Date: 12/09/2017

Detailed guidance to the PSCOs to assist in examining navigational safety as part of the port State control (PSC) inspection in Annex 1 & Annex 2.

Annex 1

ECDIS

1. A Surveyor can accept an electronic chart display and information system (ECDIS) as meeting the chart carriage requirement of SOLAS ChVR19 as per MSC 282(86).

2. The requirement for ships to comply with the carriage requirements for ECDIS are also outlined in MSC282(86) namely;

    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 survey* 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.

3. Surveyors should also be familiar with MSC.1/Circ 1503 which provides guidance for all aspects of ECDIS carriage and usage.

4. A new Marine Notice 2017/07 - "*Guidance on ECDIS for ships calling at Australian ports*" has been issued which supersedes 11/2012. This can be assessed at the link below but a copy has been provided to the Secretariat:

    https://apps.amsa.gov.au/MOReview/MarineNoticeExternal.html

5. In particular, surveyors should ensure that the use of ECDIS on board is reflected in the procedures contained in the Safety Management System and that those procedures are being followed.

6. If ECDIS is being used purely for training purposes then the unit should be marked as such and the unit should not be included on the "record of equipment".

Updated ECDIS presentation standard from 1 September 2017

The appearance and content of the chart data displayed on an ECDIS will be required to meet IHO presentation Library 4.0, as covered in the standard S-52 from 1 September 2017.

The number one complaint from mariners on ECDIS was the number of alarms generated. The IHO has taken this on board with the latest Presentation Library (version 4.0) which addresses this issue. Also, information such as fairway and anchorage area names now appear on screen, with landmarks, lights and buoys viewable via a 'hover-over' function. This reduces the constant need to find information buried in a pick report. To assist ships to comply, attending PSCO should be asking Masters and watchkeepers if they are aware of the updated standard and presentation library edition, and advising them to contact their DPA if they are unaware. The requirements to upgrade will most likely vary from ship to ship, and ensuring that ships are advised as early as possible will assist this.

https://www.admiralty.co.uk/news/blogs/the-new-s-52-ecdis-standards

After 1 September, as usual with any newly implemented requirement, PSCO will take a pragmatic approach while conducting an inspection.

Update regarding additional certificates (such as ECDIS type specific training) during PSC

Recently the IMO sub-committee meet and produced an outcome in relation to STCW and CoCs pertinent to PSC.

The crux of the outcome is that CoCs are Prima Facie evidence that a person is competent, and thus PSCOs should **not** be asking to sight specific ECDIS training certificates or issuing deficiencies for not having these certificates.

The CoC is evidence of generic training approved by the Flag. Type specific training is not required.

However, the SMS familiarisation training under element 6 of the ISM code covers Officers being appropriately familiarised with their duties. Thus PSCO can (and should) be asking Officers to demonstrate operation of key ECDIS functions, and if need be, asking to see evidence of familiarisation for their duties.

The excerpt from the relevant paper is provided below:

12   No requirement exists for the approved training on ECDIS equipment to be type-specific. The knowledge, understanding and proficiency required to be demonstrated is generalized to ensure seafarers have the necessary skills for basic operation of all types of equipment.

13   In accordance with regulation I/14, companies are responsible for ensuring that seafarers employed on their ships are familiarized with the installed equipment, including ECDIS.

14   It is agreed that seafarers required to have training in the use of ECDIS:

.1   should not be required to provide documentation of training in ECDIS that is specific to the installed equipment; and

.2   are required to be familiarized with the ECDIS equipment installed on board.

Annex 2

Training Sheet 13

ECDIS

The primary function of ECDIS is to contribute to safe navigation and a type approved ECDIS with an appropriate back up arrangement should be accepted as complying with SOLAS V/19 and V/27.

As the IMO moves closer to implementing ECDIS requirements for all ships engaged on international voyages, we have begun to see an increase in the number of fully ECDIS compliant ships visiting Australia as some shipowners take a proactive approach to ECDIS.

