

## Paper for Consideration by ENCWG 8

### Accuracy of the hydrographic information – implications on S-52 & S-64 to support Dual Fuel S-100 ECDIS

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<b>Executive Summary:</b>	The new IMO ECDIS performance standard requirements for accuracy of the hydrographic information handling have significant implications on ECDIS functionality. Additional comments are provided for document “Proposed New Editions of S-52 & S-64 to support Dual Fuel S-100 ECDIS”
<b>Related Documents:</b>	Resolution MSC.530(106) & Resolution MSC.232(82). performance standards for ECDIS S-57 Supplement No. 3 (Edition 3.1.3) June 2014 S-52 PresLib 4.0.3

#### Introduction / Background

The new IMO ECDIS performance standard requirements for accuracy of the hydrographic information handling have significant implications on ECDIS functionality. There are still some inconsistencies of accuracy related information in ENC to support required functionality as well as lack of clear operational concept for use of such information in the ECDIS.

#### Comments to document “Proposed New Editions of S-52 & S-64 to support Dual Fuel S-100 ECDIS”

1. Original text: “Unsurveyed areas do not have to have an M\_QUAL coverage.”

Comment: That works good as those Unsurveyed areas are detected as dangers by default in the ECDIS irrespective of attributes. However, addition clarification is needed if the border line of the unsurveyed area would be a subject of any accuracy to be considered. Then possible clarification to solve this would be: If the UNSARE shares boundaries with navigable areas (group1 ->DEPARE/DRGARE), the "worst" accuracy of such boundaries must be used for the whole UNSARE.

2. Original text: “Based on the IMO requirements it is not considered necessary for the IHO to bring into scope accuracy of non-bathymetric data.”

Comment: While RESOLUTION MSC.530(106) paragraphs 11.3.4, 11.4.3 and 11.4.7 deal with the Safety contour (bathymetry), other paragraphs 11.3.5, 11.4.4 and 11.4.8 mention both non-bathymetric and bathymetric objects (e.g. isolated dangers). Wording “...as defined by IHO standards” in 11.3.6 and 11.4.9 gives all flexibility to the IHO to define exactly what classes of objects are subject of accuracy evaluation in ECDIS and which are not. In addition, there may be a need to define not only feature classes/attributes but also conditions (see above proposal for UNSARE). We assume that it must be reflected in S-98 and future S-52 (S-52 edition for handling S-57 data in ECDIS system compliant to RESOLUTION MSC.530(106)). Those documents will respectively define the functionality for S-100 and S-57/63 in new ECDIS.

3. Original text: “The meta object Accuracy of data (M\_ACCY) can be used to provide an overall accuracy of position for all non-bathymetric features. It must not be used to provide the accuracy of bathymetric information.”

Comment: S-57 UOC 2.2.3.1 Quality of bathymetric data defines that “When M\_QUAL and the meta object M\_ACCY are encoded in a cell, they should not overlap.”

S-57 UOC 2.2.4 Accuracy of non-bathymetric data also allows use of the meta object M\_ACCY: “...may be used to provide an overall accuracy of position for all non-bathymetric features”. We assume this applies to e.g. non-

bathymetric objects only on land. If non-bathymetric and bathymetric objects overlap – how those metaobjects are used to define relevant accuracy? If this recommendation is strictly followed, we cannot use M\_ACCY to provide accuracy information for non-bathymetric features (e.g. buoys, beacons, line features (jetties, peers, etc.) that are surrounded by water. The solution would be to assign accuracy information to each of such features individually by encoding its spatial component(s) (node, edge) with POSACC.

Generally, it is allowed to use both M\_ACCY and M\_QUAL meta-objects and in addition POSACC and QUAPOS attributes in spatial objects. The QUAPOS is frequently use for spot soundings and isolated dangers.

We have the following ways of defining accuracy:

Bathymetric	Non-Bathymetric
M_QUAL (CATZOC)	M_ACCY (POSACC)
QUAPOS in spatial objects	QUAPOS in spatial objects
POSACC in spatial objects	POSACC in spatial objects

Hierarchy of those shall be clearly defined in S-98 and future S-52 for the purpose of use in ECDIS for accuracy calculations.

4. Original text: “It has been noted that CATZOC D and U have no numerical way of determining the accuracy, therefore its recommended S-52 prescribe a permanent indication on the ECDIS screen informing the user that no determination of accuracy can be made due to the unavailability of the underlying accuracy data.”

Comment: That would only work when a route part or a ship’s position is INSIDE that area. A permanent indication is good for nothing operationally - what are mariners supposed to do with it? Can vessel go inside or not? Effectively that would determine entire area of D and U as dangerous and requiring formal risk assessment under shipping company SMS. Considering current amount of D and U coverage - it would create unacceptable additional overhead for mariners. The other interesting part is how close can the ship be to objects located in D or U while ship is OUTSIDE but close to that area. Our understanding is that if the ship is sailing still within area B but very close to D/U then proximity of dangerous objects laying within area D/U can be disregarded because definition of CATZOC area B at ship’s position takes precedence.

Today vessels are navigating inside very same areas on paper charts (on ENC these areas are covered with CATZOC D and U), and that does not create any overhead - right or wrong! Why would we bring more problems with the ECDIS? The proposed approach would only work if IHO and its members commit to a drastic reduction of areas with D and U. So, in fact they would be always considered as dangerous by default.

**Additional comment.**

5. Regarding uncertainty attribute in S-102 and S-104

These products can have optionally defined uncertainty attribute. ECDIS must be capable of Water Level Adjustments functionality that is based on those products. At the moment it is not clear how to deal with accuracy related calculations if such uncertainty is defined. It is understood that this issue may not be relevant directly to ENC WG, however, it is worth to mention in a context of Dual Fuel concept to ensure some level of consistency for end-users.

**Recommendations**

1. Define clear hierarchy of meta-objects and accuracy attributes in spatial objects for the purpose of accuracy related functionality in ECDIS.

2. Define clear list of feature objects for which accuracy related functionality in ECDIS must be done. Here a qualified decision must be made by IHO whether non-bathymetric objects are part of this accuracy evaluation functionality or not.
3. Define numerical values of “worst case scenario” M\_QUAL – CATZOC D and U.
4. Reduce areas with CATZOC D and U at least on confined seaways and approach waters (relay to other WGs within IHO).
5. Define use, if any, of uncertainty attributes for S-102 and S-104 products for purpose of accuracy related calculations in ECDIS (relay to other WGs within IHO).

### **Action Required of ENCWG**

The ENCWG is invited to:

- a. Discuss the details within the paper
- b. Agree to the recommendations and task the S-52 subgroup to draft the required changes
- c. relay to other IHO WGs as applicable.