

Subject

"Guidance on ECDIS for ships calling at Australian ports" issued from the Australian Government (Revised)

ClassNK

Technical Information

No. TEC-0924

Date 24 August 2012

To whom it may concern

Australian Maritime Safety Authority (AMSA) published Marine Notice 11/2012 "Guidance on ECDIS for ships calling at Australian ports" instead of Marine Notice 15/2010 and 7/2012.

In "5.2 Familiarisation training", it was requested "The requirement for familiarisation is further recognised under the provisions of section 6.3 and 6.5 of the ISM Code".

In "7 Port State Control inspection", it was included the following requirements.

- documented procedures for using ECDIS
- listing of ECDIS as critical equipment in the ship's Safety Management System
- evidence of periodic tests and checks of the ECDIS equipment that need to be carried out in accordance with the ship's Safety Management System

For any questions about the above, please contact:

[For questions on audit]

NIPPON KAIJI KYOKAI (ClassNK)

Safety Management Systems Department, Administration Center, Head Office

Address: 4-7 Kioi-cho, Chiyoda-ku, Tokyo 102-8567, Japan

Tel.: +81-3-5226-2173

Fax: +81-3-5226-2174

E-mail: smd@classnk.or.jp

[For questions on survey]

Survey Department, Administration Center, Head Office

Address: 4-7 Kioi-cho, Chiyoda-ku, Tokyo 102-8567, Japan

Tel.: +81-3-5226-2027

Fax: +81-3-5226-2029

E-mail: svd@classnk.or.jp

Attachment:

1. Marine Notice 11/2012
2. Electronic Chart Display and Information System (ECDIS) - Frequently asked questions

NOTES:

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Marine Notice 11/2012 Supersedes 15/2010 and 7/2012

Guidance on ECDIS for ships calling at Australian ports

This notice aims to clarify some of the emerging issues relating to the carriage requirements for Electronic Chart Display and Information System (ECDIS) and to provide guidance for ECDIS-fitted ships calling at Australian ports.

As the mandatory carriage of ECDIS will be phased in from 1 July 2012 onwards¹, ship operators, masters and navigating officers of ECDIS-fitted ships are encouraged to take this guidance into account.

Two flow charts that address ECDIS-related issues and which will be used by AMSA's Port State Control (PSC) inspectors, are attached.

1. Safety Certificates under SOLAS

Details of a ship's navigational systems and equipment are recorded in the "Record of Equipment" attached to the relevant safety certificate under SOLAS, including:

- Passenger Ship Safety Certificate - Form P
- Cargo Ship Safety Equipment Certificate - Form E
- Cargo Ship Safety Certificate - Form C

The means of complying with SOLAS Chapter V Regulation 19 needs to be indicated (i.e. paper charts and/or ECDIS) in the relevant form containing the ship's "Record of Equipment". If a ship uses ECDIS for navigation, the "Record of Equipment" must clearly state the back-up arrangement in place. Additionally, if a ship requires flexibility in using either paper charts or ECDIS as the means of navigation, such an arrangement must be clearly indicated in the ship's "Record of Equipment". In such cases, both paper charts and ECDIS must comply with SOLAS requirements.

2. Determining the means of navigation

In determining the means of navigation being used, apart from considering the relevant form containing the ship's "Record of Equipment", AMSA's PSC inspectors will look for evidence of planning and presentation of the ship's route for the completed (or intended) voyage and of plotting and monitoring of the ship's positions throughout the voyage. This information may be cross-checked by the PSC inspectors against entries made in the ship's official documents such as the deck log book and manoeuvring book.

3. Compliant ECDIS

As per SOLAS Chapter V Regulations 18 and 19, for a ship to rely on ECDIS for navigation, the ECDIS equipment must conform to the relevant IMO Performance Standards. ECDIS units on board are required to comply with one of two performance standards (either IMO Resolution A.817(19) or MSC.232(82)), depending on the date of their installations.

Where ECDIS is being used for navigation, it must:

- i) be type-approved;
- ii) be maintained to the latest applicable International Hydrographic Organization (IHO) standards;
- iii) use official and up to date electronic charts; and
- iv) have an adequate, independent back-up arrangement.

¹Depending on ship type, size and construction date, as required by SOLAS regulation V/19.2.10

3.1 Type approval of ECDIS

In accordance with SOLAS Regulation V/18, ECDIS units on board ships must be type-approved. Type approval is the certification process that ECDIS equipment must undergo before it can be considered as complying with the IMO Performance Standards. The process is carried out by type approval organisations and marine Classification Societies. For Australian ships, AMSA has delegated type approval and certification of marine equipment to several Classification Societies as listed on the AMSA website at: www.amsa.gov.au/Shipping_Safety/Standards_and_Regulations/#class.

3.2 Maintenance of ECDIS software

An ECDIS that is not updated to the latest version of IHO standards may not meet the chart carriage requirement as set out in SOLAS Regulation V/19.2.1.4. IMO has issued SN.1/Circ.266/Rev.1 on the need to maintain ECDIS software. The following link provides a list of the latest IHO standards that apply to ECDIS equipment: www.iho.int/mtg_docs/enc/ECDIS-ENC_StdsIn_Force.htm.

3.2.1 ECDIS Data Presentation and Performance Check dataset

IHO has produced an ECDIS Data Presentation and Performance Check dataset that allows mariners to check some important aspects of the operation of their ECDIS. This dataset contains two fictitious ENC cells which navigating officers can load into their ECDIS units to assess operating performance and to determine whether there may be any display anomalies that either need to be remedied or otherwise managed in the way that the ECDIS is operated. If the check highlights a problem, the accompanying guidance notes with the check dataset offer suggested courses of action. The check dataset and accompanying instructions can be downloaded from the IHO website at: www.iho.int/srv1/index.php?option=com_content&view=article&id=585:news&catid=166:1news-links&Itemid=828.

3.3 Carriage of official electronic charts

Charts that are issued by or on the authority of a Government, authorised Hydrographic Office or other relevant government institutions are official and only these should be used to fulfil the SOLAS chart carriage requirement. There are two kinds of official electronic charts available: Electronic Navigational Chart (ENC) and Raster Navigational Chart (RNC).

Ships using ECDIS for navigation must carry ENC (which are official vector charts) or, where ENCs of an appropriate usage code (i.e. scale) for the ship's operations have not been published, RNC (which are scanned, geo-referenced images of official paper charts). Both ENCs and RNCs must be of the latest available edition and be kept up to date using both the electronic chart updates (e.g. ENC updates) and the latest available notices to mariners.

3.4 Back-up arrangements for ECDIS

Appendix 6 to the IMO ECDIS Performance Standards specifies the requirements for adequate, independent back-up arrangements. The main requirements are the ability to make a timely transfer to the back-up system during critical navigation situations and allow the ship to be navigated safely until the termination of the voyage.

