**ENC STANDARDS MAINTENANCE WORKING GROUP (ENCWG)**

# Paper by the AHO

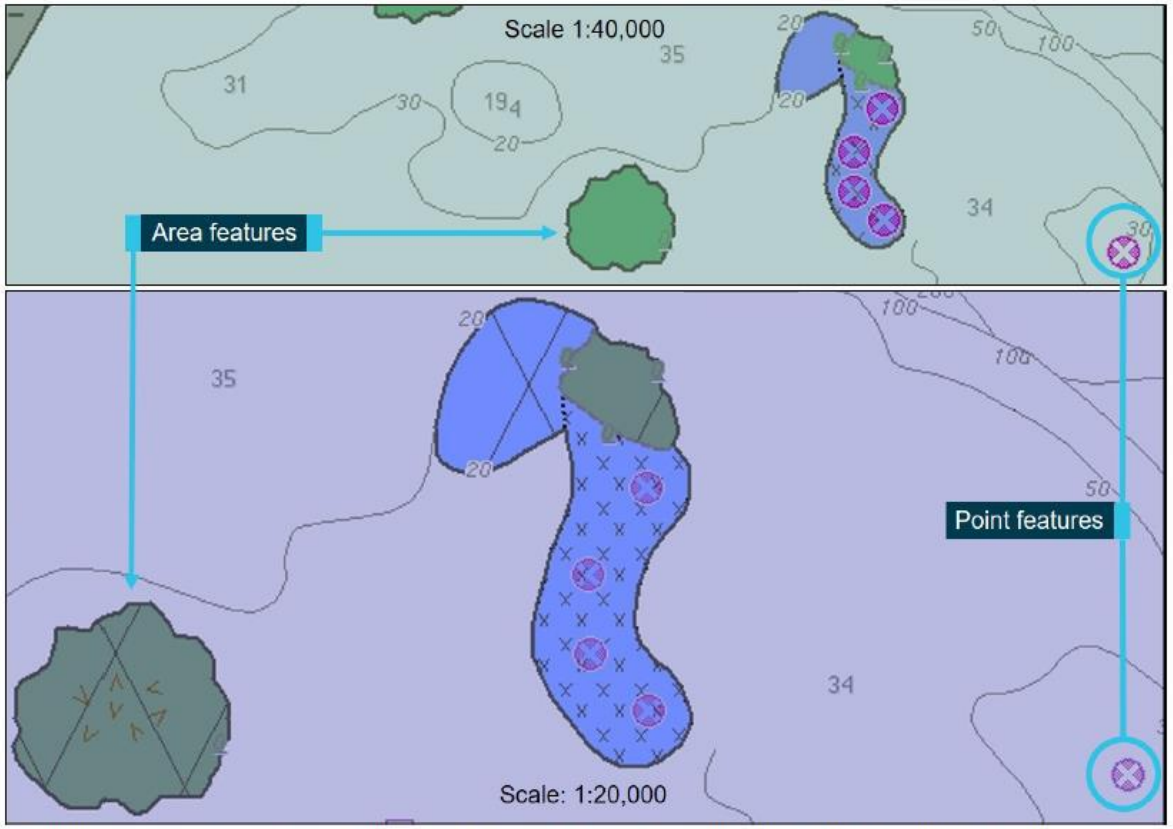
## ECDIS in-built safety functions performance vs Chart compilation practices

# Introduction

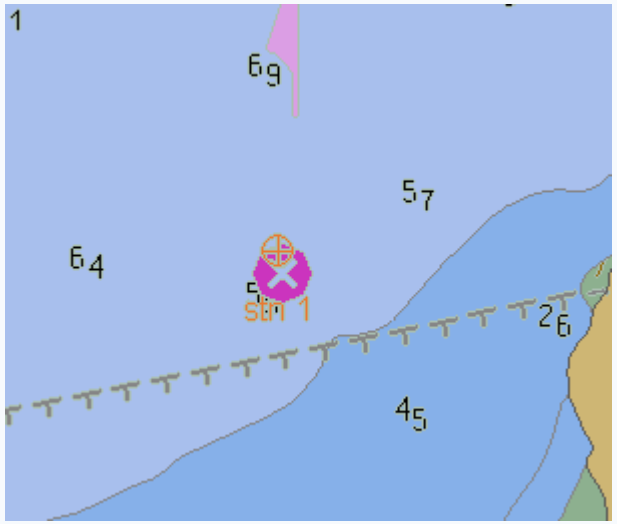
- The grounding of the container ship ‘Kea Trader’ in July 2017 highlighted a disconnection between source data generalisation practices and ECDIS’ ‘Look-Ahead’ and ‘Route check’ functions.
- Globally accepted cartographic practices include the use of point features in lieu of area features when the scale of the product denies a clear and unambiguous depiction of an object at true scale.
- It is common practice to ‘convert’ area features into point features when the corresponding point symbology ‘covers’ the area feature at the product’s compilation scale.

