18th TSMAD/1st DIPWG COMBINED MEETING
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Paper for Consideration by TSMAD/DIPWG

Issues from the ENC Encoding Bulletin Sub-Working Group

Submitted by:	ENC Sub-Working Group Coordinator (Jeff Wootton)
Executive Summary:	Issues for the attention of TSMAD from the ENC EB Sub-WG
Related Documents:	Refer to Annexes to this paper
Related Projects:	S-57 Maintenance; S-101 Development; ECDIS Portrayal (S-52)

Introduction / Background

The ENC Encoding Bulletin Sub-Working Group is a sub-working group of TSMAD. Its function is the development and approval of ENC Encoding Bulletins which are designed to address inconsistencies in methods of encoding data and emerging issues that affect the way ENCs are encoded and displayed. Since S-57 has been "frozen" on publication of Edition 3.1, the ENC Encoding Bulletin Sub-Working Group has become the principle group through which maintenance issues in S-57 have been addressed. In addition, ENC Encoding Bulletins will provide the basis for proposals to the IHO Hydrographic Register and/or proposals for enhancements from S-57 within the S-101 development process.

Where consensus is reached within the Sub-Working Group on the content of an ENC Encoding Bulletin, it is considered to constitute TSMAD approval, resulting in publication on the IHO web site without further consultation with TSMAD. If consensus cannot be reached on the content of any Encoding Bulletin, it must be referred to the full TSMAD for discussion, guidance and resolution. The following are draft ENC Encoding Bulletins on which agreement could not be reached within the Sub-Working Group. Further information on Encoding Bulletins can be found in the Annexes as listed in the Discussion below, as well as the latest draft by the Sub-Working Group Coordinator attempting to incorporate the latest round of comments by the Sub-Working group for discussion by TSMAD.

Analysis / Discussion

Wrecks: The initial requirement for this Encoding Bulletin was designed to align the encoding of the object class **WRECKS** on ENC with the revised guidance for charting wrecks on paper charts at M-4 clause B-422, and in particular B-422.7, as approved by the IHO CSPCWG and published in Edition 3.004 of M-4. This guidance recommended more quantitative information on wrecks be portrayed in order to remove the ambiguity of the terms "dangerous" and "non-dangerous", including the estimation of safe vertical clearance where possible (i.e. the use of INT1 symbols K20-27 and K30 and not K28 and K29). From an ENC perspective, this equated to the population of the attributes VALSOU and QUASOU, rather than CATWRK values 1 or 2, to provide this more quantitative information to the mariner. During the period that this Encoding Bulletin has been in development, it has also been brought to the attention of the Sub-Working Group, particularly by the RENCs, that:

- CATWRK values 1 and 2 do not have any influence on display of wrecks in an ECDIS; and
- Any wreck not having VALSOU, regardless of whether it is considered to be dangerous or non-dangerous, displays as a dangerous obstruction on the ECDIS when it is positioned in a depth area that is deeper than the safety depth set by the mariner in the ECDIS.

The principle point of disagreement in the draft Encoding Bulletin is the recommendation that where VALSOU is populated for a wreck, it is not required to populate CATWRK. Annex A to this paper includes the relevant revised clauses of M-4, the discussion thread during the

development of this Encoding Bulletin (red text indicates actions and feedback by the Sub-Working Group coordinator, and blue text comments received from Sub-Working Group members), and the latest draft submitted for discussion by TSMAD.

Minimal Depiction Areas: The requirement for this Encoding Bulletin was determined at TSMAD16/CSMWG18. The issue was originally raised by IC-ENC through the Technical Experts Working Group (TEWG), and related to encoders' interpretation of UOC Clause 5.8.3.1 (refer Annex B.1), which in some cases has resulted in poor results in portrayal of minimal depiction areas in the ECDIS (refer Annex B.2). On discussion by TSMAD it was determined that an Encoding Bulletin was required, but no guidance as to the content of the Encoding Bulletin was supplied. A first draft of the Encoding Bulletin was submitted to UKHO and IC-ENC for comment as required in the TSMAD action, and the resultant Encoding Bulletin circulated to Sub-Working Group members for comment. The principle point of disagreement in the Sub-Working Group is the requirement to show generalised information on ENCs where larger Navigation Purpose ENCs are available (refer Annex B.3). The latest draft of this Encoding Bulletin is included at Annex B.4.

