

Paper for Consideration by the Transfer Standard Maintenance and Applications Development Working Group (TSMAD) and the Digital Information Portrayal Working Group (DIPWG)

New possible sources of ECDIS anomalies

Submitted by:	Furuno Finland Oy, later called as FFOY
Executive Summary:	Our company has done extensive study of possible anomalies by looking for possible additional not yet addressed gray areas in the current S-52 presentation rules. We have found 3 pieces of such. We propose that DIPWG look these and clarify them for the new edition of the presentation library.
Related Documents:	-
Related Projects:	New edition of Presentation Library

Introduction / Background

1. IHO DIPWG4, Monaco 2012 made a decision to publish a new edition of S-52 Presentation Library and S-64 Test data set to clarify ECDIS anomalies related gray and white areas.
2. FFOY has been contributing for the new editions of both S-52 and S-64. As part of this process we have compared current editions of S-52 and S-64 against different generations of Furuno ECDIS models. As result of this internal work we have identified a few issues which should be clarified in order to avoid them being issued as new ECDIS anomalies.

Analysis/Discussion/Conclusions

3. Our opinion is that the chart content and presentation/portrayal of it should not be part of competition between ECDIS manufacturers. The issue is about training. The chart part should be equal in every ECDIS.
4. Equal chart content and presentation/portrayal of it requires that the IHO specification together with the IHO test data do not leave room for interpretation. This means that the S-64 shall have enough test data with screen sample examples to force a single uniform interpretation of the rule set by the S-52.
5. Some of the new findings are related to changes done during the years for the IHO S-57 and S-52. We are of the opinion that, if such a change causes different end result, then there should be a specific test case in the S-64.
6. Annex A describes issues about linear depth areas
7. Without any action from IHO for the issues in Annex A the mariners will see different numbers in the safety contour labels. This may cause unintended interpretation of the chart by the mariner.
8. Resolving of this issue requires changes in S-52, S-57 and S-64.
9. Annex B describes issues about obstructions over unsurveyed areas
10. Without any action from IHO the obstructions in top of unsurveyed areas will behave differently from obstructions in top of depth areas. This may cause unintended interpretation of the chart by the mariner.
11. Resolving of this issue requires changes in both S-52 and S-64.
12. Annex C describes issues about transparent foul areas
13. This is the least critical of the finding in this document. Without any action from IHO there might be different interpretations by the ECDIS manufacturers (i.e. mariner detect anomalies).
14. Resolving of this issue requires changes in S-64.
15. It is assumed that the final decision cannot be made before the TSMAD/DIPWG meeting and therefore there is a need for a plan how to proceed towards publishing between the TSMAD/DIPWG meetings in 2013 and 2014
16. IHO DIPWG should set a drafting group to complete changes related to these issues.
17. IHO TSMAD/DIPWG should set an expert review panel to review the changes before publishing. The expert review panel shall create a written review report including dates and signs of reviewers. Each change shall be reviewed at least by 3 independent reviewers.

Recommendations

18. Based on this document IHO DIPWG should set a drafting group to complete the required changes
19. Based on this document IHO TSMAD should fix the table in clause 3.3 of the S-57 Product specification
20. Based on this document IHO TSMAD/DIPWG should set an expert review panel to accept changes before publishing

Justification and Impacts

21. IHO has informed IMO to have a leading role in resolving ECDIS anomalies.
22. Without addressing these issues there will be new ECDIS anomalies to be found by mariners

Action Required of TSMAD

TSMAD is invited to:

- a. endorse the technical proposal detailed in the Annex A
- b. agree the recommendations of this document

Action Required of DIPWG

DIPWG is invited to:

- a. endorse the technical proposal detailed in the Annexes A, B and C
- b. agree the recommendations of this document

Annex A Issues about linear depth areas

Related IHO standards

This issue is related to rules set in S-52 and S-57 and to test cases in S-64.

Description

Original IHO S-57 object model included linear depth areas (i.e. DEPARE with prim = line) between adjoining area type depth areas (i.e. DEPARE with prim = area) for which DRVAL1 and DRVAL2 were different. In original IHO model the linear depth areas shared same presentation as depth contour and was used to detection of crossing of the safety contour.

