EB51 - UOC section 4 Topography

New guidance regarding the recommended level of topographic depiction for ENCs has been included in UOC Edition 3.1.0 (October 2012) – Clause 4.

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EB52 - UOC clause 2.7 Multiple objects

New guidance clarifying the requirement to indicate multiple objects where they have been generalised to a single object on the source has been included in UOC Edition 3.1.0 (October 2012) – Clause 2.7.

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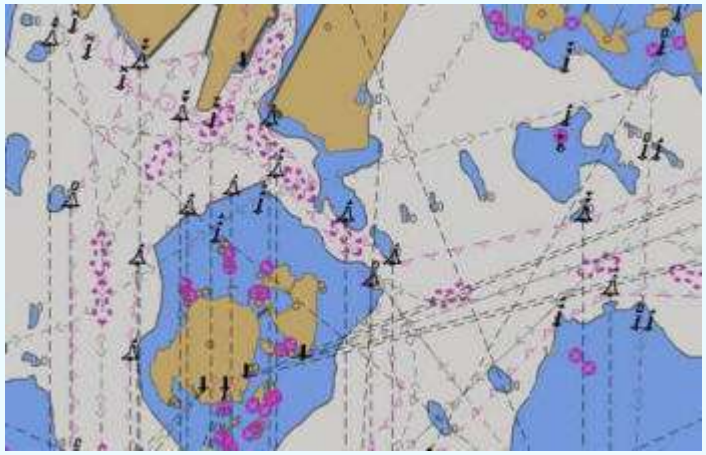
EB53 - UOC Clause 12.8.1 Description of lights

Clause 12.8.1 of Edition 3.0.0 (October 2011) of the *Use of the Object Catalogue for ENC* (S-57 Appendix B1, Annex A) provides guidance for the encoding of lights, including the population of the attributes SECTR1 and SECTR2. It is stated that the attributes SECTR1 and SECTR2 are *"only for sector lights"*.

In some cases lights that are visible all-round (omni-directional) have been encoded as **LIGHTS** objects with attributes SECTR1 = 0 and SECTR2 = 360. It has been reported that in some ECDIS **LIGHTS** objects which have been encoded in this way symbolize as a single dashed line, with no light flare or coloured "halo" to indicate that the light is visible all-round. This may result in screen clutter in some ECDIS display modes and could potentially confuse the mariner.

Encoders are advised, that the attributes SECTR1 and SECTR2 must not be populated for lights that are visible all-round (omni-directional).



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S-57 Maintenance Document 8

1. MD8 revision to Correction 1.Co.10

Correction 1.Co.10 was added to MD1 in November 1997. The correction added two extra items to table A.7. It also appears to have somehow changed the truncated escape sequence for lexical level 2 in the last line from ""%/A" to "%/@". This correction should be corrected – **i.e. the last line should read** Lexical level 2 - "%/A"

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S-57 Edition 3.1 Encoding Frequently Asked Questions (FAQ's)

These frequently asked questions (FAQ) address issues that relate to the encoding of electronic navigational charts (ENCs) by data producers. Answers provided in the FAQ are purely informational and are solely based on the rules and requirements of the S-57 Edition 3.1 standard and its associated ENC Product Specification. Answers will be formulated by members of the Transfer Standard Maintenance and Application Development Working Group (TSMADWG), who are responsible for the development and maintenance of the S-57 standard. Members of this group have extensive experience in the encoding and validation of ENCs. Answers represent a consensus opinion of this group and do not represent an official opinion of the International Hydrographic Organization or any member Hydrographic offices. If you do not find an answer to your issue in the existing FAQ listing, please submit your question using the submission form which can be found below. You will receive an automatic confirmation of receipt of your question. Once an answer has been formulated, it will be sent to the submitter of the question and added to the FAQ.

Please submit your question using the online form.

Index of Questions

Question 1

I cannot choose SIGNI as a value for the attribute MARSYS (navigational system of marks) on the object class M_NSYS. Apart from IALA, the only other option is "other system". How can I specify that the buoyage belongs to the SIGNI system?

