CONSIDERATION OF ECDIS MATTERS RELATED TO THE IMPLEMENTATION OF THE CARRIAGE REQUIREMENTS IN SOLAS REGULATIONS V/19.2.10 AND V/19.2.11

Preparation and implementation of revised ECDIS standards

Submitted by the International Hydrographic Organization (IHO), the Comité International Radio-Maritime (CIRM) and the International Electrotechnical Commission (IEC)

SUMMARY

Executive summary: This document reports on the revision of several ECDIS standards in relation to investigations into the anomalous operation of some ECDIS, and addresses the transition from the current editions of the standards to the new ones.

Strategic direction: 5.2

High-level action: 5.2.4

Planned output: 5.2.4.8

Action to be taken: Paragraph 15

Related documents: SN.1/Circ.266/Rev.1 and NAV 59/12/1

Background

1 As a consequence of the investigations into the anomalous operation of some ECDIS, the International Hydrographic Organization (IHO) undertook a review in 2012 of its standards related to ECDIS.

2 In its report to the fifty-ninth session of the Sub-Committee on Safety of Navigation, the IHO informed the Sub-Committee that the objective was to finalize drafts of revisions to the relevant standards in 2014 for adoption by IHO Member States in 2015. The IHO reported also that it was maintaining a close liaison with the Technical Committee on maritime navigation and radiocommunication equipment and systems of the International Electrotechnical Commission (IEC/TC 80) to ensure a proper coordination with the planned revision of IEC Standard 61174 – Maritime navigation and radiocommunication equipment and systems – Electronic chart display and information system (ECDIS) – Operational and performance requirements, methods of testing and required test results.
This document reports on the progress made in preparing the revised standards and addresses the transition from the current editions of the standards to the new ones.

Revision of IHO ECDIS standards

The current status of IHO standards related to ECDIS is listed in table 1.

<table>
<thead>
<tr>
<th>Edition in force</th>
<th>Title</th>
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<tbody>
<tr>
<td>S-57 Edition 3.1</td>
<td>Transfer Standard for Digital Hydrographic Data</td>
</tr>
<tr>
<td>November 2000</td>
<td></td>
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<tr>
<td>Supplement No. 2 – June 2009</td>
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<tr>
<td>S-52 Edition 6.0</td>
<td>Chart Content and Display Aspects of ECDIS</td>
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<tr>
<td>March 2010</td>
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<td>Presentation Library (Annex A to S-52) Edition 3.4</td>
<td>Presentation Library for ECDIS</td>
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<td>January 2008</td>
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<tr>
<td>S-58 Edition 4.2.0</td>
<td>Recommended ENC Validation Checks</td>
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<tr>
<td>February 2011</td>
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</tr>
<tr>
<td>S-61 Edition 1.0</td>
<td>Product Specification for Raster Navigational Chart (RNC)</td>
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<td>January 1999</td>
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<tr>
<td>S-62 Continuous update</td>
<td>Data Producer Codes</td>
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<td>S-63 Edition 1.1.1</td>
<td>Data Protection Scheme</td>
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<td>April 2012</td>
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<tr>
<td>S-64 Edition 2.0.0</td>
<td>Test Data Sets for ECDIS</td>
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<tr>
<td>May 2012</td>
<td></td>
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<tr>
<td>S-65 Edition 2.0.0</td>
<td>ENCs: Production, Maintenance and Distribution Guidance</td>
</tr>
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<td>April 2012</td>
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The investigations into the anomalous operation of some ECDIS revealed that certain parts of the requirements of the IHO ECDIS-related standards had been interpreted and implemented in different ways by different manufacturers. The investigations made it clear that there were a number of improvements that should be made to S-52 – Chart Content and Display Aspects of ECDIS to reduce the risk of implementation irregularities in the future and improve the clarity of the standard. Feedback from ships at sea also indicated that there were a number of display enhancements to be included in Annex A to S-52 – Presentation Library that would significantly increase the usability of ENC in ECDIS.

As a consequence, the improvements to the contents of S-52 must be reflected in the associated IHO standard related to the testing of ECDIS, S-64 – Test Data Sets for ECDIS. This, in turn, will affect the current edition of IEC Standard 61174 (edition 3.0, 2008). This interdependence requires that the revision, approval and implementation of all three standards are synchronized.

The revision of the IHO standards has been progressed by the relevant bodies of the IHO. Representatives of ECDIS manufacturers have participated actively in this work.
Three revised standards have been prepared:

- draft edition 6.1.0 of S-52;
- draft edition 4.0.0 of S-52 – Annex A Presentation Library; and
- draft edition 3.0.0 of S-64.

The main changes to the Presentation Library and to S-52 are described in the annex.