While there are many manufactures of ECDIS equipment the IMO have set performance standards for an approved ECDIS system as found in MSC .232.(82) (2009).

This training sheet is to help guide surveyors in understanding the complex and misunderstood ECDIS Systems.

Included in this training sheet are some questions to ask the ships officers including functions to be demonstrated. Asking these questions will not only build the surveyors understanding and knowledge but also determine the level of competency of the officers using these systems on board the ships.

During a PSC Inspection on an ECDIS compliant ship the PSCO should focus on the demonstration of crew competency and familiarization with equipment, as well as evidence the system is incorporated into the ship operating procedures and safety management system.

1. How to determine if the ship is a full ECDIS ship?

By checking Form E of the Cargo Ship Safety Equipment Certificate if it's a full ECDIS ship and is not carrying paper charts the Back Up system will normally say provided. If the backup system is charts it will say nautical charts.

2.1	~~Nautical charts /~~ Electronic chart display and information system (ECDIS) ²⁾	Fitted
2.2	Back up arrangements for ECDIS	Fitted

However because its listed as an ECDIS ship, doesn't always mean it fully complies as we have recently seen. In order for the ECDIS to be compliant it must meet the performance standards as set by the IMO.

In order for the ECDIS to be compliant it must meet the performance standards as set by the IMO in MSC.232 (82).

2. Is ECDIS required?

The requirement for ECDIS carriage is as per SOLAS Chapter V, Regulation 19.2.10

3. Types of Charts used on ECDIS and how to determine which charts the ship has

A fully complaint ECDIS (Paperless) must be using Vector Charts (Also called S-57's in reference to the IHO performance standards publication S-57).

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

Vector charts are intelligent, in that systems using them can be programmed to give warning of impending danger in relation to the ship's position and movement. (See question 6).

It's best to think of vector charts as a single chart for the entire world that are arranged in layers with each layer being a different scale.

The other type of chart is called a Raster Chart; these charts look more like the traditional paper chart and in fact are just a scanned image of a paper chart. These are single charts and like traditional charts must be put in a portfolio and attached to a passage plan within the ECDIS. A ship using Raster Charts is not an ECDIS ship but a RCDS (Raster Chart Display System) ship and must carry paper charts onboard as per Appendix 7 of MSC 232. (82).
For More information on the limitations of using a Raster Charts with an ECDIS System refer to SN.1/Circ.207.

So how do you know what type of charts the ship is using?

> Ask the operator to Query a chart object i.e. a buoy, lighthouse or restricted area, if the charts are vector charts then further information on the selected object should appear, if no further information appears then it's likely a Raster Chart and the ship is required to have paper charts on board as per Appendix 7 of MSC 232. (82).

4. How do we check Chart Corrections on an ECDIS?

Checking charts corrections is quite simple as most systems allow information to be updated via a CD or email supplied by a chart agent on a monthly basis or quarterly basis, ask the ship to demonstrate when the last update was done. Alternatively all systems have a Chart Correction or Update log, whereby the user can see the corrections applied and date applied. MSC 232. (82)

The important role that T&P Notice to Mariners play in the paper chart world in providing the mariner with navigationally significant information is not yet fully mirrored in the digital world not all Hydrographical Offices have include T&P information in their ENCs.

> Ask the Operator to show you the Update log or Chart log on the ECDIS.

5. Safety Checking of a Voyage Plan.

One of the great benefits of a fully understood and compliant ECDIS is that once a route is created by the user, The ECDIS can perform a safety check of the voyage plan to indicate to the user if the route crosses its own ship safety depth or any other dangers along the track.

> Ask the Operator to load the route used to sail to the port of inspection and ask him/her to perform the safety checking. If Alarms appear dig deeper and try to understand why these dangers still exist and why the route was not amended to remove these risks. Some alarms may be erroneous depending upon user settings (such as safety depth).

6. What is meant by the terms safety contour, safety depth and look ahead time or distance?

On ECDIS the user needs to select a safety contour. The safety contour provides a visible boundary between "safe" and "unsafe" water with respect to depth for that ship, and is highlighted on the display to enable easy identification.