Internationally Recommended Transit Corridor (IRTC): This is an emerging encoding issue. An IRTC has been established in the Gulf of Aden due to piracy activities in the region. IC-ENC has been asked for the recommended encoding guidance for this feature, which has been forwarded to the ENC Encoding Bulletin Sub-Working Group Coordinator for information. Refer to Annex C for discussion thread for this issue.

Recommendations

None.

Justification and Impacts

Although it is considered that paper charts and ENCs are different types of products, many of the principles and guidelines for the content of these products are in common. Discussion on the depiction of wrecks on paper charts identified a deficiency that resulted in some confusion over what defines a "dangerous" or "non-dangerous" wreck, which has resulted in the revised guidelines on the depiction of wrecks as approved by CSPCWG. This confusion as to what constitutes a "dangerous" or "non-dangerous" wreck should be considered to apply to both paper charts and ENCs, with the additional issue of the display of a navigational obstruction where VALSOU is not populated due to S-52 Conditional Symbology Procedures also contributing to possible confusion by the mariner. This could result in a loss of confidence in the ECDIS by the user.

Different interpretations of the guidance in Clause 5.8.3.1 of the UOC has resulted in some ENC cells showing a marked difference in data content as ECDIS users "scale out" their ECDIS display from one usage band to a lower usage band, which may result in a loss of confidence in the ECDIS by the user.

Action required of TSMAD

TSMAD is invited to:

a. Discuss the draft Encoding Bulletin on wrecks, and supply guidance to the ENC Encoding Bulletin Sub-Working Group.
b. Discuss the draft Encoding Bulletin on minimal depiction areas, and supply guidance to the ENC Encoding Bulletin Sub-Working Group.
c. Discuss the requirement for an Encoding Bulletin/FAQ for IRTC and determine encoding option and action (if required) for the ENC Encoding Bulletin Sub-Working Group.

DIPWG is invited to:

a. Note issues within this paper relating to the display of wrecks in ECDIS.

A.1 Excerpts from M-4 (Edition 3.005 – October 2008) pertaining to wrecks of relevance to this paper:

B-422 WRECKS, FOUL GROUND, OBSTRUCTIONS

a. The international abbreviation '*Wk*' must be used wherever the symbol for a charted feature does not identify it as a wreck.

b. To give the mariner the maximum useful information, the least depth over a wreck (or, if unknown, an estimated safe clearance) must be charted in preference to symbols K28 and K29. An exception is the remains of a wreck which are charted as foul ground (see B-422.8). For wrecks visible or partly visible at chart datum, the height or drying height should be shown in brackets, if known. The symbol K29 should be used for all wrecks in waters over 200 metres deep.

c. Wrecks must be shown to whatever depth they are considered to be of interest, also taking account of the needs of submarines and fishing vessels where appropriate, but not generally in water deeper than 2000m. (Trawling regularly takes place in depths of 400m and occasionally in depths as great as 2000m).

d. On medium scale charts, certain wrecks may be omitted from inshore areas. In such cases a brief cautionary note, headed WRECKS, or the equivalent, should be shown describing in general terms where wrecks are omitted, eg 'Wrecks with more than 18 metres over them within 5 miles of the coast are not shown except in Lyme Bay.' Such a note is unnecessary where wrecks have been omitted only from clearly defined areas, eg inner waters, from which navigational aids and other details have also been omitted.

e. **(I)** It is important that the largest scale International chart shows sufficient details of wrecks for safe navigation by International shipping, without reference to larger scale national charts.

f. The abbreviation '*Wks*', repeated if necessary, may be used in place of symbols on medium scale charts where there are numerous wrecks and it is necessary to navigate on a larger scale chart.

g. Blue tint must be added over wreck symbols in accordance with their depth, see B-411.6 and B-416.3.

h. The abbreviations '*PA*', '*PD*' and '*ED*' may be inserted against wreck symbols as appropriate, see B-424.

i. For Historic Wrecks, see B-449.5.

B-422.7 Changing criteria for wrecks. B-422.1-6 provides guidance on charting new wrecks. However, historically the criteria used for differentiating between symbols K28 and K29 for wrecks were often based on a threshold value for the estimated depth over the wreck (eg 20m, 28m). Criteria have varied between nations and over time (due to the increasing draught of large vessels). The term 'non-dangerous wreck' was formerly used for K29 symbols, even though they may be dangerous to some vessels capable of navigating in the vicinity. Unfortunately, the chart user is not necessarily aware of that fact or that, due to the changing criteria, the same symbol on a chart may have different meanings. Ideally, therefore, all charted K28 and K29 symbols should be re-assessed to conform to the guidance above.