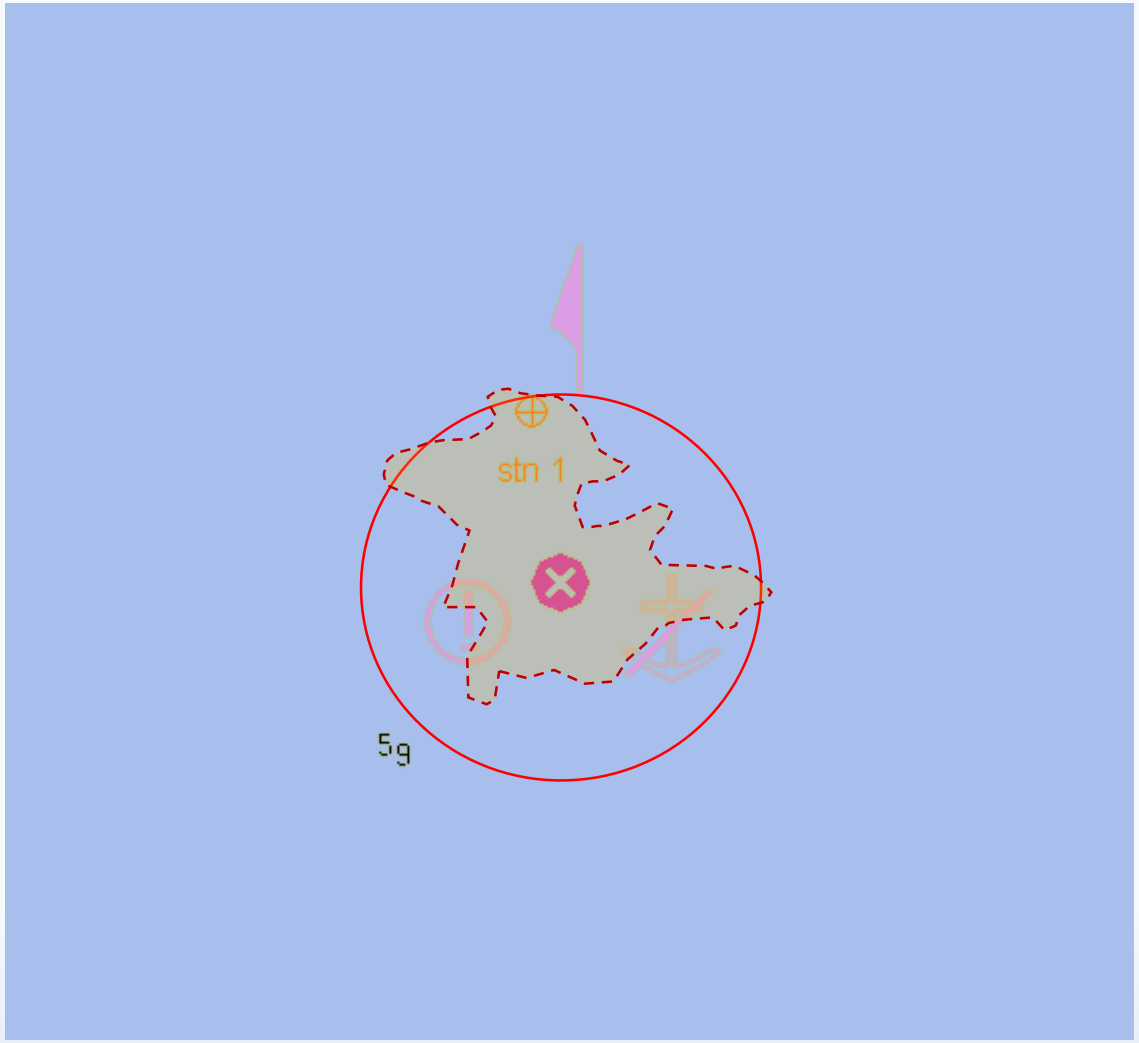
# The problem

- In ECDIS, area features change size in proportion to the scale at which the ENC is being viewed whereas symbols representing point features remain the same size.




*The images demonstrate a key difference between area features, which change size proportionate to the scale at which the ENC is being viewed, and point features, which remain the same size regardless of scale. The top picture is at scale of 1:40,000 and lower picture is at 1:20,000.*