The safety contour value is selected by the navigator to reflect the ship's draught, adjusted for the required under keel clearance and for the height of tide and represents the minimum safe depth for the ship.

Areas that are deeper than the safety contour will have a grey or white background in the normal daytime viewing mode. Areas that are shallower will show in blue.

The user also needs to set a safety depth. This affects the indication of spot soundings when

selected to be displayed on ECDIS. They will appear as bold numerals when the spot sounding is less than the safety depth, highlighting the potentially unsafe areas. The safety depth is simply put, the depth at which you will hear the hull go crunch.

There is an IMO requirement that an indication be given to the mariner if, continuing on its present course and speed, over a user specified look-ahead time or distance will pass closer than a user-specified distance from a danger (e.g. obstruction, wreck, rock) that is shallower than the mariner's safety contour or an aid to navigation.

> Ask the user to show you the Safety depth, Safety Contour and Look ahead distance or time?

Is the user specified safety contour appropriate?
> A user specified Safety Contour of 0 is not appropriate neither would be 12 meters for a ship with a deep draft of 12m.

7. What alarms are required for an ECDIS system and how do I check they are activated?

There are many alarms that can be activated on an ECDIS, so many in fact users often find them annoying and tend to turn them off or put them in ignore mode, and this has been attributed to numerous near misses and accidents in the past few years.

On most systems the user can define if they would like to receive an indication (Visual alarm on screen), an audible alarm or to simple ignore certain alarms. Below is a list alarms that the ECDIS must provide:

- Electronic Chart and the positioning system are not on same geodetic datum
- When the ship reaches a specified time or distance as set by the mariner in advance of a critical point on the route
- When the position, heading or speed source is lost.
- When the ship if continuing on its present course or speed over a specified time or distance set by the mariner (Look ahead time or Distance) will pass closer than a user specified distance from a danger that is shallower than the mariners safety contour or an aide to navigation.
- Cross Track error greater than the user specified cross track error.
- Ship will cross the boundary of a prohibited area or a geographical area for which special conditions exist.
- Larger Scale Chart Exist.
- Crossing Safety Contour (Alarm only)

As mentioned in Q.6 the look ahead time and distance needs to be properly adjusted in order for these alarms to function as intended. Often the user will ignore the alarm or place it in Auto Acknowledge mode because the user defined criteria such as Cross Track Error limit are incorrectly set, causing many alarms to the OOW.

8. ECDIS back up requirements?

Approved Nautical Chart configurations

- 1 x Paper Chart folio.
- 2 x ECDIS.
- 1 x ECDIS plus 1 x Paper Chart folio.

When 2 ECDIS units are carried they must both work completely separately. The second ECDIS must be connected to an independent power supply.

In areas for which Electronic Navigation Charts are not available Raster Navigation Charts may be provided. This must be backed up with a paper chart folio sufficient for safe navigation.

Paper charts, if used as a back up, should be appropriate, up-to-date and have the route fully planned.

In areas where neither ENC's nor RNC's are available a full folio of paper charts shall be carried for that area.
The backup ECDIS should enable a safe take over in order to ensure that a ECDIS failure does not result in a critical situation and a means to provide for safe navigation for the remaining part of the voyage in case of ECDIS failure.

9. How can I check records of Navigational Activity as per SOLAS V/R28?
All IMO approved ECDIS equipment should store and be able to reproduce and reconstruct the voyage and the charts used for the previous 12 hours as a minimum. The data that must be recorded at one minute intervals include:

- Own Ships Position, time, heading and speed.
- As well as Navigation Chart Source, edition, date and update history
- In addition to this an ECDIS must be able to record the complete route for the entire voyage with time intervals not exceeding 4 hours.

Again ask the Operator to show you the Navigation records for the completed voyage in the ECDIS system.