For Australian flagged ships, AMSA considers the following will meet the back-up requirements for ECDIS:

- i) an independent, fully compliant second ECDIS unit, connected to ship's main and emergency power supplies and connected to systems providing continuous position fixing capability; or
- ii) a folio of adequate and up to date paper charts (including relevant large scale charts) necessary for the intended voyage.

The back-up ECDIS must be loaded with relevant official charts and the voyage plan before commencement of the voyage. Similarly, if paper

charts are being used as the back-up, they must be readily available and the voyage plan must be indicated on them. The back-up arrangement must be ready for immediate use, particularly when in confined waters.

Non-Australian flagged ships should comply with SOLAS and their flag State requirements.

4. Mode of ECDIS operation

A type-approved ECDIS, when using current editions of ENC with the latest updates and corrections available, operates in ECDIS mode. An alternative mode, known as Raster Chart Display System (RCDS) mode, can only be used if there are no suitable ENCs available for the area being navigated. In recent years, ENC coverage has increased rapidly. However, there may still be some areas, such as polar regions, for which suitably detailed ENCs have not been issued.

In Australia's case, ENCs exist for all well-used coastal shipping routes and for all major ports. Hence, unless a ship will be operating in or transiting through an area for which there are no suitable ENCs, ECDIS should not need to be operated in RCDS mode in Australian waters. IMO SN.1/Circ.207/Rev.1 addresses the differences between ECDIS and RCDS.

4.1. Charts to be used in areas not adequately covered by ENCs

ENC coverage of the world's busiest ports and their connecting shipping routes, is substantially complete. Away from major shipping routes, ENCs may be limited to small scale coverage. In circumstances where greater detail is required, it may be necessary to use RNCs. When planning a passage in more remote areas, mariners should note:

- i) any caution embedded in an ENC, advising of the need to refer to larger scale charts for some areas, and
- ii) any areas within an ENC showing no data within that scale band (usage code).

Where any significant area needs to be navigated using ECDIS in RCDS mode, mariners should critically consider the ability of their ECDIS to provide an adequate 'look-ahead' capability.

5. ECDIS training requirements

Under the provisions of Standards of Training, Certification and Watchkeeping for Seafarers (STCW) Convention, there has been a long-standing requirement for all officers who carry out navigational tasks to be appropriately trained. All officers in charge of a navigational watch on ships of 500 gross tonnage or more must have a thorough knowledge of and ability to use nautical charts and nautical publications (ref STCW Code Table A-II/1). The definition of a nautical chart as provided in SOLAS Chapter V Regulation 2 includes a special-purpose map or book, or "a specially compiled database". This clearly includes ENCs and RNCs, and hence includes the use of ECDIS. In respect of seafarers who commenced an approved education and training programme before 1 July 2013, there remains a clear requirement that approved ECDIS training (as outlined below) be undertaken by all masters and officers in charge of a navigational watch on ECDIS-fitted ships.

5.1 Generic ECDIS training

All masters and officers in charge of a navigational watch should, as a minimum, complete generic ECDIS training that follows IMO Model Course 1.27 and conforms to the relevant STCW requirements.

5.2 Familiarisation training

All masters and officers certificated under Chapter II of the STCW Convention are to be familiar in accordance with STCW Convention Regulation I/14 with the ECDIS units fitted on board their ships. The requirement for familiarisation is further recognised under the provisions of sections 6.3 and 6.5 of the ISM Code. Resources supplied by the ECDIS manufacturers (such as in the form of a CD or DVD) may form part of the ECDIS familiarisation training. 'Trickle-down training' (i.e. one officer training another) is not acceptable without a structured and formalised process being in place to facilitate such training.

If the generic training includes the particular type (i.e. same make and model) of ECDIS equipment installed on board, such training may fulfil the requirement for both generic and familiarisation training. In such cases, a clear statement to this effect should be included in the ECDIS training

documentation. Masters of ECDIS fitted ships should ensure that all officers in charge of a navigational watch are competent in the safe and effective use of the ship's ECDIS.

The 2010 Manila Amendments to the STCW Convention and Code have introduced several additional specific competencies in the use of ECDIS for masters and officers in charge of a navigational watch serving on ECDIS-fitted ships. Training requirements in accordance with the 2010 Manila Amendments become effective on 1 July 2013.

6. ECDIS anomalies

An ECDIS anomaly is an unexpected or unintended behaviour of an ECDIS unit which may affect the use of the equipment or navigational decisions made by the user. Examples include, but are not limited to:

- failure to display a navigational feature correctly
- failure to alarm correctly
- failure to manage a number of alarms correctly

The IHO ECDIS check dataset (as mentioned in paragraph 3.2.1) provides a test facility for the presence of the more serious known anomalies, such as:

- the display of navigation areas recently recognised by IMO such as ESSA (Environmentally Sensitive Sea Area), PSSA (Particularly Sensitive Sea Area) and ASL (Archipelagic Sea Lanes)
- the display of lights with complex characteristics
- the display of underwater features and isolated dangers
- detection of objects by "route checking" in voyage planning mode

7. Port State Control inspections

AMSA's PSC inspectors are increasingly focussing on the means by which ships meet their SOLAS chart carriage requirements and the effectiveness with which the navigational task is being conducted.

The following is a non-exhaustive list of ECDIS-related issues which AMSA's PSC inspectors pay close attention to:

- appropriate declaration in the ship's "Record of Equipment" form
- ECDIS type approval certificate, confirming that the ship's ECDIS complies with the relevant IMO performance standards and the IEC (International Electrotechnical Commission) test standards
- maintenance of the ECDIS software to the latest applicable IHO standards
- use of latest edition official electronic charts, updated and corrected to the latest available updates and notices to mariners
- adequate independent back-up arrangements (as detailed on "Record of Equipment"), ensuring safe navigation for the remainder of the voyage in the event of an ECDIS failure
- approved ECDIS generic and familiarisation training undertaken by the master and officers in charge of a navigational watch
- documented procedures for using ECDIS
- listing of ECDIS as critical equipment in the ship's Safety Management System
- conformance and alignment with input from sensors (e.g. heading, speed, rate of turn etc) and presentation of such information on the ECDIS display
- evidence of periodic tests and checks of the ECDIS equipment that need to be carried out in accordance with the ship's Safety Management System
- demonstration of operational competency by the ship's navigating officers (e.g. safety checking of a voyage plan)

8. ECDIS flow charts

The attached flow charts outline ECDIS implementation and operational issues. These charts will assist AMSA's PSC inspectors when assessing the carriage requirement and use of

ECDIS on board. The assessment of any ECDIS related deficiencies (along with any remedial action determined) may vary, depending on the circumstances of each case, including any measures taken to limit risk and maximise safety.

