Paper for Consideration by ENCWG4

Dangers highlighted by Sector lights intersections

Submitted by:	Australia (AHO)
Executive Summary:	The grounding of the Dutch freighter 'Nova Cura' in 2016 highlighted the sub-standard depiction of a navigational danger in ECDIS when compared with its paper chart equivalent. The area to be avoided was marked by 2 intersecting light sectors. ENC encoding practices should be improved to provide ECDIS with data capable of activating its in-built safety functions.
Related Documents:	NCWG4-10.2A
Related Projects:	S-101PT

Introduction / Background

To assist mariners with the passage through Mytilini Strait two sector lights are installed on the Greek island of Lesbos, both of which indicate the danger near Lamnas Reef, see Figure 8.

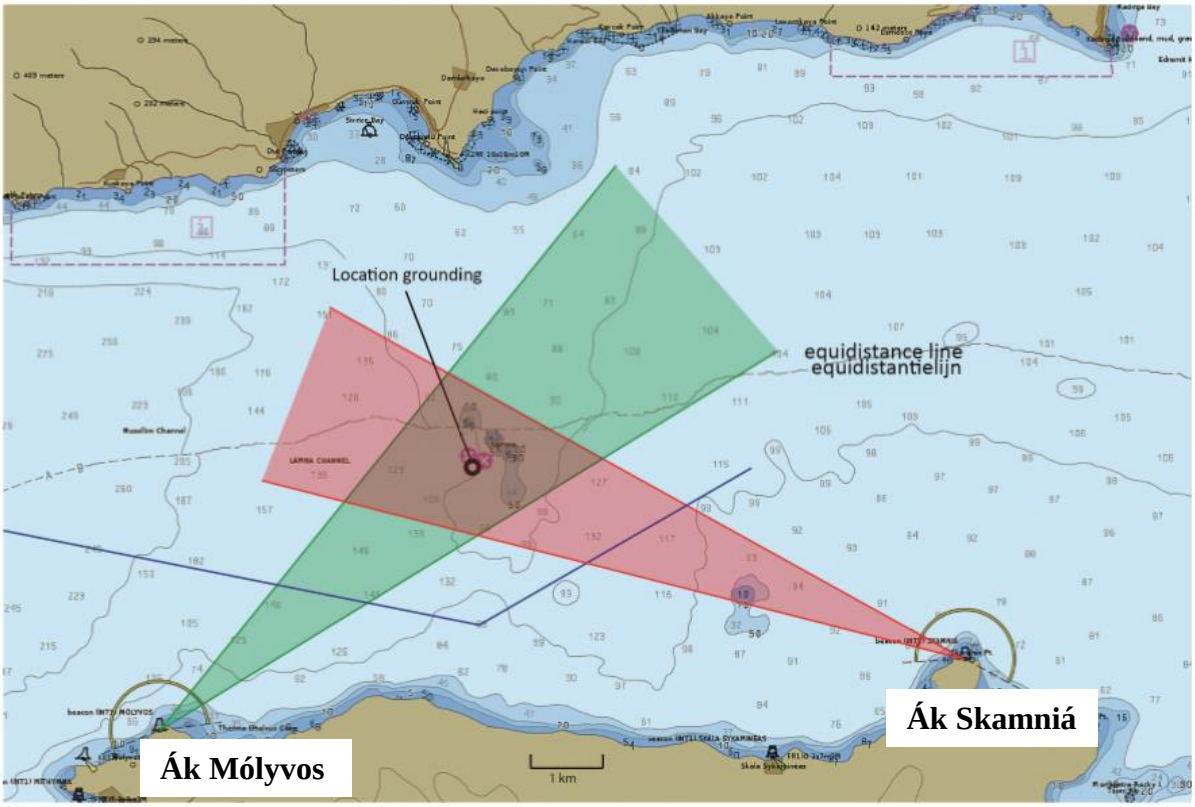

Figure 8: Sector lights in Mytilini Strait. Source: GR4APP01

The sector lights Ák Mólyvos and Ák Skamniá are both intended to warn of the danger of Lamnas Reef. In this case, the danger is located in the area illuminated simultaneously by both the green and the red sector lights. For the passage south of Lamnas Reef, coming from the west as the Nova Cura had intended (on the left of Figure 8), the vessel should approach in the left white sector of Ák Skamniá (see blue line in Figure 8). Only when the vessel has passed the green sector of Ak Mólyvos, can it go to the port side; in this case, both sector lights are white. After that, the vessel passes the red sector of Ak Skamniá and has passed Lamnas Reef. The coordinates of the area covered by the sector lights were also stated in the Pilots for the area (NP48). It is not forbidden to sail in the green or red sector of sector lights.

