TSMAD22/DIPWG3-08.8A

Paper for Consideration by TSMAD/ DIPWG

Proposal to Produce a New Version of S-52

Submitted by:	UKHO
Executive Summary:	The document is based on the recent ECDIS operation discussions at the IHO and how the standards should be developed to facilitate ECDIS harmonization. The paper recommends updating and restructuring S-52 and issuing a new version of the Presentation Library.

Introduction / Background

During 2010 the UK Hydrographic Office (UKHO) prompted the issue of 3 NAVAREA warnings to alert mariners to anomalous behaviour in the operation of ECDIS. This highlighted a number of issues concerning the operation of ECDIS with member state ENCs. Issues ranging from incorrect display of objects to anomalous alarm behaviour which have highlighted the large degree of variability in user experience of ECDIS. This situation has the undesired effect of presenting a fragmented picture to the ECDIS community. With the implementation of the IMO ECDIS carriage requirement commencing in 2012 more feedback is being received from experienced users who are starting to recognise inconsistencies with ECDIS systems when they occur.

In the UKHO investigation of the anomalies in connection with the above mentioned NavArea warnings there were several examples where anomalous or variable display behaviour could be addressed within the IHO standards. These underlying IHO standards form a bridge for ECDIS manufacturers between the realities of system development and the requirements of the IMO Performance Standard (PS). If the IHO standards are unclear and fail to specify how the IMO PS should be implemented then different manufacturers may create systems which behave differently. Details of the issues found are shown in more detail below.

In addition to a lack of clarity in some areas of the standard the basic structure of S-52 does not lend itself readily to assisting manufacturers in creating ECDIS. Due to the complex nature of ECDIS, ENC data itself triggers many functions within ECDIS (such as alarms and indications) and there is considerably more to core ECDIS functionality than the drawing of charts onscreen. There is therefore a need to illuminate these areas of functionality better to ensure the best possible implementation by manufacturers. However unfortunately as it stands currently S-52 is only oriented towards chart rendering.

A constant complaint by end users is the prevalence of alarms precipitated by chart data. A single model for alarms and indications within S-52 would facilitate manufacturers developing consistent systems. At the moment there is a lack of standardisation in this area and a need for OEM to interpret what is required.

Recommendations

Given the complexity of the drawing protocols and other areas of ECDIS functionality needed by manufacturers such as alarms and the reliance of test data for effective type approval the following recommendations are made within this paper:

1. A review and restructure of S-52, to reconcile any discrepancies or textual ambiguities.
2. The release of a new edition of the S-52 Presentation Library enhancing certain objects' display within existing ECDIS.
3. The development of new sections of S-52 dealing with ECDIS Operations other than chart rendering itself.
4. The creation of wider and more detailed test datasets to assist ECDIS manufacturers and type approval authorities.

The UKHO recommends DIPWG approve all the above action items and the formation of a sub working group tasked with addressing the following;

Presentation Library Corrections

There are numerous instances where the current standard could deliver better functionality to the user. Based on user feedback the following high level examples are suggested as enhancements to the current standard.

- Anchor Berths – Radius does not display
- Anchor Area – Names do not display
- Major Non-Sectored Lights – No clear distinction between lights.
- Fairways - Name does not display
- No distinction of important features via bold text
- M_NPUB Areas - Geometry does not display
- Fishing Facilities – Do not display in Standard mode
- Assigning of Obstruction objects in Base mode

Areas where current standard requires clarity

Point LNDARE detection by alarms

For much of the Pacific Ocean the largest scale chart coverage (both paper and ENC) is 1:3.5million. On such ENCs small islands have been encoded by the producing HOs in different ways for example as point or area features, with or without surrounding depth contours or unsurveyed areas. In some display settings these small islands do not stand out as well as on a paper chart and this makes it all the more important that alarm or indication activation can be relied upon. Manufacturer implementation of alarms is currently highly variable with some manufacturers implementing a scale cutoff for route checking and monitoring.

The wording within S-52 is currently ambiguous as far as the detection of LNDARE objects for the purpose of alarms in ECDIS is concerned:

"Note that the HO may not draw any contours round small isolated dangers. However conditional symbology procedure UDWHAZ identifies all rocks, wrecks and obstructions that require a safety contour, and the output of this procedure through calling procedures OBSTRN and WRECKS may be used in generating alarms. One object, LNDARE as a point (islet) or line (isthmus) is not covered by procedure UDWHAZ; it should be added to the safety contour detection process as a separate item."