AMSA has developed answers to a set of Frequently Asked Questions (FAQs) on ECDIS. It provides further information on regulatory, charting, software and training related issues. The ECDIS FAQs can be accessed from AMSA's website at: www.amsa.gov.au/Shipping_Safety/Navigation_Safety/ECDIS/ECDIS.asp.

Further enquiries regarding this marine notice can be addressed to:

Manager
Ship Inspections and Registration
Maritime Operations Division

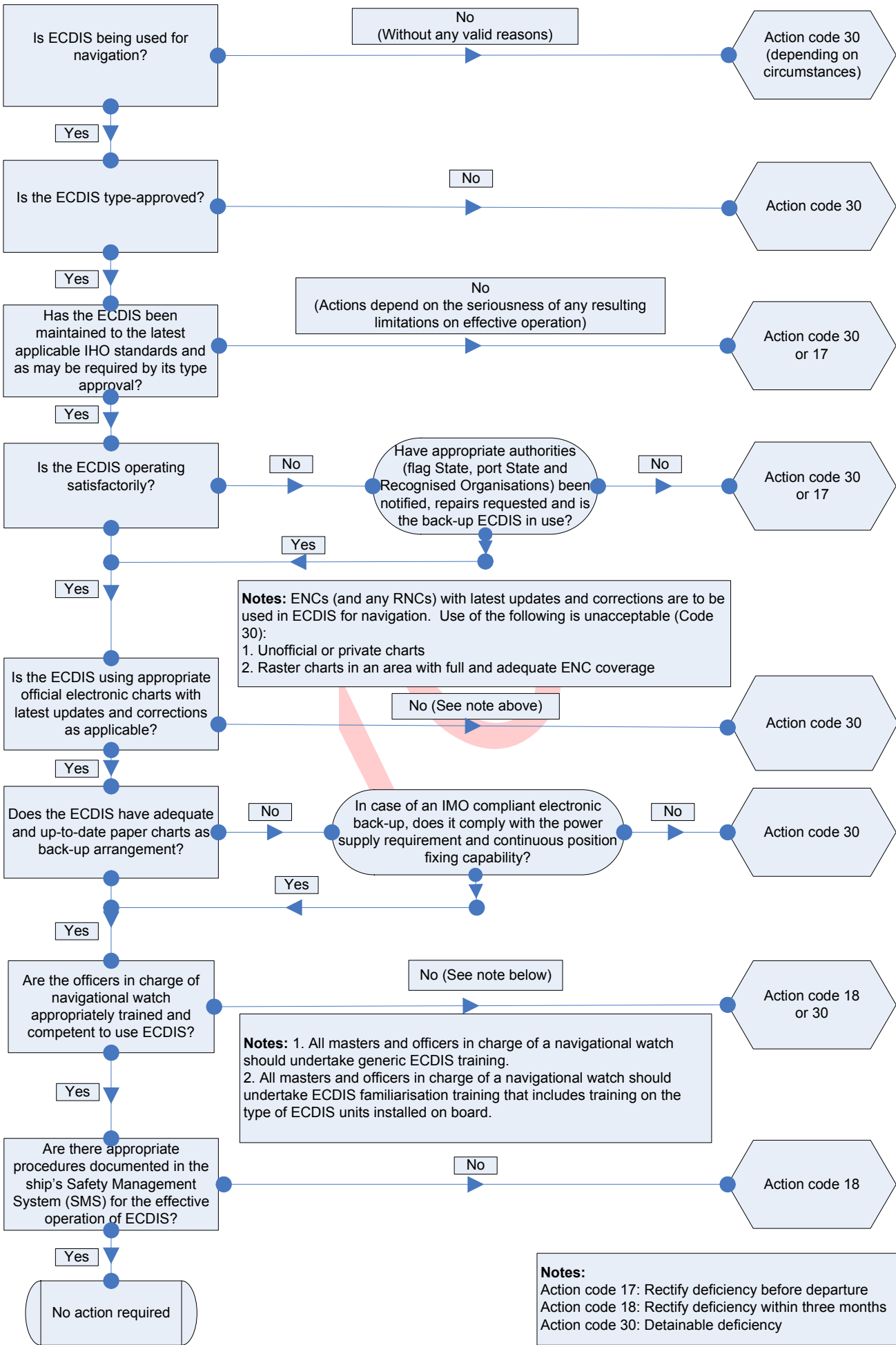
Australian Maritime Safety Authority
GPO Box 2181
CANBERRA ACT 2601

Mick Kinley
A/g Chief Executive Officer
27 June 2012

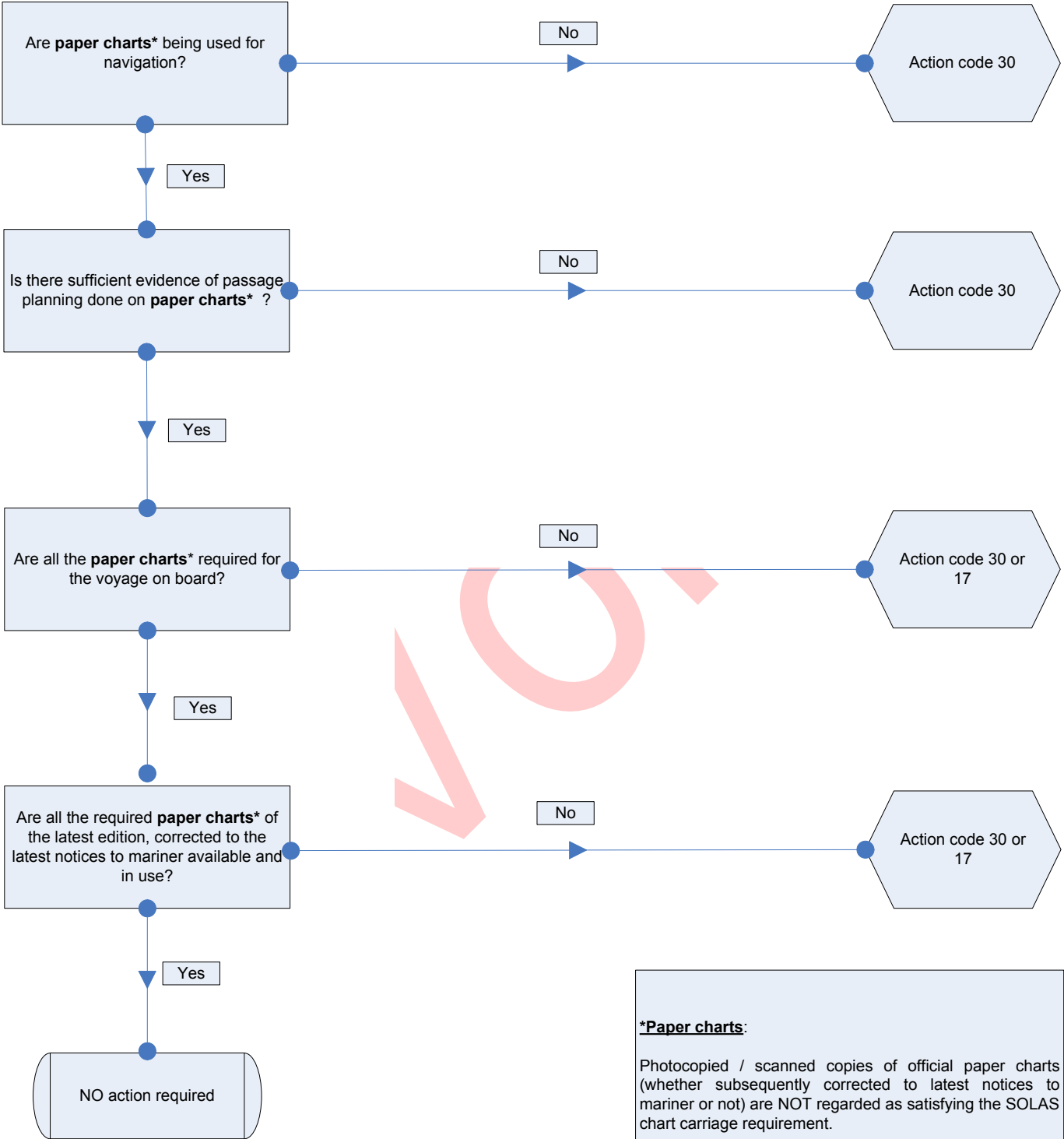
Australian Maritime Safety Authority
GPO Box 2181
CANBERRA ACT 2601
File No: 2012/1387