10. Do officers require STCW ECDIS Training Certificates on ships equipped with ECDIS?
No. Bridge officers are required to undertake ECDIS training in order to satisfy requirements of the IMO's STCW 95 convention and the ISM Code.

The STCW code requires the OOW to possess a "thorough knowledge of and ability to use navigational charts and publications" and also "Skills and ability to prepare for and conduct a passage, including interpretation and applying information from charts must be evident".

Masters and Chief Mates have additional competencies required under STCW regarding ECDIS, including ECDIS playback functionality for passage review, route planning and review of system functions.

While it can be argued the STCW code is written around paper charts, it is clearly written in SOLAS that ECDIS is considered to be included under the terms charts.

Therefore all bridge officers should have general ECDIS knowledge.

In addition equipment specific training for ECDIS is also required for each ship according to the ISM Code as stated "The Company should establish procedures that personnel are given proper familiarization with their duties and equipment.

January 1st 2012 the Manilla amendments to the STCW code will come into force that will make ECDIS training mandatory. It has been decided by the IMO Sub-committee that the Certificate of Competency is prima facie evidence that an Officer is competency and PSC should not be asking to sight specific ECDIS training Certificates, or issuing deficiencies for not having these certificates.

In these amendments ECDIS will be required training for all deck officers on all ships that

are equipped with ECDIS. ECDIS will be treated the same as ARPA or the GMDSS training, where it is an STCW restriction from serving on equipped ships if you don't have these training certifications.

Ask to see evidence of ECDIS familiarisation being carried out on board. This would be in a form as described in the Safety Management System.

11. ECDIS and ISM?

If the ship intends to operate with ECDIS only, then this may be listed as part of the critical equipment as described by ISM Code 10.3 and regular testing of standby arrangements established.

The Company has a responsibility to ensure all personnel are given proper familiarisation with their duties and equipment. Therefore, if a ship is equipped with a compliant ECDIS, then they must ensure that the operator is properly familiarized with the ECDIS before taking a watch.

The Company will additionally need to provide amendments to their Safety Management System in way of additional procedures and instructions reflecting the changes applicable to the implementation of ECDIS and the safety of navigation within the Company.

Check list of critical equipment in SMS shows ECDIS?

Ask the User to demonstrate regular testing of ECDIS back up arrangements? (Often switching off the breaker and observing the UPS).

12. Displays and Colours of ECDIS Screens?

A great benefit or possible limitation the ECDIS has over traditional paper charts is that the user is able to customize the chart to his or her liking.

The user is able to remove all chart objects (except for base display items) and add the chart objects they desire from the three IMO required displays.

While it may help to remove unnecessary information, it can often be a limitation of ECDIS if important navigational information is left turned off by the user. Especially during watch handovers when important information regarding ECDIS features are not always passed to the relieving officer (A good SMS will address this issue). The three levels of display available are:

- Base Display – the level of ENC information that cannot be turned off under any circumstances. It is the basic information required in all geographic areas, but is not intended to be sufficient for safe navigation.
- Standard Display – The display of layers with levels of information to provide a starting point which be altered by the user to create the desired custom display.
- All Other Information – All information on every layer of the ENC.

Some Common ECDIS Mistakes:

- Is the Positioning system (GPS) on the Same Geodetic datum as the ECDIS (WGS84)? Some Raster charts are not WGS 84 datum.
- Check the accuracy of the ship's primary positioning sensors (Gps Antenna) by zooming in on the ships position and observing the black dots (position history) in relation to the ship's layout. (Passenger ship Fwd, Cargo ship Aft). If these dots do not correspond to the ships antenna position GPS offsets may be incorrectly configured.
- Dead Reckoning Mode chosen as the secondary position source
- Secondary position source not activated