This wording, indeed the general treatment of alarms and indications could be significantly better within S-52 providing an unambiguous list of object/attribute combinations and user parameters which trigger the various alarm/indications defined within the IMO performance standard.

Conditional Symbology procedures

Within the set of conditional symbology procedures in S-52, the most complex area of S-52 chart rendering there are numerous areas where clarity of unclear terms would assist manufacturers in constructing systems. UDWHAZ04 contains the condition "…which intersects or includes the location of this object" where the spatial operations "intersects" and "includes" have not been previously defined.

Consideration should be given to producing elementary machine readable versions of the CSPs as the current Nasi-Schneidermann diagrams are fairly outdated and can be difficult to interpret. The issues identified in the display of OBSTRN objects have shown how easy it is for manufacturers to experience problems when implementing these diagrams and also highlights the need for much more extensive and comprehensive test data to support system development.

Pick Reports (also see paper TSMAD22/DIPWG3 08.4A)

The ability to cursor-pick an object, displayed on the ECDIS, for any additional information associated with the symbol is an important part of ECDIS functionality. However this information must be presented to the user in a clear and unambiguous way so that informed decisions can be made in a timely manner by the mariner.

At present there is no guidance offered to OEM when developing pick reports and this has led to the development of differing ECDIS pick report implementations presenting the additional content of the ENC to the Mariner in highly variable ways. Whilst ECDIS manufacturers will obviously want to differentiate their ECDIS from others in the market a high degree of variability in core functions such as the identification of objects and attributes is not desirable as it presents a confusing depiction of the navigational information where users may be exposed to multiple systems. To rectify the situation a new section to S-52 is proposed, “Specifications & Recommendations for Implementing the Cursor Enquiry and Pick Report in ECDIS”.

In addition to the pick report specification it has been identified that user driven parameters such as the safety contour, safety depth and display parameters could be better defined and standardized to ensure consistency of operation between different manufacturer ECDIS. This is fundamental to the operation of the ECDIS as many of the safety driven operations within the ECDIS rely on this critical user information to make calculations and it should be clear to the user how these calculations are made..

Alarms and Indications

A consistent approach to alarm / indication activation across ECDIS systems is necessary as mariners are very likely to move between vessels fitted with different systems. Currently there are inconsistencies between systems; however in some cases it is unclear whether these are due to differing interpretations of the standards or due to individual OEM implementation issues. Consideration needs to be given to providing equipment manufacturers with better guidance on the interpretation of the standards. Mariners should be consulted to ensure that their expectations of what should activate alarms align with the standards.

An example of differing approaches to alarm activation is provided by the route check function. The standards indicate that the largest scale ENC loaded should be used to check for hazards when checking a route plan. Some OEM systems check for dangers on all scales loaded on the ECDIS, some give the mariner the option to apply a scale filter to what is checked, some apply a fixed scale cut off and provide clear indications of this to the mariner, others apply a scale cut off but without any on screen indication. No doubt the mariner can determine which approach is used from inspection of the ECDIS manual; however there is every chance that the differences will not be fully appreciated and a false sense of security could be gained from the automated route check.

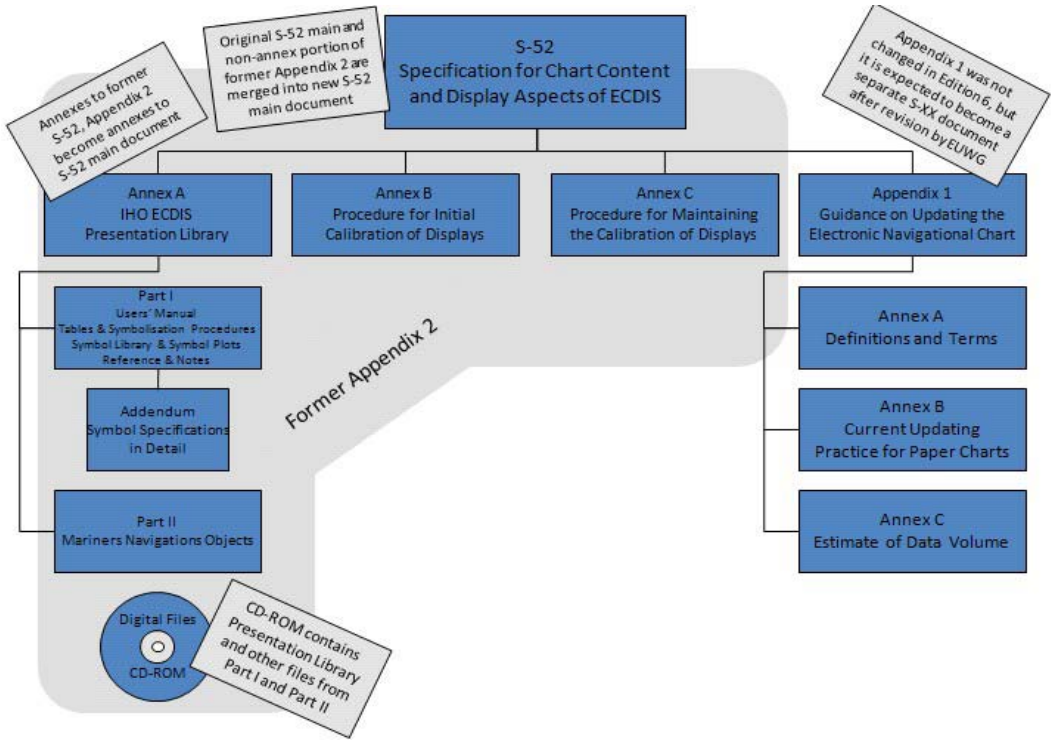
The Role of Test Data in ECDIS testing.