For any area covered by SIGNI buoyage, you should encode a M_NSYS object with the attribute MARSYS set to 10 (other system). You should use the attribute INFORM to indicate that it is a SIGNI system.

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Question 2

We have a radar reflector on top of a pile and wish to encode two objects - one for the pile, one for the radar reflector. We have encoded a PILPNT and a RADRFL and got error messages from both S-57 validation tools that we use.

Since you cannot use a RADRFL (radar reflector) object on another point object (e.g. a PILPNT (pile)), and, since you also cannot use CONRAD (conspicuous, radar) on a PILPNT, the suggested solution is to use BCNSPP (beacon, special purpose) for the pile, with attribute BCNSHP (beacon shape) = 5 (pile beacon) and CONRAD = 3 (radar conspicuous). That then complies with all of the rules in UOC 12.12, bullet point 2, and we avoid the S-57 inconsistencies related to the use of PILPNT.

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Question 3

Is there a website that will show us the colours and symbols of International 1 (INT1)?

Yes. From the IHO website, www.iho.int, look under "Standards & Publications" and you will see a list of downloadable documents. Choose "S-57, Appendix B1, Annex D", click on "English" and you should be able to download the file.

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Question 4

N.B. This is a follow up question to the previous FAQ: Yes, but column 4 is empty, and column 4 is intended to show the S-52 symbols to be used in ENCs.

The question about INT1 colours and symbols is simply asking whether there is a website where the INT1 colours and symbols are shown. The response points the questioner to S-57, Appendix B1, Annex D on the IHB website.
Annex D is actually a lot more than just a digital version of INT1. It also contains object and attribute information relating to each of the INT1 symbols. However, some of the S-52 information has not yet been included. The README file that is downloaded in the Annex D zip file contains the following explanation:

"INT1 to S-57/52 for ENCs is only an aid to encoding ENCs and any advice or recommendations included in it is not mandatory. This document contains the minimum recommended object and attribute combinations required to encode each INT1 example and any additional encoding practices used by individual national hydrographic offices can be added by using column 15 to include comments or hyper links to separate documents. The hyper links to the S-57 documents will enable users to easily discover all other available information on a topic.

This package has been published earlier than anticipated due to popular demand. As a result the columns containing the S-52 symbology and the references to M4 will remain empty until the next edition which is dependant on:

a. the creation of the S-52 symbols (in a form compatible with this document) have been completed by the Colours & Symbols Working Group.
b. the next edition of M4 (in preparation) is available in an electronic format to enable linking with the main document."

So, the completion of columns 4 and 5 in Annex D awaits a new edition, which is dependent upon further work on S-52 and S-4. It is not known when that work will be completed.

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Question 5

What is the projection of ENC data files?

S-57 compliant ENC files do not use any projection. The relevant clause (4.3) in the S-57 ENC Product Specification states: "No projection is used, therefore the "Data Set Projection" [DSPR] field must not be used. Coordinates must be encoded as geographical positions (latitude, longitude)."

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Question 6

How do you encode a submerged weir?

DAMCON does not have WATLEV as an attribute. The nearest fit is SLCONS with CATSLC - training wall. This does not quite suit the real world object.

Encode the weir as an OBSTRN object with the mandatory attributes VALSOU and WATLEV filled in. Since there is no CATOBS value for a weir and CATOBS is not mandatory for an OBSTRN object, the CATOBS attribute can be left undefined. It is recommended, however, that you use the attribute INFORM, in order to identify the object as a weir.

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Question 7

I've found that some CATALOG.031 files have space padded integer values but others have zero padded integer values for the following field/subfield:
1) [RCID] subfield of [CATD] field, e.g. " 1" / "0000000001".
2) [ISO/IEC 8211 Record Identifier] field, e.g." 1" / "00001".

Which is correct in the ENC Product Specification?