ECDIS listed
in the ship's
Record of Equipment Form



ECDIS NOT listed
in the ship's
Record of Equipment Form



***Paper charts:**

Photocopied / scanned copies of official paper charts (whether subsequently corrected to latest notices to mariner or not) are NOT regarded as satisfying the SOLAS chart carriage requirement.

Notes:

Action code 17: Rectify deficiency before departure
Action code 30: Detainable deficiency



Australian Government

Australian Maritime Safety Authority

Electronic Chart Display and Information System (ECDIS)

Frequently asked questions

REGULATORY

1. When will the carriage of ECDIS be mandatory?

The mandatory carriage of ECDIS depends on ship type, size and construction date. The IMO Resolution MSC.282(86) has amended SOLAS Reg V/19 to include a new paragraph 2.10 detailing a carriage requirement of ECDIS on certain kinds of ships engaged on international voyages. In accordance with this regulation, certain kinds of ships engaged on international voyages shall be fitted with an Electronic Chart Display and Information System (ECDIS) as follows:

1. passenger ships of 500 gross tonnage and upwards constructed on or after 1 July 2012;
2. tankers of 3,000 gross tonnage and upwards constructed on or after 1 July 2012;
3. cargo ships, other than tankers, of 10,000 gross tonnage and upwards constructed on or after 1 July 2013;
4. cargo ships, other than tankers, of 3,000 gross tonnage and upwards but less than 10,000 gross tonnage constructed on or after 1 July 2014;
5. passenger ships of 500 gross tonnage and upwards constructed before 1 July 2012, not later than the first survey¹ on or after 1 July 2014;
6. tankers of 3,000 gross tonnage and upwards constructed before 1 July 2012, not later than the first survey on or after 1 July 2015;
7. cargo ships, other than tankers, of 50,000 gross tonnage and upwards constructed before 1 July 2013, not later than the first survey on or after 1 July 2016;
8. cargo ships, other than tankers, of 20,000 gross tonnage and upwards but less than 50,000 gross tonnage constructed before 1 July 2013, not later than the first survey on or after 1 July 2017; and
9. cargo ships, other than tankers, of 10,000 gross tonnage and upwards but less than 20,000 gross tonnage constructed before 1 July 2013, not later than the first survey on or after 1 July 2018.

2.11 Administrations may exempt ships from the application of the requirements of paragraph 2.10 when such ships will be taken permanently out of service within two years after the implementation date specified in subparagraphs .5 to .9 of paragraph 2.10.

2. For which ships will the Port State Control guidance as referred to in AMSA Marine Notice 11/2012 be applicable?

AMSA Marine Notice 11/2012 provides guidance for all ships that adopt to use ECDIS voluntarily or in accordance with SOLAS Reg V/19.2.10.

3. What declaration needs to be made on a ship's Safety Certificates under SOLAS for using ECDIS as a means of navigation?

Details of a ship's navigational systems and equipment are recorded in the "Record of Equipment" attached to several safety certificates under SOLAS including:

- Passenger Ship Safety Certificate - Form P
- Cargo Ship Safety Equipment Certificate - Form E
- Cargo Ship Safety Certificate - Form C

The means of complying with SOLAS Chapter V Regulation 19 needs to be indicated (i.e. paper charts and/or ECDIS) in the relevant "Record of Equipment". If a ship uses ECDIS for navigation, the "Record of Equipment" must clearly state the back-up arrangement in place.

Declaring ECDIS in the ship's "Record of Equipment" makes ECDIS a surveyable item under SOLAS regulations. Therefore, by stating "ECDIS fitted" in the relevant form (even though the carriage of ECDIS may not yet be mandatory), it is taken that the ship is using ECDIS as one of the means of complying with SOLAS Reg V/19. In such a case, ECDIS equipment on board must be in compliance with the IMO's performance standards for ECDIS, as appropriate.

If a ship requires flexibility in using either paper charts or ECDIS as the means of navigation (and this is permissible for the ship in question in relation to SOLAS Reg V/19), such an arrangement must be clearly indicated by including both in the ship's "Record of Equipment". In such cases, both paper charts and ECDIS must comply with SOLAS requirements.

If ECDIS is carried on board as a training aid, an official letter from the flag administration or from the relevant marine Classification Society should be provided to confirm this. Where ECDIS units are installed on board as a training aid, they should be appropriately marked ("for training purpose only") and must not be used for navigation. In such cases, ECDIS must not be listed in the ship's "Record of Equipment".

¹Refer to the unified interpretation of the term "first survey" referred to in SOLAS regulations (MSC.1/Circ.1290).

4. Will AMSA accept ECDIS units that comply with the older ECDIS performance standards A.817(19)?

The older performance standards (PS) for ECDIS as outlined in IMO Resolution A.817(19) has been revised and updated. As a result, depending on the date of installation, ECDIS units are required to comply with one of the two IMO PSs (A.817(19) or MSC.232(82)), as indicated below:

- ECDIS equipment installed after 1st January 2009 must comply with the current revised PS for ECDIS (IMO Resolution MSC.232(82)).
- ECDIS equipment installed after 1st January 1996 but before 1st January 2009 can comply with the older PS for ECDIS (IMO Resolution A.817(19)).

