ECDIS

ECDIS TRAINING MANUAL

Scope

This course provides training in the basic theory and use of Electronic Chart Display and Information Systems (EGDIS) for those who will be in charge of a navigational watch on vessels equipped with EGDIS. The training comprises all safety-relevant aspects and for this reason aims beyond the use of operational controls. Because EGDIS systems and MMls are in an ongoing process of evolution, a functional approach, not a product-oriented approach, is aimed at. As EGDIS is part of a complex system (including sensors, track control, etc.), complex training based on a variety of functionalities and potential problems is promoted. The theoretical aspects like all major characteristics of EGDIS data such as data contents and all major characteristics of the display of EGDIS data will be covered in sufficient depth. For practical capabilities and skills, exercises are performed which will provide practice in setting up and maintaining an EGDIS display, in planning and monitoring a route, in using basic navigational functions and equipment in a real-time navigational environment, in activating updates and in performing proper actions which are necessary for a safe navigational watch.

Objective

- A trainee successfully completing this course will be able to use EGDIS for his navigational watch. He will be able to operate EGOIS equipment, use the navigational functions of EGDIS, select and assess all relevant information and take proper action.

- The trainee will acquire and develop a knowledge and understanding of the basic principles governing the safe operation of EGDIS, including EGDIS data and their presentation, as well as the system-related limitations and potential dangers.
- He will be able to generate and maintain displays, to operate all basic navigational functions and all specific functions for route planning as well as route monitoring, to use and select proper navigational data and to display the data in the appropriate manner. He will also be able to perform updating.
- He will be able to analyse nautical alarms during route planning and route monitoring as well as sensor alarms. He will be able to assess the impact of the performance limits of sensors on the safe use of EGDIS and to appreciate that the back-up system is only of limited performance. He will be able to assess errors, inaccuracies and ambiguities caused by improper data management. Thus, he will be aware of errors in displayed data, errors of interpretation and the risk of over-reliance on EGDIS and be able to take proper action.
- In addition, he will have knowledge of the principal types of electronic chart and the essential legal aspects of the use of EGDIS.

Entry standards
- The course is designated both for candidates for certification as officers in charge of a navigational watch and for experienced nautical officers and other persons with responsible duties in navigation work, such as pilots.
- Those wishing to enter this course should have experience in performing chart work and should be able to practice all usual tasks concerning standard navigational procedures and equipment.
- They should know about the functions and limitations of other navigational equipment. They should preferably be familiar with standard computer MMls, including elements such as windows, menus, trackball, etc.

How to use this training package

Electronic charts can help make navigation safer and easier. With more vessels now being fitted with electronic chart systems, most deck officers will be expected to be able to use them. It is important, therefore, to understand the basics of how electronic charts work, how they should be used correctly and safely and, very importantly, their limitations as a

navigational tool. This workbook and its accompanying video is intended to explain the basic elements of electronic charts and how to use them safely.

As well as reading this workbook and watching the video, you should also read your shipping company's own procedures for navigation while using electronic charts. Additionally, you should study the manufacturer's operating manual for the electronic chart system fitted to your vessel.

The Development of Electronic Charts

The use of electronic charts has increased for several reasons, including:

- the use of satellite Global Positioning Systems, namely GPS/GLONASS
- the introduction of reliable onboard computer systems
- the development of electronic charts for military and other specialist uses
- the increasing availability of many paper charts in an electronic format
- used correctly, they improve operational awareness and offer real time position fixing
- they can be adapted for different and specialized applications
- the ease with which they may be updated

Many vessels now use electronic charts of some sort. A variety of systems are available, ranging from the very basic up to highly advanced forms of electronic chart systems with specialist applications. Deep sea trawlers can run an application to locate and track fish shoals on their electronic charts. Maritime research vessels may use special hydrographic applications to provide detailed displays of currents, tides, ocean drift and sea bed contours on their electronic charts.

For most mariners, however, the main benefit of an electronic chart is to provide a quick and accurate indication of their vessel's position, along with other useful navigational information. For all vessels, the main function of any electronic chart system should be to contribute to safer navigation.