In the current version of the S-52 the "linear depth area" (i.e. DEPARE object in line geometry)

1. Has no presentation (i.e. look-up-table entry is intentionally no presentation and CSP DEPCNT03 is not using linear depth areas)
2. Do not participate in the CSP DEPARE02, which determines "safety contour" from the edges of the object DEPARE and DRGARE and which create "safety contour labels"
3. But is defined as a calling object for DEPCNT03 in the clause "12.1.5 Shared sub-procedures"
4. But is defined as a member of viewing group 33020 in the clause "13.2 Viewing groups"

Items 3 and 4 in above list should be clarified by removing DEPARE as a calling object in 12.1.5 and by removing DEPARE as a member of viewing group 33020.

The existing original test chart in S-64, the Micklefirth contains a good example in chart cell GB5X01NE. In this chart is Greatrigg Island around which there are numerous examples of area type DEPARE objects which are adjoining to each other but for which DRLVAL1 and DRVAL2 values of the area type DEPAREs are different. The plots 3, 5 and 6 in the current S-64 shall be fixed for the values of safety contour values (reason: the plots seem to use DEPARE objects with line geometry to select the safety contour label).

The current presentation does not use linear depth areas at all. However the S-57 product specification still includes DEPARE both as area and line geometry. It would be better to remove the linear depth area from the S-57 product specification.

Action requested

- a) Fix clause 12.1.5 in the S-52
- b) Fix clause 13.2 in the S-52
- c) Fix all existing sample pictures/plots in the S-64
- d) Add specific sample picture in scale 1:5 000 around Greatrigg Island in the S-64
- e) Fix table in the clause 3.3 in the S-57 product specification

Annex B Issues about obstructions and unsurveyed areas

Related IHO standards

This issue is related to rules set in S-52 and to test cases in S-64.

Description

This issue is about if obstructions (OBSTRN), underwater rocks (UWTROC) and wrecks (WRECKS) in the unsurveyed areas (UNSARE) are dangerous or not.

Background is that obstructions and wrecks can be dangerous in depth areas and in dredged areas based on the depth value of the underlying area.

Obstructions (OBSTRN) and underwater rocks use CSP OBSTRN06. Wrecks use CSP WRECKS04. Both OBSTRN06 and WRECKS04 use sub-routines UDWHAZ04 and DEPVAL02.

DEPVAL02 use skin of the earth objects DEPARE, DRGARE and UNSARE to determine the underlying depth. Object UNSARE is without DRVAL1 and DRVAL2 and this leave the depth value as unknown. The unknown value is then replaced by default value depending of the attributes of the OBSTRN, UWTROC or WRECKS.

UDWHAZ04 use only skin of the earth objects DEPARE and DRGARE. The skin of the earth object UNSARE is not used. UDWHAZ04 determines if the magenta danger symbol is used or if the standard symbol indicating no danger is used.

Further it is important to recognize that in the current S-52 the object UNSARE has not been part of the safety contour.

Result of all above is that dangerous obstructions in the unsurveyed areas are displayed as non dangerous objects.

If the obstruction is in the middle of the visible unsurveyed area (i.e. in the middle of gray dash pattern area) then the user may recognize that everything in that area is doubtful and potentially dangerous. However if the Hydrographic Office has just coded an unsurveyed area under an obstruction (i.e. both objects share same spatial list) then the end user cannot see that this obstruction is located in the doubtful area. This case will be dangerous for the mariner as the ECDIS displays the obstruction as not dangerous and as the ECDIS does not create alarm/alert from this obstruction.

Action requested

- a) Agree policy about unsurveyed areas
- b) Based on agreed policy fix the UDWHAZ04 for using or not using the UNSARE in the S-52
- c) Add clear test cases in the S-64

Annex C Issues about transparent foul areas

Related IHO standards

This issue is related to test cases in S-64.

Description

The presentation of foul area (object OBSTRN, CATOBS=6) is defined in CSP OBSTRN06. If the result of the sub-routine UDWHAZ04 is not dangerous, then the presentation is a transparent area pattern FOULAR01 (i.e. small gray diagonal crosses). However the picture samples in the S-64 have for such cases also an underlying area color fill which is a mistake.

Action requested

- a) Fix picture samples in the S-64