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Maintenance of ECDIS Software

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موسسه رده بندی ایرانیان

Contents

1. Introduction

1.1 General

This publication presents guidelines Maintenance of Electronic Chart Display and Information System (ECDIS) Software. This requirement is related to SOLAS Ch. V, Reg. 19.2.1.4 which was adopted according to Res. MSC.282 (86).

For more information and familiarity of ICS surveyors, the electronic files of following documents are enclosed to this Technical Information:

- SOLAS – Ch. V - Reg. 19.2.1.4
- MSC Res. 282 (86)
- SN.1/Circ.266
- Assembly Res. A.817 (19)
- Sample of Type App. Certificate
- One Sample Brochure

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1.2 Changes

This edition dated 2011.Feb.13 and any other necessary changes related to this document will be announced after this date.

2. Electronic Chart Display and Information System:

2.1 Description

An Electronic Chart Display and Information System (ECDIS) is a computer-based navigation information system that complies with International Maritime Organization (IMO) regulations and can be used as an alternative to paper nautical charts.

An ECDIS system displays the information from Electronic Navigational Charts (ENC) and integrates position information from the Global Positioning System (GPS) and other navigational sensors, such as radar and automatic identification systems (AIS). It may also display additional navigation-related information, such as Sailing Directions and fathometer.

The ECDIS is extremely efficient mean of navigation, which significantly reduce the workload of the officers on watch, thus allowing them to devote more time to the observation of the surroundings and to the navigation of the ship.

The ECDIS is unique means of navigation, particularly as far as the automatic activation of the alarm signal upon the detection of dangerous objects marked on the chart is concerned. Considering that nearly 50% of all accidents are the result of navigational errors (this figure varies significantly depending on the region), the cost of the cartographic systems is undoubtedly justified.

Figure 1, shows an ECDIS.

ECDIS provides continuous position and navigational safety information. The system generates audible and / or visual alarms when the vessel is in proximity to navigational hazards.

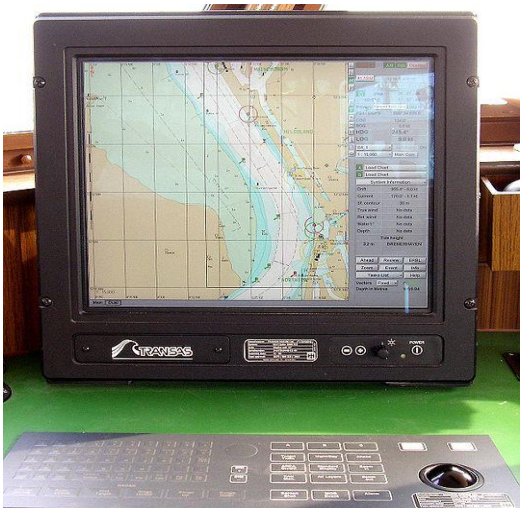

Figure 1. An ECDIS Device

2.2 System functions

- Route planning
- Route safety check
- Route monitoring
- Automatic ship tracking
- Logging and recording of targets (optional)
- Nautical chart catalogue
- Base, Standard and Full display of Playback of recorded navigational electronic charts
- Mariner's objects database
- Anti grounding and other Navigational alarms, required for ECDIS
- Color palette, selectable by operator
- Electronic Range/Bearing cursor
- Navigational sensors and manual drift and current input
- Playback of recorded navigational situations

2.3 Connection

The ECDIS can receive information from the following type of sensors Figure 2):

- GPS in formats RMC, GLL and VTG
- Loran C
- Magnetic compass
- Gyro, north seeking

- Gyro, non-north seeking
- Doppler or correlation speed log
- Electromagnetic speed log
- Mechanical speed log
- Pressure speed log
- NMEA Autopilot output

2.4 Navigation Aids and Safety:

Navigation Aids:

- Autopilot system
- Man Overboard
- Dead reckoning
- Multiple position sources

Navigation Safety

- Ant grounding control
- Depth check with safety contour
- Acoustic and blinking alarms
- Collision avoidance with ARPA and AIS target detection