1) RCID - please see S-57 - Main Document Part 3:

Clause 7.4.1:

The format for RCID must be "I(10)"of type "int"

Clause 7.2.2.2

Type "int" means : "integer; ISO 6093 NR1, SPACE, "+", "-", 0-9, right-adjusted and zero filled left (e.g. I(5) "00015")"

So, according to those rules, RCID must be padded with zeroes (not spaces).

2) Record Identifier - please see S-57 ENC Product Specification, clause 6.2.1 (Catalogue file structure)

Catalogue file example:
|
|---Catalogue Directory record
|
|--0001-- ISO/IEC 8211 Record identifier
|
|--<1>-- CATD - Catalogue directory field

The format of the Record Identifier is not defined in either the Data Structure or ENC Product Specification sections of S-57. The only reference that we can find is in S-57 Part 3, Annex A, which gives an example of a Record Identifier on page 7. In this example, under the "DDR field area" section it gives the format of the Record Identifier as I(5). As stated above, type "int" means "integer; ISO 6093 NR1, SPACE, "+", "-", 0-9, right-adjusted and zero filled left (e.g. I(5) "00015")". We, therefore, conclude that the ISO/IEC 8211 Record Identifier value must be a 5 digit integer number left padded with zeroes.

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Question 8

How are ENCs updated?

ENCs are updated by the HOs using update files (ERs), which are distributed by the HOs themselves or by the RENC (Regional ENC Centre) to which they belong. Most HOs' ERs are directly related to their paper chart Notices to Mariners.

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Question 9

We have some all weather terminals. One of the structures is a sort of house where you can go in with the ship. The other one is just a roof that hangs above the water where a boat can go under. You have to encode it because of its height. How should this be encoded?

Encode the covered terminal as an area HRBFAC object with the purpose of the terminal defined by the attribute CATHAF; the all weather terminal must have some purpose that can be associated with the CATHAF attribute list. (If there is nothing appropriate, leave CATHAF as undefined). Consider encoding the NATCON attribute for the roof and use the INFORM attribute for the height of the feature.

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Question 10

I am developing a project to view ENC files encoded in S-57 format, but I have some problems. I have searched deeply in the Internet but cannot find an answer to my problem. Do you know if there is a forum for developers?

The FAQ team does not know of any specific forum for S-57 developers, but, if you go to the Open ECDIS Forum website (www.openecdis.org/) and navigate through the various options you will find a good description of ENC and ECDIS related topics.

You could also go back to the IHO website and navigate through the "ENCs and ECDIS" tab options, where you will find further information about ENC, ECDIS and SOLAS requirements. I guess that you have probably already been there!
If those sites do not give you what you want, the only other thing that we can suggest is that you contact one or other of the commercial companies involved in S-57 activities. Two of the main ones are:
SevenCs - www.sevencs.com
HydroService - www.hydroservice.no

They may be able to help if your problem is more related to software development matters. If you could give me further details of exactly what your problem is, we could possibly investigate further.

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Question 11

We are applying photogrammetry information to a chart that has listed several "boathouses" or parking garages for boats. What is the proper encoding for this? SLCONS area? BUISGL?

For covered boat houses, any associated objects should be encoded as they exist in the "real world"; e.g. jetties as SLCONS, pontoons as PONTON, mooring posts as MORFAC. The roofed area may be covered by a BUISGL object of type area, with attribute INFORM = Boathouse or Boatshed. If the service being provided by the structure is known, object classes SMCFAC or HRBFAC may also be used.

