IHB File No. S3/8151/CHRIS

CIRCULAR LETTER 32/2007
14 March 2007

IMPROVING ENC CONSISTENCY

References: a)   Circular Letter 47/2004 dated 5 July
             b)   IHO Publication M-3 *Resolutions of the IHO*

Dear Hydrographer,

1   Circular Letter in reference a) circulated a list of recommendations for consistent encoding of ENCs by Hydrographic Offices. They are reproduced at **Annex A**. Member States were invited to follow these recommendations when producing ENCs, which would lead to considerable quality improvements and much greater user satisfaction. IHO Publication S-65 *ENC Production Guidance*, published in 2005, included references to these recommendations. The IHO website (ENC > Bulletins) also refers to them.

2   Concern was expressed at the 2nd ECDIS Stakeholders Forum (Monaco, September 2006) that little progress was being made in implementing these recommendations.   This, in particular, related to the inconsistent application of SCAMIN by neighbouring Hydrographic Offices, which resulted in unacceptable differences in display across cell / data boundaries. The 10th WEND meeting which occurred at the same time as the 2nd ECDIS Stakeholders' Forum agreed that the WEND submissions to the IHO Work Programme 2008-2012, would include the following item: "*RHCs to work for ensuring ENC consistency to achieve a common level of IHO data quality by end of 2010*" WEND also invited CHRIS to revisit this matter and possibly identify additional recommendations in order to improve ENC consistency and display, such as the use of SCAMIN, and/or symbology, .

3   CHRIS, at its 18th meeting (September 2006, Cairns, Australia), discussed this issue and concluded that the existing "*Recommendations for Consistent ENC Data Encoding*", (shown at Annex A), still provide the most appropriate guidance but do not appear to be used widely or consistently. CHRIS further concluded that proper implementation of the compilation guidelines would resolve the current presentation issues caused by ENC inconsistencies, and that there was therefore no need for new symbology, such as highlighting differences across cell / data boundaries, in fact this could cause more confusion rather than assistance to the mariner.

4   As a result, Hydrographic Offices producing ENCs are again urged to adopt these procedures and to grasp opportunities as they arise to update previously issued ENCs. Also, it is believed that embedding the recommendations into Publication M-3 *Resolutions of the IHO* would give them more visibility and weight. It is therefore proposed that the recommendations be adopted as a new IHO Technical Resolution A3.13. Member States are requested to complete the **voting paper at Annex A, to be returned to the IHB by 31 May 2007**.

On behalf of the Directing Committee
Yours sincerely,

Rear Admiral Kenneth BARBOR
Director

Annex A: Recommendations for Consistent ENC Data Encoding
Annex B: Voting Paper on the proposed IHO Technical Resolution A3.13

RECOMMENDATIONS FOR CONSISTENT ENC DATA ENCODING

1. The setting of compilation scales for all ENCs should be based upon the standard radar range scales in the following table:

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	1:8000
0.25 NM	1:4000

Table 1 - Radar range / standard scale table

- 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 22,000.
- Exceptionally, where the density of the data is such that following this rule would result in a particularly cluttered presentation, the next larger scale may be used, but only if this scale is not larger than the scale of the original source survey material. e.g. an ENC produced at 1:25,000 could have a compilation scale of 12,000.
- Where the source material used to produce the ENC is of a scale larger than 1:4000, then the actual paper chart / source material scale may be used as the compilation scale for the ENC.
- Where the source material used to produce the ENC is of a scale smaller than 1:3,000,000, then the actual paper chart / source material scale may be used as the compilation scale for the ENC.

2. SCAMIN values should be determined using a method that reduces the number of individual objects displayed and ensures clarity, using the standard rounded display scales listed in the above table:

- SCAMIN should be applied to all SCAMIN-attributable objects and also to buoys and beacons which belong to the display category "base display" of the IMO Performance Standards for ECDIS. SCAMIN should not be applied to any other base display objects.

- As a minimum, a single standard value should be applied to all SCAMIN-attributable objects. This single standard value should be set to the compilation scale minus 1 of the next available smaller scale ENC covering the area, e.g. for an ENC with a compilation scale of 12000, where the next available smaller scale ENC has a compilation scale of 90,000, this standard SCAMIN value should be set to 89,999.