- Alarms not activated
- Display set only to basic layer – wrecks and shoals not show
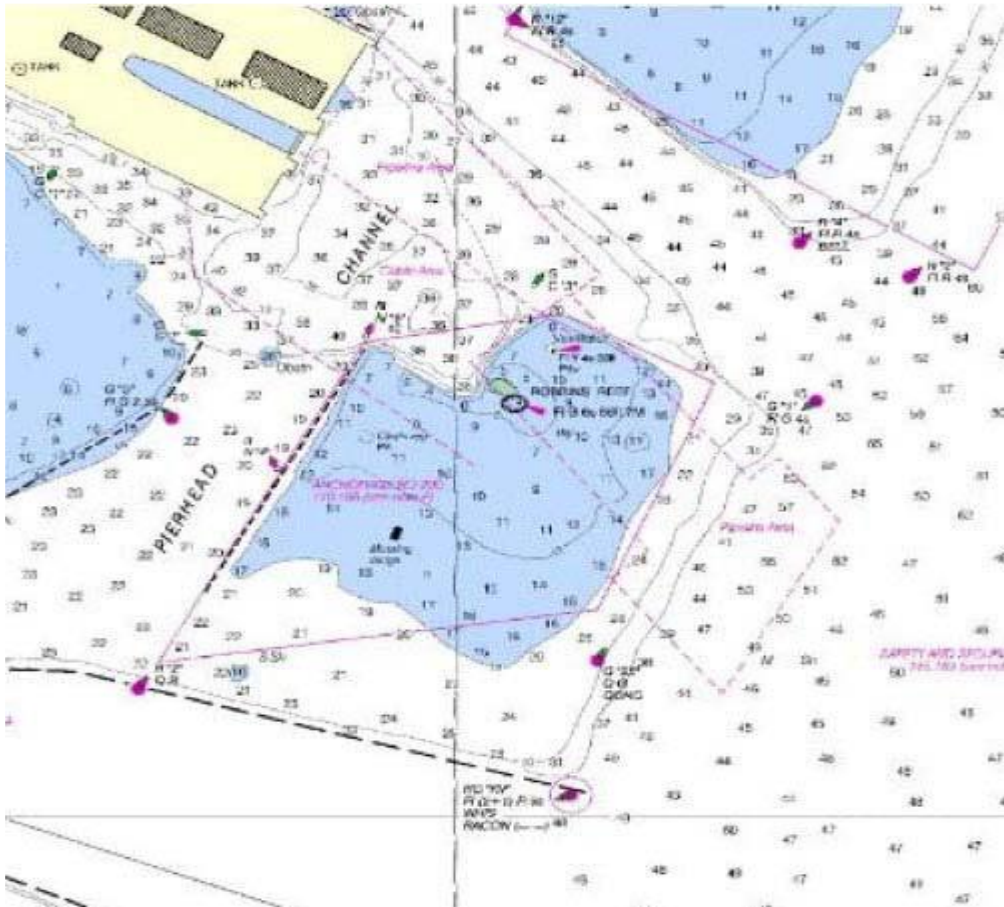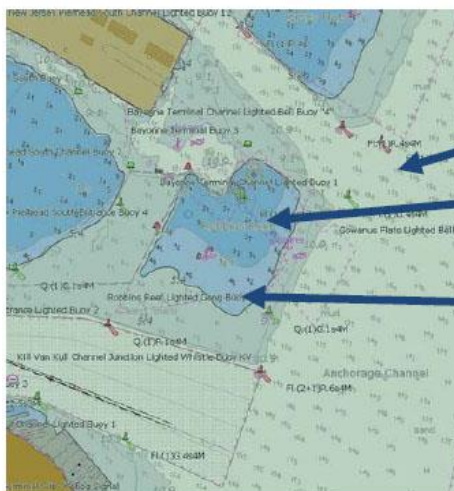
Photo 1-RASTER CHART

Photo 2-VECTOR CHART (Note difference in colours of depth contours)

White and Grey Areas are deeper than the user defined safety contour

Dark Blue -Shallow water contours are water depths less the user defined safety contour.

Light Blue-Deep Contour are water depths that are deeper than the Safety Contour but require special care by the user.

You can argue that the crewmember should have had sufficient proficiency in ECDIS but what saves lives isn't what people should know, it's what they do know.