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Question 12

Can you create an EXEZNE from 3 to 200 nautical miles? In the U.S., the President proclaimed an Exclusive Economic Zone (EEZ) from the territorial sea to 200 nautical miles, consistent with UNCLOS. However, in its domestic implementation of fisheries law, the U.S. refers to an EEZ (not a Fishery Zone) from 3 to 200 nautical miles. We cannot have 2 EEZs, but we would like to consider depicting an EEZ from 3 to 200 nautical miles that is consistent with domestic laws. The problem is that an EEZ from 3 to 200 will overlap the territorial sea at 12 nautical miles. This overlap shouldn't really be a problem, since extending the inner limit of the EEZ into the territorial sea (an area of sovereign

rights) doesn't really proclaim anything extra, but the overlap has resulted in an S-58 test error and warning. Can you please look into the error and warning? It appears that there is an incorrect diagram in Edition 2.0 of the "Use of the Object Catalog for ENC" (UOC) that has resulted in an S-58 test returning an "Error" result for what is a valid situation. Referring to Figure 19 in Section 11.2 of the UOC, it shows that an Exclusive Economic Zone (EXEZNE) ends at the offshore limit of the Territorial Sea (TESARE). This diagram was then used as the basis for test 1700 in S-58: "Check that no TESARE object overlaps an EXEZNE object." Additionally, the same situation is reported as a "Warning" by test 1500 which uses "Logical Consistency" as its basis.

Although you define the United States "EEZ" as extending from the 3NM limit to the 200NM limit, this does not constitute the EEZ as defined under UNCLOS, which is "...an area beyond and adjacent to the territorial sea..." (UNCLOS - Part 5, Article 55). As Figure 14 of the Use of the Object Catalogue for ENC (Edition 3.0.0, October 2011) and S-58 Test 1700 agree with this Convention, these will not be changed. To best depict the area subject to U.S. fisheries laws, a FSHZNE object, defined as "The offshore zone in which exclusive fishing rights and management are held by the coastal nation." (S-57 Appendix A - Chapter 1) should be encoded, and the EEZ and Terrirorial Sea encoded as outlined in UNCLOS.

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Question 13

Is it possible to have M_QUAL and M_ACCY objects overlapping each other on ENCs?

The meta object M_QUAL provides information about the quality of bathymetric information (Use of the Object Catalogue for ENC (UOC) Clause 2.2.3.1) while the meta object M_ACCY provides an overall accuracy of position for non-bathymetric features (UOC Clause 2.2.4.1). Both of these Clauses state that where both M_QUAL and M_ACCY appear in an ENC cell, they should not overlap, which by strength of language definition in the UOC means that this is an optional requirement, that is the recommended process to be followed, but is not mandatory. Therefore if you wish to have these objects overlapping, you may do so.

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Question 14

How do you encode linear maritime jurisdiction features in an ENC?

See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 11.2.

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Question 15

Can a territorial Sea Area (TESARE) and an Exclusive Economic Zone (EXEZNE) overlap?

Yes, but only in areas of two or more Coastal States that are in dispute. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 11.2.4.

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Question 16

Is it required to encode Automatic Identification System (AIS) information in ENC ?

See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 12.14.1.

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Question 17

Should an ENC cell cross the 180º Meridian of Longitude?

No. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 2.1.8.2.

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Question 18

How is a DGPS Station encoded for ENC?

If it is required to encode a DGPS station, it must be done using a RDOSTA object (see S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 12.9), with attribute CATROS = 10 (Differential GPS).

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Question 19

How is an IALA Emergency Wreck Marking Buoy encoded for ENC?

See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 12.4.1.1.

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Question 20

Can the _ (underscore) character be used in an ENC data set file name?

No. See ENC Encoding Bulletin number 20.

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Question 21

Should text and picture files included in an ENC exchange set be encoded using formats other than ASCII text (.TXT)

and .TIF?

No. S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clauses 2.3 and 4.8.20.

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Question 22

Are depth areas of type line required for ENCs?

Depth areas of type line will not be required in ENCs from 01 January 2009. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 5.4.1.

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Question 23

Am I required to remove depth areas of type line from existing ENCs?

No. S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 5.4.1.

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Question 24

Is the population of time varying attributes implemented by the ECDIS?

Yes, but encoders should note that not all S-57 objects include the time varying attributes in their attribute list. For encoding navigation aids containing certain equipment objects for ENCs compiled on production systems not current to S-57 Supplement No. 2 (June 2009), see ENC Encoding Bulletin Number 24.

