

Paper for Consideration by ENCWG4

Encoding of Submarine Volcanos in ENCs

Submitted by:	Australia (AHO)
Executive Summary:	New guidance - Encoding of active submarine volcanos in ENCs.
Related Documents:	ENCWG3-5.10, UOC Ed 4.1.0
Related Projects:	S101PT

Introduction / Background

At ENCWG3 Australia presented a paper (based on input from Carnival cruises) regarding issues related to the way active submarine volcanos are currently encoded and displayed in ECDIS.

As a consequence Australia was tasked to present amendments to the UOC in order to improve the way ECDIS safety route checking functions interact and therefore alert mariners of the presence of active submarine volcanos and the extent of areas that can be potentially covered by toxic gases.

Analysis/Discussion

Please refer to paper ENCWG-5.10 for all the background details.

Carnival cruises approached the AHO/IHO seeking changes to the existing ENC encoding practices and ECDIS performance in order to provide a better 'warning system' to mariners.

The key objective of this proposal is to encode active submarine volcanos in a way they interact differently with ECDIS safety functions. To do this we are proposing to avoid the use of OBSTRN point features and encode OBSTRN areas supplemented by DEPAREs instead. The encoding guidance proposed will facilitate detection by ECDIS' safety 'route checking' functions and it will escalate the warning provided from an 'Indication' to an 'Alarm'. As per S-52 PL 4.0.2, OBSTRNs (areas or point) are highlighted in yellow (Indication) and they should not trigger an audible alarm. On the other hand, 'crossing the safety contour' (DEPARE) is highlighted in red and an audible alarm is mandatory.

In the AHO proposal, the encoding of a CTNARE covers for the possible existence of toxic gases in the air and the use of a DEPARE aims triggering higher-level alerts (red highlight and sound).

Conclusions

The current encoding practices for active submarine volcanos can be improved in order to better interact with ECDIS safety route checking functions.

A new 'Category of Obstruction' attribute value (*submarine volcano*) and portrayal should be discussed at the S101PT level.

Recommendations

Add a new entry to the 'Remarks' of section 6.2.2 of S-57 Appendix B.1, Annex A (UOC) to read:

- **Active submarine volcanos** can be a significant navigational hazard; and harmful concentrations of volcanic gases emanating from active submarine volcanos can cover an extensive area (see S-4 – clause B-428.4). If it is required to encode an active submarine volcano, it must be done using an **OBSTRN area**, with attributes EXPSON = 2 (shoaler than the range of depth of the surrounding depth area), QUASOU = 2 (depth unknown) and INFORM = *Active submarine volcano*. To indicate the unpredictable nature of the volcano (it may be periodically submerged or extend above the surface), the mandatory attributes VALSOU and WATLEV must be populated with an empty (null) value. In order to stand out visually as much as an OBSTRN point does, the minimum recommended size for the OBSTRN area object is 4mm (at compilation scale) on any direction. In order to increase the level of alert provided by ECDIS it is recommended that a DEPARE (e.g. 0-2m or intertidal) object is double encoded with the OBSTRN. The area that can be potentially covered by harmful volcanic gases, which may cover an area of up to 10 NM from the volcano, should be encoded using the feature object **CTNARE** (see clause 6.6), with attribute INFORM = *Volcanic activity*; and an appropriate cautionary note referenced using the attribute TXTDSC similar to:

VOLCANIC ACTIVITY

Active submarine volcanos exist in this area. Some volcanos have been reported to erupt breaking the surface of the sea and projecting ashes, other volcanic materials and harmful gases into the air. Changes to charted depths, uplifting of reefs and emerging of volcanic islets may occur throughout the area. Due to the unpredictable nature of these events mariners are strongly recommended to avoid the area.

Justification and Impacts

Active submarine volcanos, especially in remote areas, are a real threat to marine navigation. Their unpredictable nature and the serious consequences they may inflict on shipping deserve a different interaction with ECDIS.

The AHO considers that the existing ENC product specification has to be updated in order to provide new encoding guidance that facilitates a more adequate interaction between active submarine volcanos and existing ECDIS safety checks.

Action Required of ENCWG

The ENCWG is invited to:

- a. review the proposed UOC's encoding guidance and update the document accordingly.
- b. decide on the merits to pass this issue to the S101PT for implementation in the DCEG and to investigate the need for new symbology.