Training requirements

Facts about electronic charts
and carriage requirements
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Introduction

ECDIS is widely used on an increasing number of ships, both as a primary and secondary navigation system. Proper training and education for the navigators are vital if the safety benefits of ECDIS are to be truly realised. Knowing how to make proper use of electronic chart system is fundamental to safe navigation. Despite a recent strengthening of regulations, it is apparent that many mariners are being expected to operate these systems without sufficient, or indeed in some cases, any training. At best this means that the efficiencies these systems can bring are not being realised; at worst safety is put at risk. A fundamental lack of operational expertise in using electronic chart systems was documented by a comprehensive survey of navigators carried out in 2002 by Ålesund University College (AUC), Ålesund, Norway. Experience and investigations show that many mariners are not sufficiently familiar with the basics and proper use of ECDIS, particularly in "non-standard situations". Recognising this problem the IMO has requested STW sub-committee to review the requirements for ECDIS training. Details of existing ECDIS education courses reported by flag states are listed at the end of this section.

Legal aspects with respect to ECDIS training - STCW 95

At first glance, the provisions of the STCW 95 Convention (Standards of Training, Certification and Watchkeeping for Seafarers) with respect to ECDIS seem to be vague, but actually they are not. Both electronic and paper charts are to dealt with on the same functional level. This is indicated by Table A-I I-1 where it is stated "ECDIS systems are considered to be included under the term "charts" ".

The degree of knowledge and competency concerning the use of paper charts is explicitly defined. The navigation officer must possess "a thorough knowledge of and ability to use navigational charts and publications..." He must show… ...evidence of skills and ability to prepare for and conduct a passage, including interpretation and applying information from charts". This demonstrates that:

(1) If ECDIS is used as "chart", the user must demonstrate the same degree of knowledge and competency concerning the use of ECDIS as a user of a conventional chart must demonstrate chart work competency.
(2) ECDIS training is as "mandatory" as chart training.

Must ECDIS Courses explicitly be required by IMO?

So far (March 2007), there is no IMO requirement concerning mandatory ECDIS courses (e.g. published by a circular letter). However, national administrations may require ECDIS training by either:

- setting it on a list of national mandatory requirements and/or
- instructing the "notifying body for ISM Code".

Under the terms of the ISM Code (International Ship Management Code), the ship owner or operator has a responsibility to ensure that personnel are given proper familiarisation with their duties. In this case: If a ship is equipped with a compliant ECDIS as the primary means of navigation at sea, the ship owner has to provide ECDIS training to ensure that ECDIS users are both properly trained and familiar with the shipboard equipment before it is used. Future impacts on insurance and liability are possible.

Required documentation for ECDIS training

To check the knowledge and competency of ECDIS and its proper use, the European Union has provided "Guidelines for Port State Control on Electronic Charts (Paris Memorandum of Understanding). These guidelines explicitly require, for both ENC and RCDS mode, to check:

"Are the Master and deck watchkeeping officers able to produce appropriate documentation that generic and type-specific ECDIS familiarisation has been undertaken?"

Training objectives

The overall objective of ECDIS training is to enhance navigation safety. In rather general terms, this includes

- Safe operation of the ECDIS equipment
  - Use of navigational functions of route planning and monitoring
  - Proper action in case of any malfunction
- Proper use of ECDIS-related information
  - Selection, display, and interpretation of relevant information
  - Ambiguities of data management ("datum")
  - Assessment of alarms and indications
- Awareness of ECDIS-related limitations
  - Errors of displayed data and their interpretation
  - Real and potential limitations
  - Over-reliance on ECDIS
- Knowledge of legal aspects and responsibilities related to electronic charts
  - Awareness of the status of ECDIS and ECS; of official and non-official data
  - Limitations of RCDS mode

In order to achieve these objectives, the mariner must acquire a thorough knowledge and functional understanding of the basic principles governing ENC data, its proper display in ECDIS and its use with navigation sensors and their respective limits. For example, the Mariner must be familiar with the object-attribute structure and the feature-space relationship of ENC data as well as information and events such as "SCAMIN", "overscale", "update history", "safety values" and "chart usage".

ECDIS training must have the necessary depth in theoretical aspects (ECDIS data and their presentation) as well as dealing with its proper use (functions and limitations). It should cover all safety-relevant aspects and go far beyond type-specific "button pressing" or basic operations. ECDIS training should be both generic and type-specific.

Ideally, the training should cover the full extent of functions and procedures necessary to deal with a wide range of possible navigational problems. It should cover thorough route planning and both visual and automatic route monitoring in typical navigational situations and sea areas. To prepare a user for practical operations, decision-making and alarm handling, real-time complex ECDIS simulator exercises should be conducted.