The draft revised standards were posted on the IHO website in February 2014 to enable comments from all stakeholders in accordance with the IHO procedures for the revision of its standards. It is expected that the revised standards will be adopted by IHO Member States before the end of October 2014. This will then enable the revised standards to be made available for subsequent implementation and completion of the revision of IEC 61174.

In parallel, a new edition of S-58 – Recommended ENC Validation Checks has been prepared. The new edition 5.0.0 of S-58 introduces various new critical error checks to avoid errors in the compilation of ENC by Hydrographic Offices that might cause a failure in the ECDIS, or at least severely compromise ECDIS performance. IHO S-57 Supplement No.3 then introduces the minimum validation requirements that are defined in the new edition of S-58. It also includes some minor changes to improve consistency. Both documents have been approved by IHO Member States. The revisions to S-58 and the introduction of S-57 Supplement No.3 have no direct impact on the other standards discussed in this report. They are expected to enter into force in mid-2015 to account for the development and implementation of new validation software.

Revision of IEC 61174

As a consequence of recent decisions by the Maritime Safety Committee (for example: the requirement for connection to BNWAS and VDR, the amendment of the terminology to alert from alarm, amended and new symbols for navigation presentation, etc.) and as a consequence of coming changes to IHO standards, the IEC TC80 established, at the end of 2012, a Maintenance Team to draft a new 4th edition of the ECDIS standard IEC 61174. This work has been conducted in cooperation with the related IHO technical bodies to build one common solid set of new editions of the ECDIS related IEC and IHO standards. The draft new edition of the IEC 61174 will be ready for the CDV voting by the National Committees of the IEC within the second half of 2014. The final FDIS voting by the National Committees of the IEC is planned for the summer of 2015.

Implementation of the revised standards

Subject to the successful completion of the relevant approval processes, the new editions of S-52 and S-64 should be published in October 2014 and the new edition of IEC 61174 should be published in September 2015.

It is proposed that the date of entry into force of the new editions of the three standards be aligned with the date of publication of the new edition of IEC 61174. From that date, these revised standards will be available for the type approval of new ECDIS.

In order to allow manufacturers and national authorities the time necessary to type approve ECDIS products to the revised standards, and to enable shipowners and operators to update existing systems to conform with circular SN.1/Circ.266, as amended, covering the maintenance of ECDIS software, it is proposed that the IHO will keep the previous editions of the S-52 and S-64 standards valid for twelve months beyond the date of entry into force of
the new editions. If the date of entry into force of the new edition of IEC-61174 is September 2015, this would mean that the previous editions of S-52 and S-64 would remain valid until September 2016.

**Action requested of the Sub-Committee**

15 The Sub-Committee is invited to consider this report and take action as appropriate.

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ANNEX

Summary of the main changes to the ECDIS Presentation Library and to S-52

Changes to the Presentation Library

Language within the Presentation Library has been simplified and clarified, and many of the old diagrams and examples have been replaced to bring the document up to date. Detailed examples have been added to provide ECDIS developers with clear guidance for implementing the more complex parts of the ECDIS presentation. Look-up and colour tables have been removed from the Presentation Library, part I and placed in separate files.

In instances where multiple options were specified to perform the same task, sometimes leading to ECDIS implementation inconsistencies, the options have been limited. Redundancies and duplicate copies of several tables within the specification have been eliminated, as have elements that have never been implemented, such as raster symbol definitions.

A number of changes have been made to reflect new requirements contained in the existing revised IMO performance standards for ECDIS, such as new sections being added for the detection and notification of navigational hazards, detection of areas for which special conditions exist, and detection of the safety contour. These new sections now provide much clearer guidance on those S-57 objects and attributes that are required to initiate an alert or an indication within ECDIS. This will reduce the number of extraneous alarms that occur in existing ECDIS. The revised Presentation Library also makes the use of the IMO-specified display categories (MSC 232(82), appendix 2) mandatory.

The complex Nassi-Shneiderman diagrams used to describe the Conditional Symbology Procedures (CSPs) have been converted to Unified Modelling Language (UML). The inconsistent use of some terms within the CSPs has also been eliminated.

The facility to display text has been added to selected features so that this information is available to the mariner without having to initiate a "pick-report". For example, anchorage areas and fairway names may now be shown directly on the ECDIS chart display.

Some new symbols have been added to the Presentation Library to identify objects with "date-dependant" attributes and to indicate automatic updates for review purposes.

Changes to S-52

Updating the main S-52 document was required to remove the information on colour calibration procedure in Annexes B and C that was based on obsolete references to Cathode Ray Tube (CRT) technology and instead provide references to appropriate current standards. Annex B was deleted and Annex C was updated. The references to the various sections of the Presentation Library have been updated as necessary.