If resources and knowledge do not allow for an immediate re-assessment of all charted K28 and K29 symbols, the following actions should be taken to reduce possible confusion, starting with priority areas:

- An explanation (or reference to an explanation in a nautical publication) of the possible inconsistency between the meaning of K28 and K29 symbols on a chart must be given in the national equivalent of INT 1, and a cautionary note may be added to charts.

- Existing K29 symbols may be updated according to the following formula:

i. Retain K29 in water deeper than 100m.

ii. In water shallower than 100m, amend K29 to K30, with the safe clearance depth being that formerly applied to differentiate between K28 and K29. (Take care where the criteria used has changed over time).

iii. If this action results in over-crowding, a selection should be made to show the extent of the area, or symbols merged into extended danger lines. Alternatively, the size of the K30 symbol may be reduced.

iv. Take care to ensure no anomalies result, such as wrecks with a safe clearance greater than the surrounding depths; in such cases, the original data must be reassessed or, if not possible, the symbol should not be changed, see B-416.3.

- A database, maintained for wreck information, would assist any reassessment and demonstrate why a particular symbol was chosen.

A.2 ENC Encoding Bulletin Sub-Working Group discussion thread:

Wrecks: First draft completed but needs to be simplified. **Investigate and re-draft for circulation and comment**.

Simplified draft focusing on moving away from the non-prescriptive encoding of "dangerous" and "non-dangerous" wrecks compiled and approved by Chris ROberts. Working Draft completed for circulation to Sub-WG 29/10/07. Comments by 16/11/07.

Comments received from:
FR: OK
C-Map: OK
IC-ENC: I think it would be useful to include the amended clause from M-4 and the UOC table in this bulletin.
US: The US sees a problem with the wrecks bulletin. The guidance is to not populate CATWRK 1 or 2 if the depth is known. However, how is display handled if these are not populated. Additionally, for those nations that are moving to centralized production systems that attribute is instrumental in determining the paper chart symbology. This is contrary to USA Nautical Chart Manual, and cannot be accepted by the USA. For other user nations would this present a problem for printing paper charts on ENC? I see no reason to change this or even address it.

The purpose of EBs is to provide additional guidance to encoders where the published Standards and Specifications are ambiguous, or to provide encoding guidance on emerging issues, in order to help ensure consistency. The fact that both the relevant clauses from M-4 and the UOC are referenced in the EB would, I hope, encourage encoders to actually read the documents, rather than be spoon fed through regurgitating them in the EB. I therefore would not like to see M-4 Clause B-422 or UOC table 6.2 included in this EB.
The guidance in this EB is in agreement with the revisions to M-4 clause B-422 as released in Edition 3.004 (July 2007), in particular B-422.7 which relates to changing criteria of wrecks (I have inserted the Edition of M-4 in the EB). The main reason for the change to M-4 was that the criteria used for determining the threshold for depicting INT1 symbols K28 and K29 has been inconsistent and has changed over time. This was discussed extensively by the CSPCWG and anyone interested can check the Minutes of CSPCWG and related IHO CLs to look at the history. With regards to S-57, populating CATWRK is only mandatory if there is no value populated for VALSOU (ENC PS table 3.3). With regards to display, Chris has informed me that the current Version of the Presentation Library (3.3) and the very soon to be published Version (3.4) does not recognize CATWRK when displaying wrecks (don't ask me why). As an example, I had a situation pointed out to me on ECDIS today where a non-dangerous wreck (no VALSOU) in 30-50 metres of water with WATLEV = *3* displayed with the default danger symbol (cross in filled magenta circle) even when the safety depth was set to zero. Surely this is a circumstance that we wish to avoid! I currently have one of our compilers doing a test cell with various encoding combinations of VALSOU, QUASOU and CATWRK to investigate this further in ECDIS with varying safety depths. As far as paper chart symbology goes, the population of CATWRK is only relevant where there is no value populated for VALSOU. Where VALSOU is populated, the paper chart symbols INT1 – K26, K27 or K30 will be used, dependant on the value of QUASOU. As the revised M-4 clause B-422.7 suggests, the use of symbols K28 and K29 should be a last resort, which is the message that we are trying to deliver by this EB. Having said all this, I don't think we will reach an agreement on this EB, and will probably need to discuss further at TSMAD15.