ECDIS equipment installed before 1st January 1996 may not comply with any of the above IMO PSs and may not be considered an IMO-compliant ECDIS.

For the older ECDIS PS to be acceptable, the ship must have clear evidence of the date of installation of the ECDIS.

5. What is the requirement for back-up arrangements of ECDIS for Australian flagged ships?

The IMO performance standards for ECDIS require that adequate back-up arrangements should be provided to ensure safe navigation, in case of an ECDIS failure. The principal functional requirements for back-up are: to enable a safe take over of the ECDIS functions (to ensure that an ECDIS failure does not develop into a critical situation), and to provide means of safe navigation for the remaining part of the voyage in case of an ECDIS failure.

Appendix 6 of the IMO PSs list the functional requirements of the back-up system but does not prescribe specific arrangements that can meet these requirements.

For Australian flagged ships, AMSA considers the following will meet the back-up requirements for ECDIS:

Option 1: A second 'compliant' ECDIS which must be independent of the main ECDIS and connected to the ship's main power supply, emergency power supply (refer SOLAS Regulation Chapter II-I). It must also be connected to systems providing continuous position fixing capability. The back-up ECDIS must have the chart database and voyage plan loaded before commencement of the voyage. In confined waters the back-up arrangements must be in operational mode.

Option 2: A folio of paper charts that satisfies SOLAS carriage requirements, corrected to the latest available Notices to Mariners, covering the intended voyage and showing the intended voyage plan.

Therefore, and depending on the application of SOLAS Reg V/19 to the ship in question at the time, an Australian flagged ship can carry nautical charts in accordance with the following options:

- Paper charts
- Two independent IMO compliant ECDIS units
- One IMO compliant ECDIS unit and one set of paper charts

Note that depending on the ship type, size and construction date, the "paper charts" option alone will not be acceptable after the mandatory carriage requirement date as specified in SOLAS Reg V/19.

6. What is the requirement for back-up arrangement of ECDIS for non-Australian flagged ships?

Non-Australian flagged ships should comply with SOLAS and their flag State requirements.

CHARTS

7. What type of charts can be used in areas not adequately covered by Electronic Navigational Charts (ENC)? Does AMSA permit the use of Raster Navigational Charts (RNC) on board?

Although the primary mode of operation of ECDIS requires the use of ENCs, under certain circumstances the ECDIS performance standards (PS) allow the use of Raster Navigational Chart (RNC). Section 1.9 of the ECDIS PSs state that: *When the relevant chart information is not available in the appropriate form (see section 4), some ECDIS equipment may operate in the Raster Chart Display System (RCDS) mode as defined in appendix 7.*

Large scale ENC coverage of the world's busiest 800 ports as well as coverage of connecting shipping routes is now more than 94% complete². However, away from major shipping routes, ENCs may be limited to small scale coverage only. In such areas, some ECDIS equipment may not activate alarms for some features/hazards in some display configurations. These features/hazards could be difficult to detect on ECDIS as they may be obscured by other detail (such as contour labels). This is most likely to be a problem where only small scale ENCs (usage band

²Evaluation of availability of Electronic Navigational Charts (NAV 57/6/1) submitted by the International Hydrographic organisation (IHO).

1 and 2) are available. When planning a passage in such areas, mariners should note:

- Any cautions embedded in an ENC advising the need to refer to larger scale charts, and
- Any areas within an ENC showing nil/inadequate data within that scale band

Noting the above, in areas covered only by small scale ENCs and where navigation hazards might be expected AMSA recommends reference be made to either larger scale RNCs or the equivalent paper charts to obtain greater detail of information. Where any significant area needs to be navigated using ECDIS in RCDS mode, mariners should critically consider the ability of their ECDIS to provide an adequate 'look ahead' capability and to make use of manually inserted caution and warning areas. In all cases, when referring to RNC and appropriate paper charts, these charts should be kept up to date.

8. Does AMSA allow the use of scanned copies of official paper charts?

Photocopied or scanned copies of official paper charts, whether subsequently corrected to latest notices to mariner or not, are not regarded as satisfying the SOLAS chart carriage requirement.

9. What is a possible course of action if inaccuracies in electronic charts produced by commercial chart producers are observed?

Although most of the electronic charts created by commercial chart producers, also known as private charts, appear to be vector charts with all the features of ENCs, they are not recognised as 'official charts'. This is because they are not issued under the authority of a national hydrographic office or similar institution. Hence, private charts produced by commercial chart producers should not be used for navigation since they do not meet the SOLAS chart carriage requirement.

Official vector charts (known as Electronic Navigational Charts or ENC) are produced by or on the authority of national hydrographic offices. The ENC chart database is standardised with respect to its content, structure and format for use within ECDIS. ENCs are compiled in accordance with International Hydrographic Organization (IHO) standards, such as S-57 (chart data transfer standard) and S-52 (product display specification). Moreover, all ENCs are regularly updated with official updates.

AMSA plays no role concerning inaccuracies found in unofficial charts. It is the responsibility of ship operators to ensure that electronic charts used on board are official and up to date. Any observed inaccuracies in private charts should be brought to the attention of the supplier.

SOFTWARE

10. Does AMSA allow ships installed with ECDIS complying with older performance standards (A.817(19)) and conforming to IMO SN Circ.266/Rev.1 to freely enter/depart Australian ports?

This will generally be acceptable by AMSA provided the relevant software for the ECDIS equipment has been upgraded in a timely manner. Ships with the older models of ECDIS equipment that conform to the earlier IMO performance standards as set out in A.817(19) and is in conformance with IMO SN Circ.266/Rev.1, will be considered to comply with all the necessary requirements. However, if ECDIS is used to fulfil the SOLAS chart carriage requirement, it will be difficult for older ECDIS equipment to be maintained to the latest international standards as promulgated by IMO (e.g. existing guidance in SN.1/Circ.266/Rev.1).

With older ECDIS units (hardware), difficulties have been observed when upgrading ECDIS software. At least one ECDIS manufacturer has confirmed to IHO that their older hardware (built before 2003) cannot be upgraded with new software.

11. What is AMSA's view on the time schedule for manufacturers to provide a software upgrade to the latest IHO standard (e.g. PL v3.4)?

It is acknowledged that there needs to be some practical consideration given to a reasonable time period to comply with the latest IHO standards. IMO Circular SN.1/Circ.266/Rev.1 mentions the need to maintain ECDIS in accordance with the relevant IHO Standards. The same circular notes that an up-to-date list of all relevant IHO Standards relating to ECDIS equipment is maintained within the "About ENCs" section of the IHO website.

It is understood that if IHO makes a change to their standards, there has to be some time allowed for the manufacturers to redesign their software and take what action is necessary before the manufacturer can deliver a compliant product. As such, the "ideal schedule" for the upgrading of ECDIS to meet the latest IHO standards cannot be easily defined. An acceptable schedule should take account of what can reasonably be achieved and will depend on the circumstances of each case.

