

1 ECDIS and Passage Planning Requirements

Introduction

This edition of '*ECDIS Passage Planning and Watchkeeping*' sets out procedures for the correct configuration of ECDIS and, utilising the appraisal, planning, execution, monitoring (APEM) methodology, highlights best practices for passage planning and watchkeeping.

An ECDIS operator should:

- Be proficient in setting up the ECDIS, particularly the safety and display settings
- be aware that, while ECDIS may continuously display a 'position', it is important to understand how that position has been derived and how to verify its accuracy. The key to effective ECDIS navigation is 'position verification' of the current global navigation satellite system (GNSS) position. The watchkeeper must regularly verify the GNSS position with lines of position (LOPs) derived from an alternative positioning method.

Practising the use of every function and technique available on the ECDIS is one of the most effective ways for a watchkeeper to maintain and develop their navigation skills at sea. Learning how to use each type of ECDIS thoroughly, and mentoring others to do the same, contributes towards safer ship operation and a more effective bridge team.

In November 2021, the UK Supreme Court reaffirmed the decision that a defective passage plan effectively renders the ship legally unseaworthy. In the case in question, a large container ship went aground. The company was held liable for several million dollars when it was determined that the chart had not been properly updated. It was found that the passage plan (appraisal and planning stages) and subsequent navigation outside a buoyed fairway did not reflect a warning given in a Notice to Mariners. The warning stated that the depths shown on the chart outside the fairway were unreliable and that the waters were shallower than those recorded on the chart.



The importance of a well-made ECDIS passage plan, effectively executed and monitored, should not be underestimated.

1.1 ECDIS Requirements

ECDIS is a mandatory carriage requirement for ships on international voyages (specifically, cargo ships and tankers of 3,000 GT and upwards and passenger ships of 500 GT and upwards) under SOLAS Chapter V, Regulation 19.2.10. Additional carriage requirements may also apply depending on the ship's flag State.

A ship can use ECDIS to meet the compulsory chart carriage requirements for a voyage under SOLAS if electronic navigational charts (ENCs) are used and if certain additional conditions are met:

- ENC carriage must comply with SOLAS Chapter V, Regulation 27 (the ENCs must be the latest available edition, kept up to date and correctly displayed according to the latest International Hydrographic Organization (IHO) standard – see the table on page 6)
- the installed ECDIS must be type approved (SOLAS Chapter V, Regulation 18)
- the ECDIS must conform to the required International Maritime Organization (IMO) Performance Standards (Resolution MSC.232(82) or MSC.530(106))
- there must be adequate, independent backup arrangements in place (SOLAS Chapter V, Regulation 19.2.1.5)
- the ECDIS operator must have the correct, in-date STCW certification.

In addition, each flag State and Classification Society has its own requirements for the use of ECDIS as the primary means of navigation (PMN) including, for example, the requirement for an uninterruptible power supply (UPS). Ships using ECDIS as the PMN must have an independent secondary ECDIS or an appropriate portfolio of paper charts (APC). Officers, Masters and owners should be fully aware of the requirements of their flag State Administration.

The approved PMN is detailed in the SOLAS certification for the ship, specifically:

- For cargo ships, either the Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E) or the Record of Equipment for the Cargo Ship Safety Certificate (Form C)
- for passenger ships, the Record of Equipment for the Passenger Ship Safety Certificate (Form P).

1.1.1 Standards for ECDIS

The international organisations involved with equipment and data standards concerning ECDIS include:

- The International Maritime Organization (IMO) – Resolutions and Performance Standards
- the International Hydrographic Organization (IHO) – ECDIS and ENC standards
- the International Electrotechnical Commission (IEC) – Operational and performance requirements and testing standards.

1.2 IMO Standards

The IMO regularly issues and updates Performance Standards for navigation equipment. The Performance Standard for each ECDIS on board depends on its date of installation. The following are relevant to ECDIS:

Resolutions	Name	Adoption Date
MSC.530(106)	Performance Standards for Electronic Chart Display and Information Systems (ECDIS)	7th November 2022
MSC.232(82)	Adoption of the Revised Performance Standards for Electronic Chart Display and Information Systems (ECDIS)	5th December 2006
MSC.86(70)	Adoption of New and Amended Performance Standards for Navigational Equipment	8th December 1998
MSC.64(67)	Adoption of New and Amended Performance Standards	4th December 1996
A.817(19)	Performance Standards for Electronic Chart Display and Information Systems (ECDIS)	23rd November 1995

Resolution MSC.530(106) recommends governments to ensure that ECDIS equipment:

“(a) if installed on or after 1 January 2029, conforms to performance standards not inferior to those specified in the annex to the present resolution

(b) if installed on or after 1 January 2026 but before 1 January 2029, conforms either to performance standards not inferior to those specified in the annex to the present resolution or to performance standards not inferior to those specified in the annex to resolution MSC.232(82)

(c) if installed on or after 1 January 2009 but before 1 January 2026, conforms to performance standards not inferior to those specified in the annex to resolution MSC.232(82)

(d) if installed on or after 1 January 1996 but before 1 January 2009, conforms to performance standards not inferior to those specified in the annex to resolution A.817(19), as amended by resolutions MSC.64(67) and MSC.86(70).”