EB sub-group members to provide feedback on the above by 07/12/07; possibly needs to be referred back to full TSMAD.

Comments received from:
C-Map: I'm ok with this one, and I don't see why it would be a problem for a centralized production system. These attributes can remain populated in the database and simply be filtered away on export to a product (ENC).
US: We don't really see the need to issue a bulletin, as this is primarily a rule for paper charts. By encoding CATWRK 1 or 2 just gives more information, especially if it is only an estimated sounding over the wreck. In addition, S-52 doesn't use it as the primary means of display, especially if the VALSOU is encoded.

Discussed at TSMAD15. **Needs to be referred to combined TSMAD/CSMWG meeting (co-ordinator action).**

Draft version as amended at TSMAD16 re-circulated to Sub-WG 27/10/08. Comments by 10/11/08.

Comments received from:
US: The US still does not concur with the bulletin. It really is a paper chart issue. We look at is as extra information, especially if you are only using estimated safe clearances. I checked S-52 and leaving it be would not effect anything.
UK: Minor editorial changes and otherwise no comment.

Added additional introductory paragraph on the effect of not populating quantitative information for wrecks in ECDIS display. Removed reference to not populating CATWRK where VALSOU is populated, as per US concerns. Re-circulated to Sub-WG 25/02/09. Comments by 13/03/09.

Comments received from:
US: Still have issues - just let me have CATWRK 1 and 2. Although since it is not a shall not I can do it anyways.
FR: It seems to me that the new wording of the bulletin has evaded the important message of the new version of M4 which advices the cartographer to avoid the ambiguous concept of "dangerous" or "non dangerous" wreck when the least depth is known or may be estimated.
I propose to complete the bulletin as indicated in the attached file:
"Encoders should note that when encoding a WRECKS object, the attributes populated should adhere to the guidance in M-4 Clause B-422, in addition to UOC Table 6.2 as amended by ENC Encoding Bulletin Number 6. Where possible, this includes the population of the attributes VALSOU and QUASOU where the depth of a wreck is known, or the depth is unknown but an estimated safe clearance can been determined. This being done, the mariner should be able to estimate if the wreck is dangerous or not for his vessel and the population of the attribute CATWRK = *1* (non-dangerous wreck) or *2* (dangerous wreck) becomes useless."
FI: OK.

A.3 Draft ENC Encoding Bulletin for discussion by TSMAD:

Proposed S-57 Encoding Bulletin

XX. UOC Clause 6.2.1 Wrecks

The IHO Chart Standardisation and Paper Chart Working Group (CSPCWG) is conducting a full review of IHO Publication M-4 – Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO. As part of the review, Clause B-422 relating to wrecks has been updated in Edition 3.005 to provide additional guidance for depicting more quantitative information regarding wrecks on charts, as distinct from only classifying “dangerous” and “non-dangerous” wrecks.

The provision of more quantitative information for wrecks where possible is particularly important in terms of the portrayal of wrecks in ECDIS. Conditional Symbology Procedures in the IHO Specifications for Chart Content and Display Aspects of ECDIS (S-52) Appendix 2, Annex A – ECDIS Presentation Library, do not take into account the classification of wrecks as “dangerous” or “non-dangerous” when symbolising. This often results in wrecks being symbolised as an obstruction to navigation where they are actually non-dangerous.

Encoders should note that when encoding a WRECKS object, the attributes populated should adhere to the guidance in M-4 Clause B-422, in addition to UOC Table 6.2 as amended by ENC Encoding Bulletin Number 6. Where possible, this includes the population of the attributes VALSOU and QUASOU where the depth of a wreck is known, or the depth is unknown but an estimated safe clearance can been determined. Where the depth is known, or the depth is unknown but an estimated safe clearance has been determined, it is not required to populate the attribute CATWRK = *1* (non-dangerous wreck) or *2* (dangerous wreck), as the mariner has the quantitative information in order to determine whether the wreck may be dangerous to their type of vessel.

Proposed FAQ

None required.