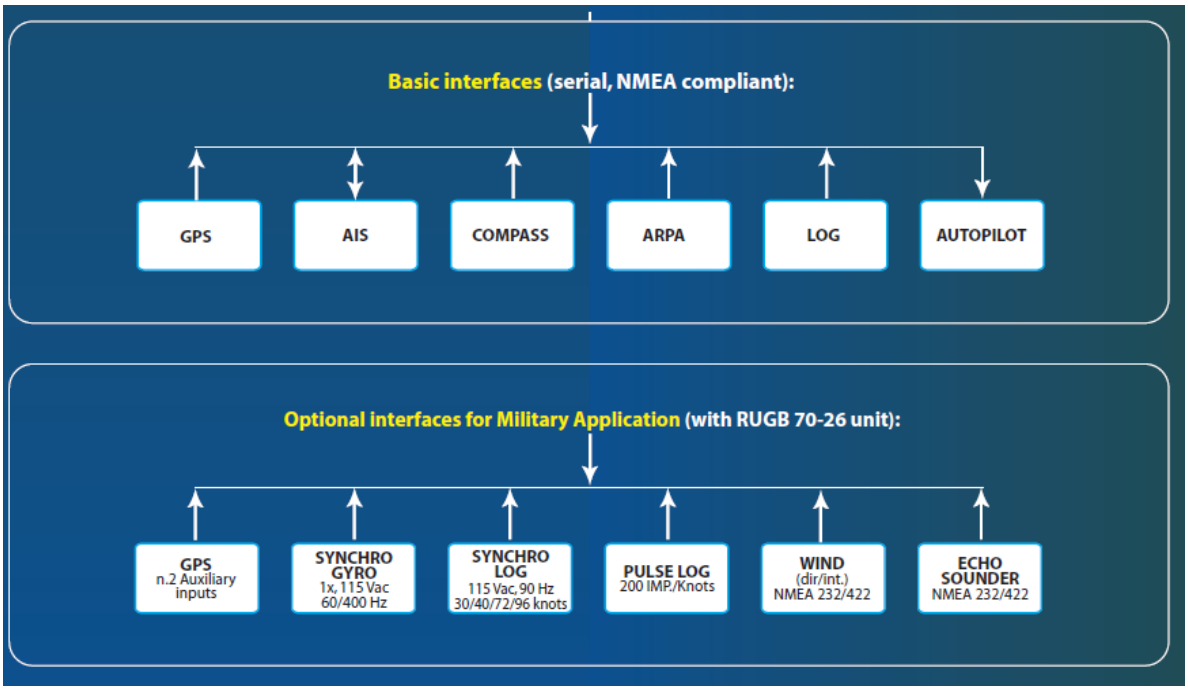

Figure 2. Connection of ECDIS

2.5 Electronic chart data

There are two types of electronic chart data.

1. Vector charts

Vector charts (Figure 3) are the chart databases for ECDIS, with standardized content, structure and format, issued for use with ECDIS on the authority of government authorized hydrographic offices. ENCs are vector charts that also conform to International Hydrographic Organization (IHO) specifications stated in IHO Publication S-57.

ENCs contain all the chart information necessary for safe navigation, and may contain supplementary information in addition to that contained in the paper chart (e.g., Sailing Directions).

This supplementary information may be considered necessary for safe navigation and can be displayed together as a seamless chart. ENCs are intelligent, in that systems using them can be programmed to give warning of impending danger in relation to the vessel's position and movement.

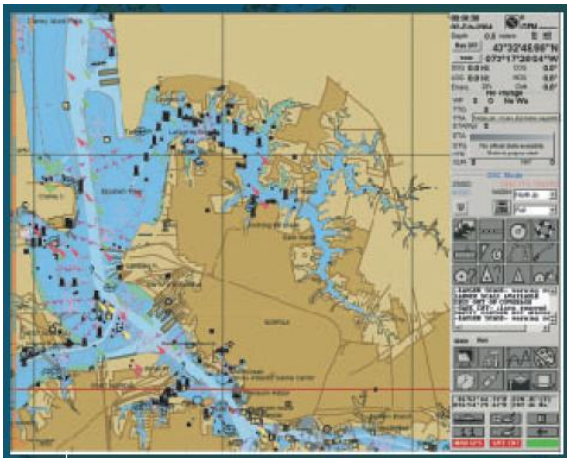

Figure 3. A view of Vector Chart

2. Raster charts

Raster navigational charts (Figure 4) are raster charts that conform to IHO specifications and are produced by converting paper charts to digital image by scanner. The image is similar to digital camera pictures, which could be zoomed in for more detailed information as it does in ENCs. IHO Publication S-61 provides guidelines for the production of raster data. IMO Resolution MSC.86 (70) permits ECDIS equipment to operate in a Raster Chart Display System (RCDS) mode in the absence of ENC.

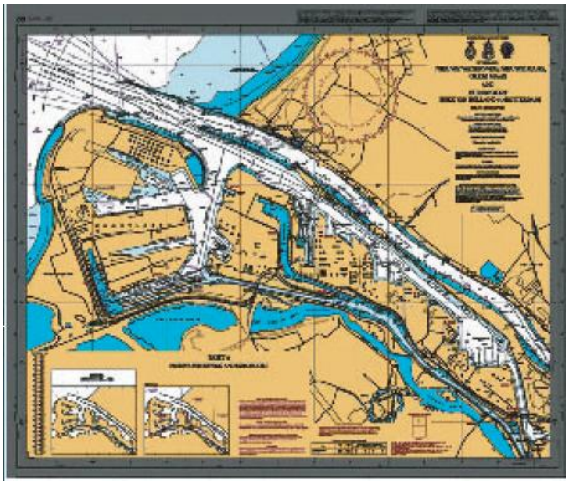

Figure 4. A view of Raster Chart

3. Maintenance of ECDIS Software

3.1 Adoption History

Resolution MSC.282 (86), adopted on 5 June 2009, introduced a mandatory carriage requirement for Electronic Chart and Display Systems (ECDIS) to be phased in, according to size and class of ship, between 1 July 2012 and 1 July 2018. ECDIS Performance Standards have been adopted by IMO and in turn refer to the International Hydrographic Organization (IHO) Standards that govern the transfer and presentation of the chart information used in ECDIS.