1.3 IHO Standards

IHO Standards apply to all ECDIS equipment carried on board ship for both:

- Dedicated standalone workstations, and
- multifunctional workstations as part of an integrated navigation system (INS).

IHO standards are updated periodically and ECDIS operators should ensure that the relevant, up-to-date standards are used. Further information is available on the IHO website.

The latest revision of the main IHO standards required for installation on all ECDIS:	
Standard	Revision
Specifications for Chart Content and Display Aspects of ECDIS	S-52 Edition 6.1.(1)
IHO ECDIS Presentation Library (PL)	S-52 Annex A Edition 4.0.(3)
IHO Test Data Sets for ECDIS	S-64 Edition 3.0.(3)
IHO Transfer Standard for Digital Hydrographic Data	S-57 Edition 3.1
IHO Data Protection Scheme	S-63 Edition 1.2.(1)

Correct as at December 2025, Reference: <https://iho.int/en/standards-in-force>

The IHO standards relating to ECDIS that must be understood are as follows:

Number	Type of Information	Latest Update	Detail
S-4	Regulations for International (INT) Charts and Chart Specifications of the IHO	April 2021	The aim of the international chart concept is to facilitate the provision of minimum sets of charts suitable for the navigational requirements of international shipping.
S-11	Guidance for the Preparation and Maintenance of International (INT) Chart and ENC Schemes and Catalogue of International (INT) Charts	January 2025	Part A – Guidance for the Preparation and Maintenance of International (INT) Chart and ENC Schemes (February 2018) Part B – International Chart Web Catalogue, Associated Webservices and User Manuals INT Charts/ENC Regions Coordinators (January 2025) INT Charts/ENCs (S-57, S-101)/S-100 Regional Coordinators (draft September 2024) The latest IHO chart catalogue can be viewed at: https://chart.iho.int/iho/main.do
S-49	Standardization of Mariners' Routeing Guides	September 2020	S-49 provides a standardised structure for the preparation and publication of Mariners' Routeing Guides.
S-52	Specifications for Chart Content and Display Aspects of ECDIS (chart symbols etc)	October 2014	S-52 is the standard used by ECDIS manufacturers that determines how ENC data (lines, styles, colours) are displayed on an ECDIS screen. This ensures that all ECDIS users see data displayed on screen in the same manner across all type approved makes and models of ECDIS. (The Presentation Library is key to S-52 and all ships were required to update to the latest Presentation Library (PL 4.0) in August 2017.)

Number	Type of Information	Latest Update	Detail
S-57	IHO Transfer Standard for Digital Hydrographic Data	November 2000	S-57 is the data format that transfers digital hydrographic data between hydrographic offices, ECDIS manufacturers and other data users. S-57 was developed primarily to meet the ENC requirements for an IMO-compliant ECDIS. The S-57 ENC Product Specification defines how hydrographic offices must construct an ENC, ensuring that all electronic charts contain all the chart information necessary for safe navigation. <i>(Migration from S-57 to S-100: The IHO advise that S-57 3.1 will continue to be used for many years even with release of S-100 and that S-57 3.1.1 data will be usable in S-101 compliant ECDIS.)</i>
S-65, Annex A	High Density (HD) ENC Production and Maintenance Guidance	July 2024	Annex A provides the hydrographic offices with survey capture, processing and production guidance to enable the effective creation of HD ENCs.
S-65, Annex B	S-57 ENC to S-101 Conversion Guidance	October 2025	Annex B lists the recommended conventions for preparing and finalising S-57 ENC data sets for conversion to S-101 editions.
S-66	Facts about Electronic Charts and Carriage Requirements	October 2024	The main emphasis of this standard is to qualify what is required to satisfy the SOLAS carriage requirements for charts.
S-67	Mariners' Guide to Accuracy of Depth Information in Electronic Navigational Charts (ENC)	September 2020	S-67 is a guide for ECDIS operators and training organisations on maintaining confidence in the adequacy and accuracy of charted depths and their positions in an ENC. It is no longer valid as it has been incorporated into S-66.
S-100	IHO Universal Hydrographic Data Model	Edition 5.2.0, June 2024	S-100 will become the new base standard for hydrography data. This new base will allow for a wider variety of applications to be layered. It has a wider geospatial standard, is not specific to ECDIS and is intended for the development of digital products and services for hydrographic, maritime and GIS communities. Its compilation included 10 years' worth of deferred S-57 corrections and extensions. All maritime services should conform with the IHO S-100 framework standard, which specifies the method for data modelling and the development of product specifications.

1.3.1 S-100 Overview

S-100 is a new universal standard that is gradually being phased in for ENC compilation and ECDIS use. It is based on the global ISO 19100 series of standards. MSC.530(106) mandates that ECDIS must be built with S-100 capabilities from 2029 and in the interim, from 1st January 2026, voluntary application of S-100 is allowed, along with ships also maintaining S-57 compliance.

S-100 introduces new capabilities, data types and operational procedures that differ from familiar S-57 based systems. The dynamic data products enabled by S-100, including real-time water level predictions, surface current forecasts and bathymetric surfaces with continuous depth representation, require ECDIS operators to develop new methods for interpreting and utilising this information. While these data layers can aid situational awareness, they also increase the chance of user error due to misinterpretation of the various S-100 layers.