ANNEX B

B.1 Excerpt from Use of the Object Catalogue for ENC relating to minimal depiction areas:

5.8.3 Bathymetry in areas of minimal depiction of detail on paper charts

Where areas of little or no depth information exist within a specified ENC usage, they should be encoded using one of the following options:

5.8.3.1 Areas of omitted bathymetry

Where larger scale coverage is available, the larger scale charts should be examined to determine the shallowest **DEPARE** object within the whole of the area. One **DEPARE** object should then be created, with attributes DRVAL1 and DRVAL2 encoded from the values obtained from the larger scale. **DEPARE** objects of type line may be created to join the area of omitted bathymetry with adjoining known **DEPARE** objects of type area.

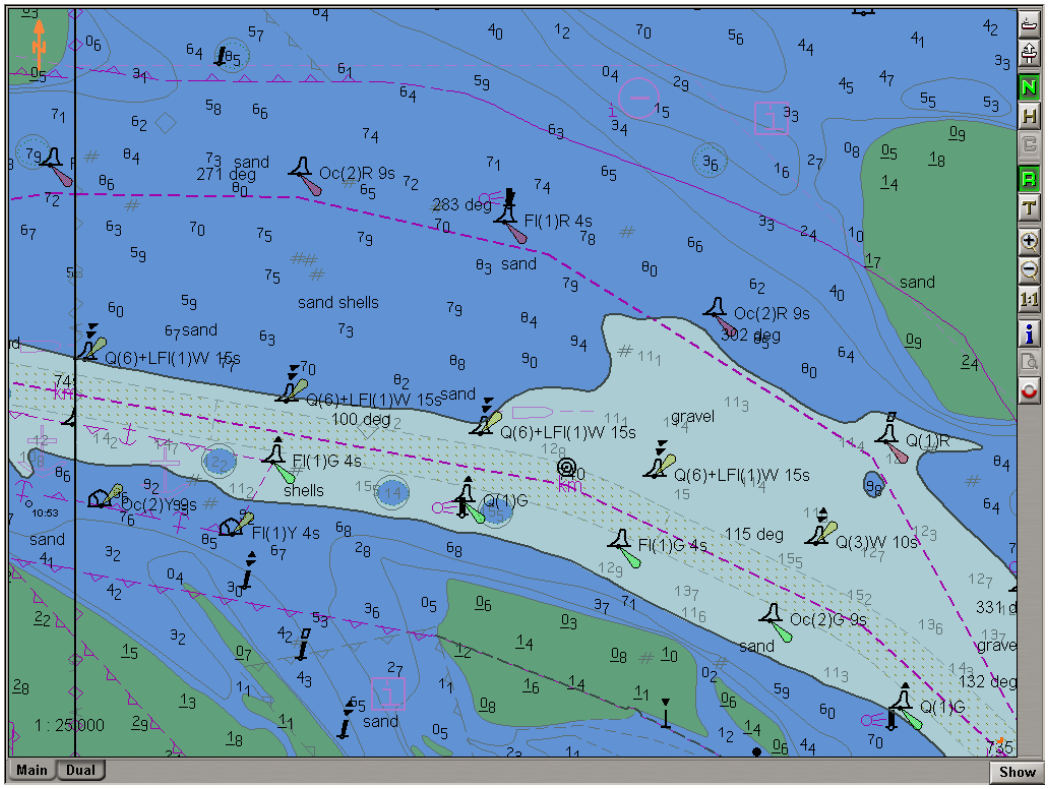
Where larger scale coverage does not exist, a single **DEPARE** object should be created to cover the area of omitted bathymetry. The DRVAL1 value of the **DEPARE** object should be set to the shallowest value appropriate to the colour tint that is applied to it (e.g. if blue tint is used for 5-20m areas, the DRVAL1 value for the area of omitted bathymetry should be set to 5). The DRVAL2 value should be set to the shallowest value of the surrounding Group 1 polygons. **DEPARE** objects of type line may be created to join the area with adjoining known **DEPARE** objects of type area.