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Question 25

How should advance notice of changes to traffic separation schemes (TSS) be promulgated to mariners?

See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 2.6.1.1.

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Question 26

How are oscillating sectors of complex directional navigation lights encoded?

See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 12.8.6.1.

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Question 27

Is it safe to use the attribute EXPSOU for SOUNDG objects?

It may not be safe. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clauses 5.3 and 5.5.

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Question 28

Is it required to continue to populate the attribute INFORM for new objects and attribute values appearing for the first

time in S-57 Edition 3.1 or Supplement No 1 (Edition 3.1.1)?

The population of INFORM on feature objects to describe the meaning of new objects and attribute values in S-57 Edition 3.1 and Supplement No 1 (Edition 3.1.1) will not be required in ENCs from 01 January 2009. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 1.1.

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Question 29

Is it required to remove INFORM where it has been populated for new objects and attribute values appearing for the first time in S-57 Edition 3.1 or Supplement No 1 (Edition 3.1.1) from existing ENCs?

No, but note that the retention of INFORM will result in unnecessary display of the "information" symbol in the ECDIS. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 1.1.

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Question 30

I have encoded some objects in an ENC and they do not display in ECDIS. How should these be encoded?

Not all objects that are valid in the ENC Product Specification are displayed in ECDIS. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clauses 2.5; 4.6.6.6; 4.7.4; 4.7.7.1; 4.7.7.2; 4.7.11; 4.8.3; 4.8.5; 4.8.8; 4.8.10; 4.8.12; 4.8.13 and 11.6.1.

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Question 31

I have a strip light that serves the purpose of an aid to navigation. How should I encode this?

See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 12.8.7.

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Question 32

Can an ENC update be issued which changes the limit of data coverage of the base ENC cell?

No. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 2.6.

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Question 33

What is the maximum data limit for an ENC update?

There is no maximum limit specified, but ENC updates should not exceed 50 Kilobytes. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 2.6.

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Question 34

Can a Feature Object Identifier (FOID) be repeated in a single ENC cell ?

Yes, but only where the FOID references multiple parts of a single real-world feature. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 2.1.8.1.

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Question 35

Can a navigational mark equipment object be associated with more than one master object through the master/slave relationship?

No. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 12.1.2.

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Question 36

Can mangrove areas be encoded for ENC in accordance with the changed paper chart specifications for the depiction of mangroves (Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO (S-4) – clause B-312.4; as amended at Edition 3.006 (April 2009))?

Yes. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 4.7.11.

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Question 37

How do I encode a Maritime Rescue and Coordination Centre (MRCC)?

See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 13.2.

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Question 38

How do I encode a floating waste bin?

See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 12.4.1, table 12.3.

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Question 39

How do I encode a subsurface data acquisition buoy consisting of a large float moored below the water surface (i.e. no surface buoy)?

See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 12.4.1, table 12.3.

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Question 40

I have encoded a named anchorage area but the name is not displaying in the ECDIS. How should I encode the area such that the name displays?

The area should be double encoded as a SEAARE object, in addition to the encoded ACHARE. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 9.2.1.

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Question 41

How do I avoid the display of unnecessary isolated danger symbols in ECDIS where the depth of an encoded underwater rock, wreck or

obstruction is not known but the source indicates the depth is within the range of depth of the surrounding depth area?

The attribute value EXPSOU = 1 (within the range of the surrounding depth area) should be encoded. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clauses 6.1.2, 6.2.1 and 6.2.2.

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Question 42

What is the preferred method for encoding magnetic variation information in ENCs?

It is recommended that magnetic variation be encoded as area objects using the object class MAGVAR. See S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC (Edition 3.1.0, October 2012), Clause 3.1.1.

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Question 43

If I encode an all-round light with attributes SECTR1 = 0 and SECTR2 = 360, will this symbolize as a "halo" in the ECDIS display?

Not in some ECDIS. Therefore this encoding must not be used for all-round lights. See ENC Encoding Bulletin No. 53

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