- In order to achieve clarity of display as the user zooms out, intermediate SCAMIN values should be applied to those individual objects in SCAMIN-attributable object classes that the HO considers are less important and that are contributing to clutter. These values should be set to one of the rounded standard scales (minus one) between the compilation scale of the cell and the compilation scale of the next smaller scale ENC available. For instance, for an ENC with a compilation scale of 12,000, where the next available smaller scale ENC has a compilation scale of 90,000, a SCAMIN value of 44,999 could be applied to such objects.

- If it is desired to continue displaying navigationally important objects of the ENC at zoom levels beyond the compilation scale of the next smaller scale ENC available, other smaller scale SCAMIN values should be applied to such individual objects. These values should be set to one of the rounded standard scales (minus one) beyond the compilation scale of the next smaller scale ENC available. For instance, in the example above, a SCAMIN value of 179,999 may be applied to such objects. The number of upward steps in rounded standard scales will differ for different objects/object classes of differing importance for navigation, e.g. selected soundings may possibly have SCAMIN values of two steps beyond, whereas aids to navigation (buoys, beacons etc.) may possibly require three or more steps beyond.

For the purposes of consistency, and to support a seamless transition between ENC cells, it makes sense if the objects selected for smaller scale SCAMIN values broadly correlate with the objects which appear on the next smaller scale ENC available.

- If there is currently no smaller scale ENC available, it is recommended that the starting point for use of SCAMIN be set at two steps beyond the compilation scale. The values should be set to one of the rounded standard scales (minus one) beyond the compilation scale of the ENC as described above.

- If the above recommendations are used to apply SCAMIN values, the last bullet point of UOC clause 2.2.7 recommending the use of the same SCAMIN value for all navigational purposes no longer applies.

- In order to ensure consistency of display at their boundaries, it is essential that HOs liaise with their neighbouring HOs, RENC and/or Regional Hydrographic Commission when defining these SCAMIN values.

3. HOs may assign each ENC to a navigational purpose based on the ENC's compilation scale. This should be done in consultation with neighbouring HOs or with all nations within a RENC, or with all nations within a Regional Hydrographic Commission, in order to maintain consistency across national or regional boundaries. For instance, the following ranges may be applied:

Navigational Purpose	Name	Scale Range	Available Compilation Scales	Matching Scale Ranges
1	Overview	<1:1,499,999	3,000,000 and smaller 1,500,000	200 NM 96 NM
2	General	1:350,000 – 1:1,499,999	700,000 350,000	48 NM 24 NM
3	Coastal	1:90,000 – 1:349,999	180,000 90,000	12 NM 6 NM
4	Approach	1:22,000 – 1:89,999	45,000 22,000	3 NM 1.5 NM
5	Harbour	1:4000 – 1:21,999	12,000 8000 4000	0.75 NM 0.5 NM 0.25 NM
6	Berthing	> 1:4000	3999 and larger	< 0.25 NM

Table 2 - Possible assignment of navigational purposes to scale ranges

Note that this correlation of navigational purposes to compilation scale is intended to give guidance to those HOs about to start ENC production or to those who wish to rescheme their ENC cells.

4. 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.

5. 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 simplified outline form.

6. In addition to discussing and agreeing the setting of compilation scale and 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 in data coverage. In particular, the following issues should be investigated and resolved:
   - common border limits and boundaries
   - COMF value used
   - scales / navigational purposes
   - overlaps / gaps - buffer zone
   - content / data alignment
   - depth contour intervals
   - truncated limits and boundaries (areas that cross the border)
   - SCAMIN rule used.

7. Misalignment and inconsistent depiction of data at cell, source and international boundaries should be investigated and rectified.

8. HOs should, as a minimum, use standardised depth contour intervals (INT1 II30, 31). Additional contours may be added, where required.

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

10. Wherever possible, meaningful and useful values of CATZOC should be used, i.e. values other than CATZOC 6 (data not assessed) for water areas.

11. Coordinates 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.

12. There must be no gaps in data between adjoining cells of the same navigational purpose.

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

VOTING PAPER

*(to be returned to the IHB **by 31 May 2007***
E-mail: info@ihb.mc - Fax: +377 93 10 81 40)

RECOMMENDATIONS FOR CONSISTENT ENC DATA ENCODING

Member State: ………………………………………………………………………………

Do you agree that the '*Recommendations for Consistent ENC Data Encoding*', as contained in Annex A to IHB CL 32/2007, be made a new IHO Technical Resolution A3.13?

YES ☐ NO ☐

Comments : . . . .

. . . .

. . . .

. . . .

Name/Signature …………………………………… Date: ……………………

—————