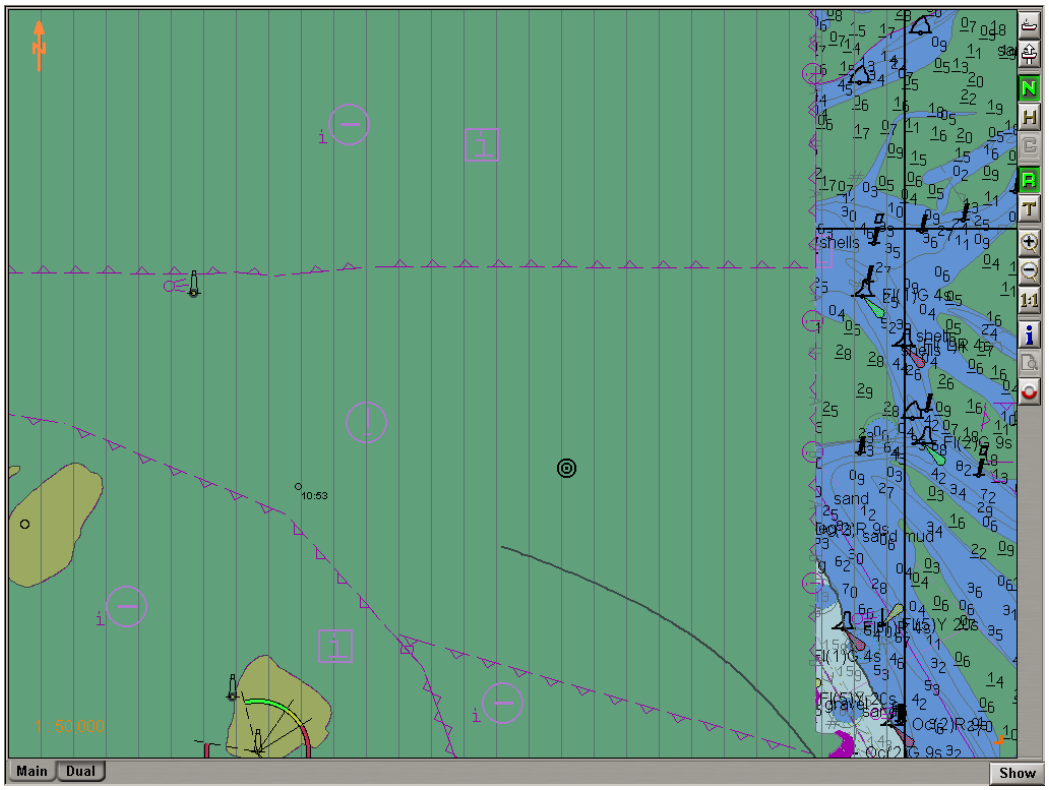
In either case, the areas should be covered by a **CTNARE** object, the boundary of which follows exactly the surrounding Group 1 objects (see clause 2.8.2).

B.2 Excerpt from IC-ENC paper presented at TEWG:

3.4 Areas of minimal depiction

The following screenshots illustrate the use of minimal depiction of bathymetry at certain scales:





B.3 ENC Encoding Bulletin Sub-Working Group discussion thread:

Minimal depiction of depth detail: Refer presentations at JTEWG7 and UOC Clause 5.8.3. TSMAD16/CSMWG18. **Draft new EB**.

This issue was raised by Richard Fowle through the IC-ENC TEWG, and was discussed at the combined TSMAD16/CSMWG18 meeting. The interpretation of UOC clause 5.8.3 is resulting in widely ranging levels of depiction of bathymetry between successive Navigation Purposes, which is causing a loss of confidence in the ECDIS. First draft completed 05/03/09. Sent to TSMAD Chair (joint Action from TSMAD16) and IC-ENC (Richard Fowle) for feedback ASAP.

Comments received from:
UK/IC-ENC: Amended version (Version 2) received 11/03/09.

Version 2, as amended by UK and IC-ENC, circulated to Sub-WG 11/03/09. Comments by 27/03/09.

Comments received from:
US: The US disagrees with this bulletin for the following reasons:
1. The US does not think the premise of the bulletin is a good idea, we understand that mariners are not going to buy all the coverage, but if we genralize in areas that have been traditionally areas of minimal depiction we will be encouraging mariners to use the wrong product to navigate in areas where there is larger scale coverage.
2. In addition, the US feels that this is encroaching more on cartographic policy rather than encoding practice.
3. It is rather impractical to execute if you have a large suite of ENCs.
CA: CA disagrees with this EB. Our ENCs currently reflect our paper charts, thus, we do not start generalizing information from another product to fill in gaps on an ENC. When we have 'whited-out' areas, or areas of minimal depiction, we adhere to the U of C as written. If a larger scale ENC exists, instead of generalizing from that, we should just make the minimal depiction area CATCOV=2 in the file. CA ENC catalogue is much too large to follow this EB.