IEC 61174 is at present written in such a way that if something is not a specific test, then that detail is not tested by the type approval house. In such a case the behaviour of the ECDIS system then is dependant on the manufacturer’s own test procedures.

Therefore it is our duty to provide detailed test data along with expected outcomes in S-64 to underpin all the modules of S-52 to enable core ECDIS function to be scrutinized properly. Not only will it assist the development of ECDIS it will facilitate type approval and ultimately result in a more harmonized picture of ENC in all ECDIS systems.

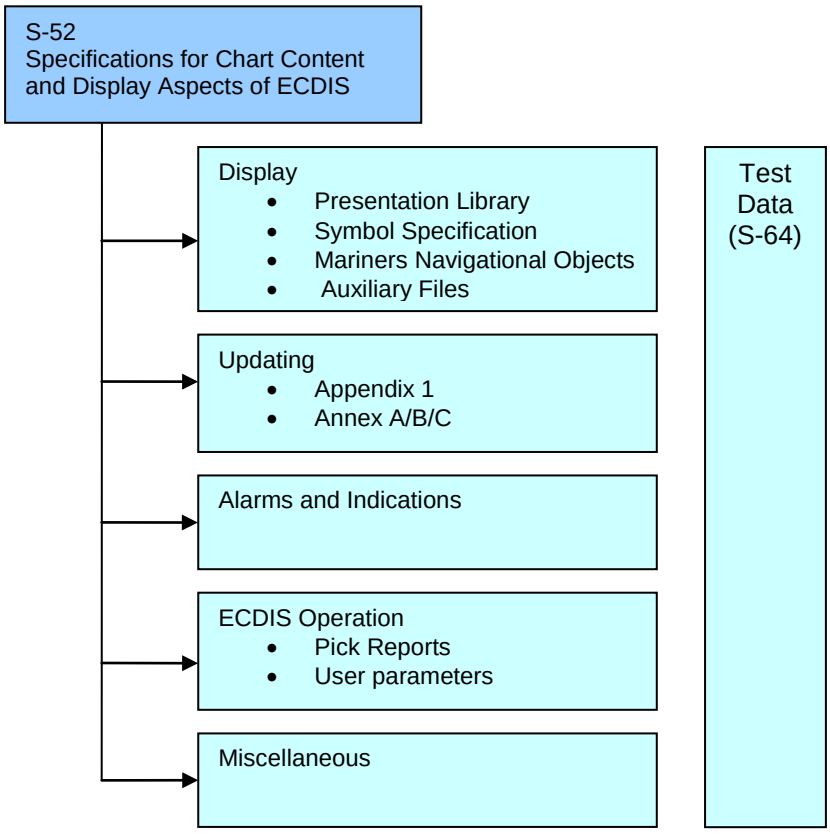
Proposed new S52 document Structure

Current S-52 Structure



The current structure of S-52 is confusing and is not prepared in the most efficient manner. To allow for a new approach to the updating of the standard a modular approach to the structure is proposed.

New simplified modular approach to S-52 structure



Action Required of DIPWG

The TSMAD/DIPWG is invited to:

Agree to the recommendation of producing a new version of S-52