

Paper for Consideration by TSMAD/ DIPWG

ECDIS Test Data

Submitted by:	UK
Executive Summary:	This paper provides a summary of the ECDIS display and alarm issues which have been identified. It provides specific details of those cases which could be included in a revised S-64 ENC Test Dataset in order to improve the robustness of Type Approval and improve consistency across ECDIS systems.
Related Documents:	1. S-52 Presentation Library
Related Projects:	1. N/A

Introduction / Background

1. Despite ECDIS having been in use for many years, in the last two years with mandatory carriage approaching its use as a primary navigation tool has grown. As a result a number of issues with ECDIS display and functionality have been identified. Following reports in early 2010 the UK undertook a systematic analysis of ECDIS Display and Alarm functionality to identify the scope of the issue. This paper sets out the issues identified and identifies additional test cases for S-64 which would ensure that consistent implementation by OEMs.

Analysis/Discussion

2. During 2010 the following ECDIS Display/Alarm issues were identified;

Point on a Line

Following a report on the grounding of a UK passenger ferry the UK noted that on certain ECDIS point features which fall directly on a line do not display and may not generate alarms. It was found that this was isolated to a single manufacturer but that it was not identified during type approval.

Expsou=2

Following the grounding of a vessel on a shoal sounding (using paper charts) the UK raised to the IHO that the previously identified issue with Exposition of sounding is more significant than first thought. Because of the relationship between S-52 and IEC 61174 shoal soundings are not identified as isolated underwater dangers and therefore do not generate alarms. This is a standards issue and to make data safe obstruction objects have been used to double encode instances of Expsou=2. An IHO CL was issued and TSMAD updated their TORs to deal with such issues more effectively in future.

Point LNDARE

Following a vessel grounding on a pacific atoll it was identified that some ECDIS systems do not check small scale cells during route checking. It seems that some systems implement an optional scale cut off whilst some do not check on small scales at all. In some areas small scale data may be all that exists. This issue can only be addressed fully in the performance standard.

3. The UK considered that as these issues had been identified by chance systematic analysis was required to identify the scope of the issue and the root cause. Given the number of possible object attribute combinations it was decided to focus on those which would most significantly affect navigation. It was also noted that display and alarm functionality is far more likely to be variable where Conditional Symbology Procedures are involved and therefore focussed on objects which call the CSPs in the testing.

4. The systematic testing included 64 test cases tested on 5 of the most popular ECDIS systems. Each case defined a feature/attribute combination and display settings such as safety depth etc. For each case the feature

was viewed in ECDIS and a route created to check alarms in route planning mode. The results were compared against S-52 and IEC 61174 but the expected display/alarm functionality was also considered irrespective of the standards. It was notable that no significant safety issues similar to the Expsou=2 issue were identified however the results indicate variability across ECDIS display and functionality and isolated cases of implementation errors.

The results fell into 3 categories;

- 1) Standards issues where S-52 did not correspond to the expected display
- 2) Implementation Issues where a single OEM had not followed the standards (S-52/IEC 61174)
- 3) Implementation consistency issues where multiple OEMs had made errors indicating that the standards are unclear.

5. Case 1) can only be addressed through a revised S-52 Presentation Library whilst case 2) requires liaison with the relevant OEM directly. In order to identify instances of Case 3 at Type Approval and during system development additional S-64 Test Datasets would provide the best solution. Some instances of case 2) could also be added to the Test Data to ensure these issues do not reoccur. The Test Data which accompanies this paper includes full details of the test cases proposed. More may be required but the UK feels that this selection covers the most significant cases identified in its testing.

However we might also consider test cases to cover the following;

- Small scale checking – small scale cell to include Point LNDARE etc
- Point on a line – include instances of objects coincident with a node

Conclusions

6. The issues identified over the last year have highlighted that the display and functionality of ECDIS is not meeting the expectations of the user. This paper has summarised the systematic testing performed by the UK and proposes revised Test Data to be added to S-64 to help OEMs in producing their systems and ensure that Type Approval identifies such issues.

Action Required of TSMAD and DIPWG

The TSMAD and DIPWG is invited to:

- a. Review the Test Data that accompanies this paper