Course outline

Training area & Objectives	Hours

1. Legal aspects and requirements
     a. Describe the essential legal aspects and responsibilities in the use of ECDIS
     b. Carriage requirements
     c. Equivalency
     d. Data procurement
	0.50

2. Principal types of Electronic Chart a. State the main characteristics of principal types of electronic chart (vector and raster)	0.75

3. ECDIS data
    a. Explain all safety-relevant as well as all other major characteristics of ECOIS data such as data contents, handle ECOIS data on board and assess all errors, inaccuracies, and ambiguities caused by improper data management
    b. Terms and definitions
    c. Data structure and database
    d. ENC creation
    e. Data quality
    f. Reference systems
    g. Data distribution
    h. Loading and storing
	2.5

4. Presentation of ECDIS data
    a. Explain the main characteristics of the display of ECDIS data and select proper information for the navigational tasks
    b. Presentation library
    c. Modifying the chart presentation
    d. Scope and selection of chart data (display categories)
    e. Automatic presentation rules
    f. Modes of presentation
	2.0

5. Sensors
    a. Describe the performance limits of sensors and assess their impact on the safe use of ECDIS
    b. Performance limits
    c. Fall-back sensor systems
    d. Data reference system
    e. Selection of appropriate and unambiguous sensor data
    f. Plausibility of sensor input
	1.5

6. Basic navigational functions and settings
    a. Operate all basic navigational functions and settings
    b. Automatic functions
    c. Manual functions
    d. Own chart entries
    e. Presentation of navigational marks
    f. Additional information
    g. Vector types
	2.75

7. Specific functions for route planning
    a. Operate all specific functions and obtain all relevant information for route planning from ECDIS
    b. Sea area selection
    c. Route planning information
    d. Construction of a route
    e. Adjustment of a planned route
    f. Curved track planning
    g. Planning notes
    h. Safety values
    i. Check for navigational safety.
    j. Ultimate route
	7.5

8. Specific functions for route monitoring
    a. Operate all specific functions for route monitoring and obtain all relevant information for navigation and for the ship's safety
    b. Monitored area
    c. Required route
    d. Vector-time
    e. Check measurements
    f. Look-ahead function
    g. Alarms
    h. Current and wind
	9.5

9. Updating
    a. Perform updates and appreciate the importance of updating
    b. Production and distribution of updates
    c. Manual, semi-automatic and automatic updating
    d. Performing updates on board
    e. Updating and safe navigation
	2.0

10. Display and function of other navigational information
    a. Explain the display and possible dangers and demonstrate the function of other navigational information
    b. Radar superimposition
    c. Automatic track-keeping
    d. Use of transponders
	1.75

11. Errors in displayed data
    a. Explain the potential errors of displayed data and take proper action
    b. Potential errors in the ECDIS display
    c. Potential errors in the display of own ship's position
    d. Correctness of displayed data
	1.5

12. Errors of interpretation a. Explain the potential errors of interpretation and take proper action to avoid these errors	1.5

13. Status indications indicators and alarms
    a. Explain the status indications, indicators and alarms for different kinds of situation and take proper action
    b. Definition and meaning of indicators and alarms
    c. Nautical indications/alarms and sensor alarms
    d. Data and chart alarms
	1.5

14. Documentation
    a. Understand the meaning of voyage recording and operate the corresponding functions
    b. Automatic voyage recording
    c. Reconstruction of past track
	0.5

15. Integrity monitoring
    a. Analyse and assess the functioning of EGDIS On-line test
    b. Manual and visual tests
    c. Verification of proper functioning
	1.25

16. Back-up
    a. Navigate as safely as possible using the back-up system in the case of an EGOIS failure
    b. Takeover by the back-up system
    c. Reduced functional capabilities
    d. Periodical function test
	1.5

17. Risk of over-reliance on ECDIS
    a. Assess the limits of EGDIS as a tool which does not release the navigator from proper
    b. watchkeeping
	1.5

Total	40.0