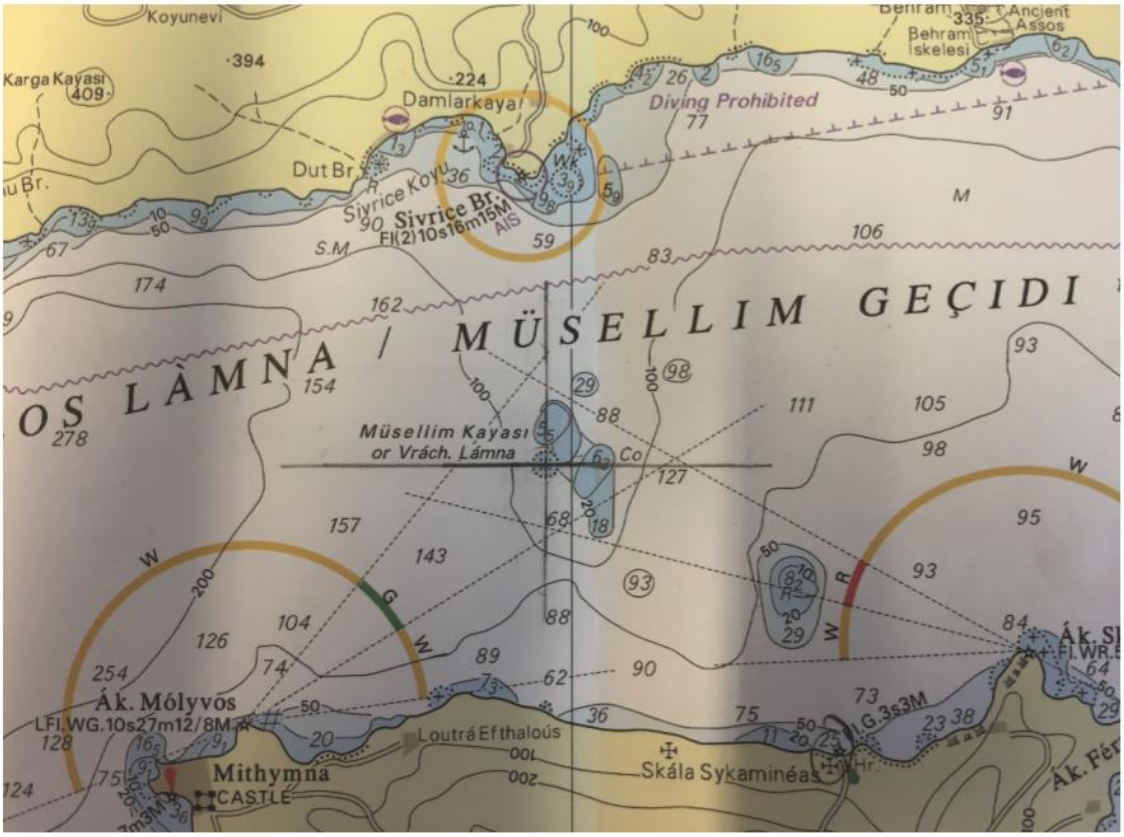

Figure 9: Lamnas Reef in BA1061.

Analysis/Discussion

Sector lights support safe navigation and are relevant at both route planning and route monitoring stages. For sector lights in ECDIS, the 'show full length light sector lines' option can be 'enabled' or 'disabled'. If the extension of the sector lines to reach VALNMR is 'enabled', it applies to all sector lights stated in the ENC, including those that are not relevant to the route. In the standard display, the option to show full length light sector lines is disabled and all sector lines are 25mm in length.

The sector lights Ák Mólyvos and Ák Skamniá are both intended to warn of the danger of Lamnas Reef. In this case, the danger is located in the area simultaneously illuminated by both the green and the red sector lights. The Nova Cura eventually was located precisely in the area where the red and green sectors overlap. This indicates that the passage using these sector lights was not correctly included in the voyage preparations and that ECDIS was not capable of providing the ship any early warning as it approached a 'no-go' area.

Whereas light sector boundaries on a paper chart are usually drawn to cover the area of interest (although not always extended to their full range), in ECDIS there are only two options available: full length based on VALNMR or the default 25mm length. If the 'full length light sector lines' option is constantly 'enabled', the image will become contaminated and will be detrimental to navigation. Consequently, mariners are required to operate this function in a way it suits their needs depending the area and the time of the voyage. This manual process is vulnerable and may leave the mariner with the incorrect settings switched on at the wrong time.

S-52 PL4.0.2 gives OEMs the option of designing their software in a way that '*it **should** be possible, for the mariner to be informed, on demand, of the sector-colour and sector-limits affecting his ship which are generated by lights <u>located outside the display window</u>*'.
This option, although very useful if implemented, is not a MUST in the Standard and has not been included in S-64.

Where 'full length light sector lines' option is turned Off (see image above- 25mm length) **or** is On but the optional function to display light sectors even when their light structures are not in the display window is Off (or not available), the use of a CTNARE or RESARE object would certainly provide an additional safety net to mariners.

The existence of the 'No-go' area would be detected and indicated to the mariner at both the route planning and route monitoring stages.

Conclusions

According to the accident report:

- The 'no-go' area illuminated by both light sectors was either not identified sufficiently or not identified at all.
- The correct use of sector lights could have contributed to a safe passage of Lamna Reef.
- In addition to the wealth of information that ECDIS offers, its use for navigation is not as intuitive as navigation with a paper chart. One example of this is the use of the sector light settings. A paper chart provides a clear overview at a glance of the area covered by sector lights, whereas ECDIS does not. In ECDIS' default view, sector lights are disabled.

Recommendations

The AHO considers that there should be a way of highlighting areas where sector lights intersect for a specific purpose. In this case to mark a 'No GO' area.

In the short term, this could be managed by 'double encoding' the 'NO-GO' area as an 'independent' CTNARE or RESARE object. This feature and the corresponding sector LIGHTS should be linked using an M_ASSO Meta object.

Action Required of ENCWG

The ENCWG is invited to:

a. Assess the merits of including encoding guidance in S-57 Appendix B.1, Annex A (UOC).

b. Asses the benefits of amending S-52 Edition 6.1.1, 3.3.1 (2) (and consequently S-64) to mandate the implementation of the ECDIS functionality that allows mariners to display, on demand, a sector light's colour and limits affecting the position of the ship when the lights involved are off the display.