An important mitigating factor in relation to this issue is whether ship's officers are aware of any limitations that may result from an ECDIS not being compliant with any particularly new IHO standards and to be able to continue to use the ECDIS in a safe and efficient manner.

- 12. Will AMSA accept an older ECDIS unit whose software was improved say against “some wreck display problem” as previously advised by IHO circular letter, but the ECDIS does not still comply with the IHO PL v3.4?**

Will AMSA accept an older ECDIS unit whose software was not improved, but ship’s crew advise the date of upgrading software in the future? Say for example the manufacturer provides a letter/e-mail etc., confirming when the software will be upgraded?

AMSA does expect ECDIS software to be up to date and, within reason, to comply with the latest versions of applicable IHO standards. Similar to chart corrections, AMSA will consider a practical and achievable timeline for any needed software upgrades to take place.

Acceptance of the use of older ECDIS equipment whose software was not improved/upgraded will depend on how the ECDIS unit is being used on board. Any risks should be addressed by carrying out an appropriate risk assessment. Mitigating actions could include carrying a paper chart back-up and by making reference to the paper charts, particularly when passage planning.

AMSA recognises the nature of shipping including long sailing times between ports. In such circumstances there should be evidence on board to indicate that any pending upgrades are scheduled to take place in the near future.

TRAINING

- 13. Can ECDIS be used as a training aid on board?**

Yes, ECDIS can be installed on board and used solely for training purposes until such time when the use of ECDIS becomes mandatory for the ship in question. If ECDIS is carried on board as a training aid, an official letter from the flag administration or from the relevant Classification Society should be provided to confirm this. Where ECDIS units are installed on board as a training aid, they should be appropriately marked (“for training purpose only”) and must not be used for navigation. In such cases, ECDIS must not be listed in the ship’s “Record of Equipment” form.

- 14. What are the ECDIS training requirements for masters and officers in charge of a navigational watch serving on ECDIS fitted ships?**

Under the provisions of Standards of Training, Certification and Watchkeeping for Seafarers (STCW) Convention, there has been a long-standing requirement for all officers who carry out navigational tasks to be appropriately trained. All officers in charge of a navigational watch on ships of 500 gross tonnage or more must have a thorough knowledge of

and ability to use nautical charts and nautical publications (ref STCW Code Table A-II/1). The definition of a nautical chart as provided in SOLAS Chapter V Regulation 2 includes a special-purpose map or book, or “a specially compiled database”. This clearly includes ENCs and RNCs, and hence includes the use of ECDIS. In respect of seafarers who commenced an approved education and training programme before 1 July 2013, there remains a clear requirement that approved ECDIS training (as outlined below) be undertaken by all masters and officers in charge of a navigational watch on ECDIS-fitted ships.

Generic ECDIS training: All masters and officers in charge of a navigational watch should, as a minimum, complete generic ECDIS training that follows IMO Model Course 1.27 and conforms to the relevant STCW requirements.

Familiarisation training: All masters and officers certificated under Chapter II of the STCW Convention are to be familiar in accordance with STCW Convention Regulation I/14 with the ECDIS units fitted on board their ships. The requirement for familiarisation is further recognised under the provisions of sections 6.3 and 6.5 of the ISM Code. Resources supplied by the ECDIS manufacturers (such as in the form of a CD or DVD) may form part of the ECDIS familiarisation training. ‘Trickle-down training’ (i.e. one officer training another) is not acceptable without a structured and formalised process being in place to facilitate such training.

If the generic training includes the particular type (i.e. same make and model) of ECDIS equipment installed on board, such training may fulfil the requirement for both generic and familiarisation training. In such cases, a clear statement to this effect should be included in the ECDIS training documentation. Masters of ECDIS fitted ships should ensure that all officers in charge of a navigational watch are competent in the safe and effective use of the ship’s ECDIS.

The 2010 Manila Amendments to the STCW Convention and Code have introduced several additional specific competencies in the use of ECDIS for masters and officers in charge of a navigational watch serving on ECDIS-fitted ships. Training requirements in accordance with the 2010 Manila Amendments become effective on 1 July 2013.

- 15. What are the contents of ECDIS familiarisation training? What sort of training will be accepted by AMSA as ECDIS familiarisation training?**

ECDIS familiarisation training relates to training for the specific make and model of the ECDIS equipment fitted onboard. Familiarisation training refers to the process required to become familiar with any on board ECDIS equipment (including back-up) before taking charge of a navigational watch. In accordance with the ISM

Code, the company should establish procedures, plans and instructions, including checklists, for key shipboard operations such as the use of ECDIS for navigation. The requirement for familiarisation is recognised under the provisions of section 6.3 and 6.5 of the ISM Code.

Familiarisation training will be needed for each ECDIS a Master or a navigating officer is expected to operate. This training should build on the approved ECDIS generic training (based on IMO Model Course 1.27), and be delivered by a suitable person or organisation, such as the ECDIS manufacturer, the manufacturer's approved agent or another qualified trainer. A manufacturer's computer based training package may be accepted for this purpose.

If the generic training includes training on the particular type (i.e. same make and model) of ECDIS equipment installed on board, such training can be considered to fulfil the requirement of both generic and familiarisation ECDIS training. A clear statement to this effect should be included in the ECDIS training documentation. The master is required to verify that the ECDIS familiarisation requirements are observed and documentary evidence of such training is kept on board.

The ECDIS familiarisation training should contain information required for the safe and effective operation of the on board ECDIS for navigation and to avoid distractions from peripheral functions in the ECDIS. As a minimum, such training should cover the following areas:

- familiarisation with available functions
- familiarisation with the menu structure
- display setup
- setting of safety values
- recognition of alarms and malfunction indicators and action to be taken
- route planning
- route monitoring
- changing over to backup systems
- loading charts and licenses
- updating of software

Considering above, "trickle-down-training" (i.e. one officer training another) is not acceptable, as it leads to incomplete knowledge of the equipment capabilities, and especially the lesser used functions. The UK Nautical Institute has developed a useful check list on ECDIS familiarisation that lists the key tasks for using ECDIS as a means of navigation.

16. With regard to the familiarisation training of ECDIS, what is meant by 'structured and formalised process'?

AMSA considers that trickle-down training (i.e. one officer training another) is not acceptable without there being a 'structured and formalised process' in place to facilitate such training. The phrase '**structured and formalised process**' means that the conduct of ECDIS familiarisation training should include the following:

• **Qualified instructor**

This course may be delivered by a suitably qualified person or organisation, such as the ECDIS manufacturer, the manufacturer's approved agent or another qualified trainer. A manufacturer's computer based training package may be accepted for this purpose.