1
6 9
5 7
6 4
stn 1
2 6
4 5

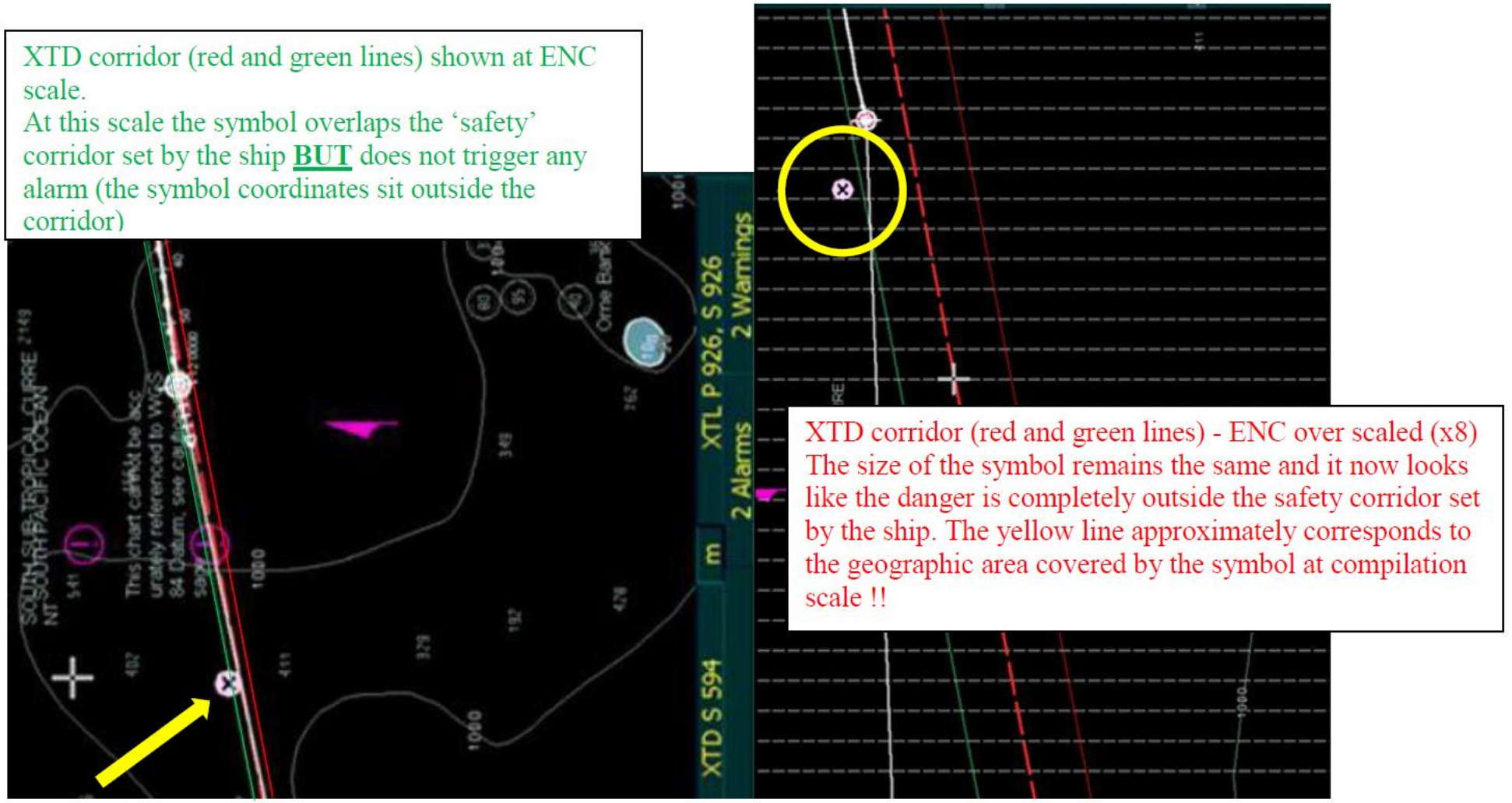

stn 1
5 9

# The problem

- ECDIS ‘safety checking function’’ checks a route safety region against the chart database for dangers. With regard to point features, the ECDIS route safety region is only checked against the true position of the point feature regardless of the actual extent of the physical feature it represents. Essentially, ECDIS would only identify a feature as a danger to the planned route if its charted position in the ENC (its exact Lat/Long ) falls within the route safety region.
- Based on current chart generalisation practices and the way ECDIS safety checking functions behave, the extent of a ‘danger’ (e.g. obstruction, wreck, rock) is not equally interpreted by ECDIS and producers.
- Mariners’ freedom to over scale ENCs continues to be a problem and it clearly impacts on safety of navigation.
- Mariners frequently ‘over zoom’ and sail ‘too close’ to dangers (this has been reported in several maritime accidents’ reports).

# The problem

XTD corridor (red and green lines) shown at ENC scale.
At this scale the symbol overlaps the 'safety' corridor set by the ship **BUT** does not trigger any alarm (the symbol coordinates sit outside the corridor)




XTD corridor (red and green lines) - ENC over scaled (x8)
The size of the symbol remains the same and it now looks like the danger is completely outside the safety corridor set by the ship. The yellow line approximately corresponds to the geographic area covered by the symbol at compilation scale !!

# Conclusion

- **There's a disconnection between source data generalisation practices and ECDIS 'look ahead' and 'route check' in-built safety functions.**
- **Mariners' ability to over scale ENCs continues to be a problem and it clearly impacts on safety of navigation.**
- **By changing the way HO's compile and generalise features and the way ECDIS interacts with the areas covered by point features the IHO can make navigation safer.**

# The proposed solution

- Discuss the pros and cons of ‘locking’ the ECDIS maximum display scale to the one encoded in the ENC (or M_CSCL). An alternative option would be for ECDIS to resize point symbols ‘on the fly’ to always cover the same geographic area independently of the display scale selected.
- Amend S-52/S-64 in order to drive enhancements to the way ECDIS in-built safety functions interact with S-57 point features such as UWTROC, WRECKS and OBSTRN.
- Introduce more robust route checking algorithms when developing the future performance standards for the next generation (S100) ECDIS.