B.4 Draft ENC Encoding Bulletin for discussion by TSMAD:

S-57 Encoding Bulletin

XX. UOC Clause 5.8.3 Bathymetry in areas of minimal depiction of detail on paper charts

Clause 5.8.3 of Edition 2.1 (April 2002) of the Use of the Object Catalogue for ENC (S-57 Appendix B.1, Annex A) provides guidance for the encoding of bathymetry on ENCs where there is minimal detail shown on paper charts corresponding to the ENC Navigation Purpose. This guidance includes the encoding of a single depth area covering areas of omitted bathymetry. It has been identified that strict adherence to these original guidelines can result in considerable inconsistencies in the display of differing scale coverage within an area, causing confusion and loss of confidence in the product by the mariner.

Encoders are advised, therefore, that when encoding areas of bathymetry from paper charts containing minimal depth detail at scales that correspond to the ENC Navigation Purpose, to consult larger scale paper charts or ENC Navigation Purpose cells and generalise the bathymetry from this data.

FAQ

Q XX ***When encoding an ENC using paper charts as source, should areas of omitted bathymetry where larger scale chart coverage is available be covered by a single depth area in accordance with the recommended guidance in UOC clause 5.8.3?***

A XX It may be, but see ENC Encoding Bulletin number XX.

ANNEX C

E-mail discussion thread on encoding of Internationally Recommended Transit Corridor:

Please read the following from top-down.

To: Fowle Richard
Subject: Irtc corridors...

Are these able to represented in ENCs? I was just wondering if reality had overtaken specification again....

Cheers,

J

Piracy update- three
(Apr 16 2009)

Chart agency Thomas Gunn has circulated the following information regarding UK vessels transiting the Gulf of Aden area.

Due to pirate activities in the region, an Internationally Recommended Transit Corridor (IRTC) has been established through the Gulf of Aden.

The corridor consists of Westbound and Eastbound lanes, both five nautical miles wide and separated by a two nautical mile wide buffer zone.

The lanes are defined as follows: - Westbound lane orientated along a straight line course 252 de and the Eastbound lane is orientated along a straight line course of 072 deg.

It is advised that vessels send position reports via email every four hours to the UK Maritime Trade Organisation (UKMTO); ukmto@eim.ae and the Maritime Liaison Office (MARLO); marlo.bahrain@me.navy.mil

Although coalition warships and aircraft maintain a presence in this area, the establishment of the IRTC does not eliminate all risk of criminal activity. Extreme caution and vigilance must be exercised in the Gulf of Aden at all times, Thomas Gunn said.

Mariners should comply with the IMO guidance on preventing and suppressing acts of piracy and armed robbery against ships (See MSC/Circ 623/Rev 3).

In case of emergency, call the UK Maritime Trade Organisation (UKMTO); +971 50 5523215 (primary) or the Maritime Liaison Office (MARLO); +973 39401395 (secondary) to reach coalition forces.

The charts affected are - 6 - 2964 (INT 758) - 2970 (INT 7002) – 3661 (INT 7162) - 3784 - 4071 (INT 71) - 4072 (INT 72) - 4703 (INT 703) - 4704 (INT 704) - 4705 (INT 705).

Jonathan

At the moment there isn't a specific object for an IRTC (Internationally Recommended Transit Corridor), it may be possible to encode them as RCTLPT (Recommended traffic lane part).

Barry/Jeff Do we need encoding bulletin for this recent development ?

Richard.

Richard:

Because RCTLPT is part of an IMO-adopted routeing measure (by definition), I don't think it is appropriate to use this object (unless the IRTC is IMO-adopted?). I think the preferred option would be TWRTPT, with the mandatory attributes ORIENT and TRAFIC to indicate the direction and one-way designation of the IRTC zones. The definition for two-way route also better fits the reason for the IRTC being established (although I don't think the purpose fits the original intention of the word "dangerous").

I am in the process of putting the finishing touches of an ENC EB paper for TSMAD18, and would be happy to add a paragraph on this issue, if you think it is necessary - it is probably worth putting in just to get a full TSMAD opinion as to whether an EB and/or FAQ is required.

Regards,

Jeff.