The person conducting the training should possess an ECDIS train-the-trainer qualification or must have successfully completed an approved ECDIS training course with adequate navigating experience on ECDIS.

For Australian registered ships, the instructor must hold an Australian Certificate IV in Training and Assessment (TAE40110) or an equivalent qualification.

• **Clearly defined course content**

The course content should focus on the functionality and effective use of ECDIS equipment fitted on board. A document outlining the list of specific subject matters (training areas) and a description of the sub-topics being covered under each subject should be provided. ECDIS manufacturer's manual or other relevant course documents should be provided to trainees for easy reference.

• **Well organised lesson plan**

A lesson plan with appropriate delivery method and time duration (time spent on each subject/element) should be prepared. This should reflect how the course objective will be achieved within the defined timeline. Focus should be upon achieving and demonstrating the necessary competencies, rather than time spent on training or achieving certification alone.

• **Practical evaluation**

This includes the practical demonstration of key navigational tasks to assess the competency of a Master or a navigating officer. For the purpose of effective evaluation, a proficiency checklist should be used based on key navigational functions and settings. Whilst evaluating competence, it will be necessary to verify if the information from the ECDIS was correctly interpreted and properly analysed taking into account the limitation of the equipment.

- **Record keeping**

In addition to appropriate record keeping by the shore management, documentary evidence of conducting ECDIS familiarisation training must be kept onboard. Given the critical nature and importance of conducting such training, the procedures involved in recording this training should be incorporated in the ship's Safety Management System.

17. Does AMSA plan to endorse ECDIS qualification on Australian Certificate of Competency (CoC)?

Yes. Similar to petroleum and other endorsements of STCW short courses on the Certificate of Competency (CoC), AMSA intends to endorse ECDIS qualifications on Australian CoCs. Such endorsement of ECDIS qualifications refer to Generic ECDIS training as mentioned in the STCW Code Table-II/1 (for navigation at operational level) or table A-II/2 (for navigation at management level).

For non-Australian CoCs, the fulfilment of ECDIS training requirements should be evidenced by appropriate endorsement or certification, as appropriate. This includes separate documentary evidences for ECDIS generic as well as familiarisation training.

MISCELLANEOUS

18. What is meant by an ECDIS anomaly?

An ECDIS anomaly is an unexpected or unintended behaviour of an ECDIS which may affect the use of the equipment or navigational decisions made by the user. Examples include, but are not limited to:

- failure to display a navigational feature correctly
- failure to alarm correctly
- failure to manage a number of alarms correctly

In October 2011, the IHO produced an ECDIS and ENC Data Presentation and Performance Check Dataset for ships to test for the presence of the more serious known anomalies:

- the display of navigation areas recently recognised by IMO such as ESSA (Environmentally Sensitive Sea Area), PSSA (Particularly Sensitive Sea Area) and ASL (Archipelagic Sea Lane)
- the display of lights with complex characteristics
- the display of underwater features and isolated dangers
- detection of objects by "route checking" in voyage planning mode

19. Is there a list of commonly identified ECDIS anomalies?

Yes, a list of commonly identified ECDIS anomalies has been provided to the IMO's Maritime Safety Committee in document MSC 90/10/3. A copy of this document is attached to these FAQs.

Further enquiries on ECDIS can be addressed to:

Manager
Ship Inspections and Registration
Maritime Operations Division
Australian Maritime Safety Authority
GPO Box 2181
CANBERRA ACT 2601

MARITIME SAFETY COMMITTEE
90th session
Agenda item 10

MSC 90/10/3
27 March 2012
Original: ENGLISH

SAFETY OF NAVIGATION

Operating anomalies identified within ECDIS

Submitted by Australia and the United Kingdom

SUMMARY

Executive summary: This document comments on document MSC 90/10/1 by the International Hydrographic Organization and the actions taken with respect to "Operating anomalies identified within ECDIS" since MSC 89

Strategic direction: 5.2

High-level action: 5.2.4

Planned output: 5.2.4.1

Action to be taken: Paragraph 10

Related documents: COMSAR 16/16; MSC 90/10/1, MSC 90/25/13 and MSC 90/25/14

Introduction

1 This document comments on document MSC 90/10/1 (IHO) relating to Operating anomalies identified within ECDIS, and is submitted in accordance with the provisions of paragraph 6.12.5 of the Guidelines on the organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies (MSC-MEPC.1/Circ.4).

2 After discussion, at the eighty-eighth and eighty-ninth sessions of the Maritime Safety Committee, about operating and display anomalies discovered in some ECDIS, the Committee decided to refer the relevant documents to the fifty-seventh session of the Sub-Committee on Safety of Navigation for further detailed consideration and instructed NAV 57 to advise MSC 90 on the way forward. The Committee had also noted that the subject was of "relevance and concern" for the COMSAR and STW Sub-Committees and needed to be considered carefully on an urgent basis.

3 NAV 57 (paragraph 14.41) noted that the United Kingdom had proposed to MSC 88 that work should be done to "systematically establish a mariner-friendly list of anomalies and publish them worldwide".

4 However, further progress has been made at COMSAR 16, and there is now, more information available to form part of the "consolidated" advice that the Sub-Committee on Safety of Navigation noted was to be provided to MSC 90. STW 43 would also consider this.

Background

5 Some unanticipated display and operating anomalies have been discovered with some ECDIS units and, after initial examination, work started with the International Hydrographic Organization (IHO), some maritime Administrations and some non-Governmental Organizations to address these issues.

General progress

6 The IHO held a workshop in Monaco in Spring 2011, and this underpinned the documents to MSC 88 and NAV 57. After NAV 57, and needing to make substantive progress towards MSC 90 but without the assistance of an IMO-sponsored body, the United Kingdom hosted a further workshop in London in September 2011.

7 There were two chief outputs from the workshop. A list of reported anomalies was reviewed and mitigating actions identified to counter them. The second output was a decision that the IHO would design and distribute a Presentation and Performance Check Data Set in the form of two fictitious test ENC cells that could be examined by mariners and reported to the IHO. The outcomes to date have been reported at MSC (MSC 90/10/1).

Specific comments on MSC 90/10/1

8 The sponsors of this document express their gratitude to the IHO and its supporting member Hydrographic Offices for the excellent progress to date, but are concerned that even though the sample of returns to date is statistically significant, the number may demonstrate that only a small proportion of ECDIS/ENC users have received and applied the check data set. Moreover, the checks deliberately concentrated on key software version and anomaly testing issues, and were only able to examine a subset of the anomalies. Accordingly, and in association with the desire at NAV 57 to list and publish the major anomalies that have been identified, this document lists them in the annex and the potential steps that mariners and ship operating companies can take within their ship safety management systems, to mitigate these issues.