The Sub-Committee on Safety of Navigation (NAV), at its 56th session (26 to 30 July 2010), reviewed the text of SN.1/Circ.266 and agreed that the text of the original circular should be amended as this was an important issue for ensuring the safety of navigation.

The Maritime Safety Committee, at its eighty-eighth session (24 November to 3 December 2010), concurred with the Sub-Committee's views, approved the revised Guidance on the maintenance of Electronic Chart Display and Information System (ECDIS) software, as set out in the annex, and encouraged their use by the relevant authorities.

Member Governments are invited to bring the attached revised SN circular to the attention of all concerned for information and in particular to ensure that mariners always have the latest safety-related information available to them.

3.2 Application

The range of application for New and Existing ships is mentioned in table 1.

Table 1: Application for New and Existing Ships

Ship Type	Gross Tonnage (GT)	Application	
		New Ships	Existing Ships (other than new ships)
Passenger Ships	500 GT and upwards	Ships constructed on or after 1 July 2012	Not later than the first survey on or after 1 July 2014
Tankers	3,000 GT and upwards	Ships constructed on or after 1 July 2012	Not later than the first survey on or after 1 July 2015
Cargo ships (other than tankers)	50,000 GT and upwards	Ships constructed on or after 1 July 2013	Not later than the first survey on or after 1 July 2016
	20,000 GT and upwards but less than 50,000 GT		Not later than the first survey on or after 1 July 2017
	10,000 GT and upward but less than 20,000 GT		Not later than the first survey on or after 1 July 2018
	3,000 GT and upward but less than 10,000GT	Ships constructed on or after 1 July 2014	N/A

Note:
- **Tankers: Oil tanker, Chemical tanker, Gas carrier**

3.3 Requirements

ECDIS in operation comprises hardware, software and data. It is important for the safety of navigation that the application software within the ECDIS works fully in accordance with the Performance Standards and is capable of displaying all the relevant digital information contained within the Electronic Navigational Chart (ENC).

ECDIS that is not updated for the latest version of IHO Standards may not meet the chart carriage requirements as set out in SOLAS regulation V/19.2.1.4.

For example, in January 2007, Supplement No.1 to the IHO ENC Product Specification was introduced in order to include, within the ENC, then recently introduced IMO requirements for Particularly Sensitive Sea Areas (PSSA), Archipelagic Sea Lanes (ASL) and to cater for any future Safety of Navigation requirements.

Any ECDIS which is not upgraded to be compatible with the latest version of the Product Specification or the S-52 Presentation Library may be unable to correctly display the latest charted features. Additionally, the appropriate alarms and indications may not be activated even though the features have been included in the ENC. Similarly any ECDIS which is not updated to be fully compliant with the latest version of the S-63 Data Protection Standard may fail to decrypt or to properly authenticate some ENCs, leading to failure to load or install.

The status of IHO standards affecting ECDIS Equipment in 2010 are mentioned in table 2.

Table 2. IHO ECDIS Standards

IHO ECDIS Standards	Current Edition
Electronic Navigational Chart (ENC)	S-57 Edition 3.1
Presentation Library for ECDIS	S-52 PresLib Edition 3.4
ENC Data Protection Scheme	S-63 Edition 1.1
Raster Navigational Chart (RNC) *(Only if ECDIS software supports RCDS mode)*	S-61 Edition 1.0

An Updates list of all the relevant IHO standards relating to ECDIS equipment is maintained within the "About ENCs" section of the IHO website (www.iho.int).

The need for safe navigation requires that manufacturers should provide a mechanism to ensure software maintenance arrangements are adequate. This may be achieved through the provision of software version information using a website. Such information should include the IHO Standards which have been implemented.

Administrations should inform ship-owners and operators that proper ECDIS software maintenance is an important issue and that adequate measures need to be implemented by masters, ship-owners and operators in accordance with the International Safety Management (ISM) Code.

Assembly Res. 817 (19) as enclosed to this Tech. Inf., prescribed the performance standards for Approval of the Software according to statutory requirements.

4. References

- ✓ KR – Technical Information
- ✓ http://krcon.krs.co.kr
- ✓ http://www.kelvinhughes.com
- ✓ http://www.polythomasgunn.gr/
- ✓ http://en.wikipedia.org/
- ✓ www.gemrad.com