IMO model training course "Operational Use of ECDIS"

The IMO Committee on Standards for Training and Watch-keeping (STW) approved a standardised IMO "Model Training Course on the Operational Use of ECDIS" (Model Course 1.27). The primary objective of the Model Course is to ensure proper use and operation of ECDIS in terms of a thorough understanding and appreciation of its capabilities and limitations. The IMO Model Course contains four main parts

Part A:	Course framework	Part C:	Detailed teaching syllabus
Part B:	Course outline and time table	Part D:	Instructor manual

and annexes dealing with proposals and examples of situations for the development of scenarios and of "errors of interpretation".

The proposed contents (syllabus) of ECDIS training are listed in the table below. They are based on the analysis of onboard navigational activities and include the learning objectives on the operational as well as on the management level (e.g. STCW Convention). In addition to providing detailed learning objectives and detailed guidance on a range of subject areas, the Model Course also contains recommendations for facility and staffing requirements, entry standards, lesson plans, teaching aids, examples of ship-simulator training exercises that can be conducted and certificates.

1. Legal aspects and requirements
2. Main types of electronic charts
3. ECDIS data
4. Presentation of data
5. Sensors
6. Basic navigational functions
7. Special functions for route planning
8. Special functions for route monitoring
9. Updating
10. Additional navigational functions and indications
11. Errors in displayed data
12. Errors of interpretation
13. Status information, warnings and alarms
14. Voyage documentation
15. System integrity monitoring
16. ECDIS back-up
17. Dangers of over-reliance on ECDIS

The IMO Model Course 1.27 "The Operational Use of Electronic Chart Display and Information System (ECDIS)" together with its annex and attachment is regarded as minimum requirements a candidate should have gone through to receive an ECDIS certificate. It covers all relevant safety aspects and overall system knowledge. Governments are strongly recommended to ensure that every officer in charge of a navigational watch are trained and certified in accordance with the objectives of the course.

Certification of ECDIS education

The certificate shall document that:

- The candidate has completed a course in operational use of ECDIS (Electronic Chart Display and Information Systems), based upon the IMO Model Course 1.27 "The Operational Use of Electronic chart Display and Information systems (ECDIS)".
- The course fulfils the requirements of IMO STCW-95.

The certificate shall be governmental issued or the issuer governmentally approved.

ECDIS training schools and courses

This table below lists available ECDIS education courses as reported by Flag states. Note that this list is not exhaustive.

Flag state	ECDIS training based on IMO model course 1.27 available	Location	Contact details
Australia	Y	Australian Maritime college. Pivot Marine. Royal Australian Navy.	
Denmark	Y	DFuruno Integrated Navigation System Training Center (INSTC), Copenhagen.	A complete list of relevant institutions in Denmark can be found at : www.fuldskruefrem.dk/adresseliste.html
Finland	Y	Satakunta University of Applied Sciences. Kymenlaakso University of Applied Sciences. Yrkeshøgskolan Sydväst Høgskolan Åland	www.samk.fi/english/ http://www.kyamk.fi/Frontpage www.sydvast.fi/index.php?option=com_content&task=view&id=68&Itemid=77 www.ha.aland.fi/text.con?iPage=91
France	Y	ECDIS simulators : École Navale (French Naval Academy) Écoles nationales de la marine marchande Marseille Le Havre Nantes	www.ecole-navale.fr/ www.hydro-marseille.com/ www.hydro-lehavre.fr/ www.hydro-nantes.org/
Germany	Y	Hochschule Wismar, University of Technology, Business and Design Fachbereich Seefahrt Richard-Wagner-Straße 31 D-18119 Warnemünde Hochschule Bremen Fachbereich Nautik – und Internationale Wirtschaft Werderstraße 73 D-28199 Bremen	Homepage: www.sf.hs-wismar.de/ Contact: Bernd Ulbricht, bernd.ulbricht@sf.hs-wismar.de Contact: rchrist@fbn.hs-bremen.de Homepage: www.hs-bremen.de

		Fachhochschule Oldenburg Ostfriesland/Wilhelmshaven Fachbereich Seefahrt in Elsfleth Weserstraße 4 + 52, D-26931 Elsfleth Fortbildungszentrum Hafen Hamburg e.V. Köhlbranddeich 30 D-20457 Hamburg	Contact: christoph.wand@els.fh-oldenburg.de Homepage: www.fh-wilhelmshaven.de Contact: Caroline Baumgärtner, c.baumgaertner@fzh.de www.fzh.de (for pilots only)
Norway	Y	Ålesund University College	norvald.kjerstad@hials.no
Portugal	Y	Escola Náutica Infante D. Henrique	info@enautica.pt
South Africa	Y	South African Maritime Training Academy (SAMTRA)	training@samtra.co.za
Spain			
Sweden	Y	Kalmar and Gothenburg Maritime Agencies	robert.fredriksson@hik.se
United Kingdom	Y	Warsash Maritime Centre South Tyneside Blackpool and Fylde Glasgow Nautical College Lairdside Maritime Centre	www.warsashcentre.co.uk/ www.stc.ac.uk/marine/ www.blackpool.ac.uk/index.php?page=47 www.glasgow-nautical.ac.uk/ www.ljmu.ac.uk/lairdsidemaritimecentre/