9 The actions which, as a result, need to be taken by IHO and IEC are recognized and are being taken forward by those organizations. In particular, IHO Standards S-52, S-58 and S-64 are to be reviewed and revised or clarified as appropriate to help minimize anomalies in new systems. IEC61174 will be reviewed this year to ensure that it fully covers any revisions to relevant IHO standards including S-64. COMSAR 16 has endorsed the use of the Worldwide Navigational Warning Service (WWNWS) to inform mariners of significant ECDIS issues, and several NAVAREAs have repeated NAVAREA 1 317/10 and 048/12. The United Kingdom understands that the IHO has, in addition, written to the relevant Original Equipment Manufacturers (OEMs) to inform them of the results of the Presentation Check Data Set (PCDS) received so far concerning their equipment, and asked them to confirm to the IHO their awareness of those results and to indicate what action they intend taking. The IHO has further asked OEMs to confirm to the IHO what ongoing action they are taking with respect to the software maintenance regime that applies to their customers' ECDIS equipment.

Action requested of the Committee

10 The Committee is requested to consider the information provided and act accordingly.

ANNEX

LIST OF ECDIS APPARENT OPERATING AND DISPLAY ANOMALIES (NOT IN PRIORITY ORDER)

1 Inability to correctly display symbols for recently-approved IMO features such as ASLs or PSSAs (SN.1/Circ.266/Rev.1 refers) – ECDIS equipment that does not have the latest version of the IHO Presentation Library installed will, instead of displaying the correct symbol, either show question marks (?) or nothing at all. In some cases the ECDIS may fail to load an ENC that includes such data. An ECDIS retains its type approval certificate regardless of the version of the Presentation Library installed. Workaround – interrogate any "?" symbol displayed using the pick report or refer to paper charts and/or publications. Included¹.

2 Incorrect display of fouls and obstructions in some ECDIS equipment – some ECDIS models do not show some underwater features in Standard display mode as expected (however they do activate appropriate alarms). These features are only displayed when the "All" or "Other" display mode is used. Also in some cases different symbols are used to depict these features. Workaround – use Mode "All" or "Other". Included¹.

3 On some occasions some stranded/dangerous wrecks and obstructions may not display in any mode; it is believed that this is limited to some ECDIS versions from a single manufacturer. NAVAREA 1 048/12 issued 13 March 2012 has been issued to alert mariners and has been re-broadcast by most NAVAREA coordinators. Workaround – use paper charts. Included¹.

4 An object that falls on a contour line may fail to display in "Standard" Mode in some ECDIS equipment. Workaround – use Mode "All" or "Other". Included¹.

5 Small (point) land areas, especially those depicted only on small scale (usage band 1 and 2) ENCs may not always be clearly displayed and do not always activate alarms in route planning or route monitoring modes in some ECDIS equipment:-

- a) It is possible for small land features to be obscured by other chart detail such as names or contour labels.
- b) Some ECDIS equipment may not conduct route checks on small scale ENCs and may not therefore provide an appropriate warning. Where this is the case the land area may not be detected by the "look-ahead" function during route monitoring.

Workaround – Careful manual inspection of the largest scale ENC available. NAVAREA1 317/10 refers. Included¹.

6 Incorrect display of the coloured arcs of light sectors – Some ECDIS may not display the coloured arcs of complex lights as intended. This is especially prevalent where the sectors straddle 0/360deg (North). Workaround – use pick report function to check light sectors. Included¹.

¹ "Included" means a test for this was incorporated into the IHO Presentation Check Data Set November 2011.

7 Some early models of ECDIS are unable to display correctly time-variable data encoded in ENC's. For example features with Date Start and Date End attributes used for the implementation of new Traffic Routing measures in ENC's may not be depicted correctly; the result being that both old and new instances are displayed simultaneously. Tests for this were not included in IEC61174 Ed1. Workaround – use pick report function to determine Start/End date/time. **Not** included¹.

8 Tidal stream data not available in usable form – some early models of ECDIS only provide a comma-separated list of values which is difficult to interpret and use. Workaround – use Tidal Stream Atlases external to ECDIS. **Not** included¹.

9 Display of anchorage, berth and channel names may not be easily visible to the mariner and the radius of a maximum swinging circle may not be shown. Workaround – use "All" or "Other" display mode and pick report function to obtain swinging circle information; VTS/Port Authority communications will be able to clarify any necessary names. **Not** included¹.

10 360deg landfall lights not always prominent in comparison to shorter range sector lights. Workaround – mariners to be aware – use pick report to verify light characteristic. **Not** included¹.

11 ENC's may include certain shoal soundings, especially reported depths, which have been encoded in such a way that they do not display in "Standard" Mode and might not activate an alarm even where the depth is less than the safety contour setting. Most Hydrographic Offices have reported to the IHO that they have updated the relevant ENC's to ensure that significant depths are displayed in Standard Mode. Workaround – operate in a display Mode where all soundings are shown. **Not** included¹.

12 Areas of foul ground that have no known depth value may be depicted in some ECDIS as isolated dangers and shown in "Standard" mode; this can result in unnecessary screen clutter. Workaround – no workaround for clutter problem, mariners to be aware and use pick report function to determine if the feature is a danger. Included¹.

13 Where ECDIS includes an option to show isolated dangers in waters shoaler than the safety contour value the symbology used may vary between manufacturers. Workaround – mariners to be aware and to use "All" or "Other" Mode when operating in such areas. **Not** included¹.

14 Screen clutter can be a problem when displaying smaller scale ENC's for areas where larger scale coverage is also loaded in ECDIS. This can be more apparent when the user zooms out. This is due to a combination of each manufacturer's ENC loading strategy and the individual ENC producer's encoding policy. Where HO's use SCAMIN (scale minimum) attributes on chart features then this problem is minimized. The intention of the IHO standard is that ECDIS should not display ENC data which has a compilation scale significantly different from the display scale in use. Improvements could be made, in future, by adopting a standardized ENC loading strategy based on a scale range defined within the ENC. Workaround – the situation can be improved through use of the standard display mode during voyage monitoring and appropriate (but not over) use of the zoom function. This technique should be included in the IMO 1-27 Model Course syllabus. **Not** included¹.

15 In some ECDIS equipment the text for some notes in the ENC may be truncated or not displayed at all, and therefore is not available to the mariner. Workaround – no workaround available; mariners should advise ENC service providers where they observe this problem. **Not** included¹.

16 Unnecessary alarms and indications – feedback from mariners shows that ECDIS can produce excessive and distracting alarms. This is due to a combination of the interpretation of the requirements of the ECDIS Performance Standards and the ENC encoding. Some control over the number of alarms and indications is available to the mariner in ECDIS built to the revised Performance Standards (MSC.232(86)) but this is not always recognized. Workaround – the methods available to minimize alarms should be included in the IMO 1-27 Model Course syllabus. **Not** included¹.

