ECDIS
Training Pack

NorthStandard

Contents

Introduction

This ECDIS training pack has been created to supplement NorthStandard's new platform: **ETA - ECDIS Training Assessment**.

It is designed to help users gain a better understanding of the use of ECDIS and improve knowledge and use of the system overall. It is also intended to supplement the 'type-specific' ECDIS training that is received on board and any other ECDIS familiarisation requirements introduced by your shipping company.

This pack should be used whilst onboard or in a simulator, in conjunction with the ECDIS manufacturer's user manual and your company's navigational procedures, which are usually found in the vessel's safety management system (SMS).

Divided into ten sections, key information is supplemented by visual references and a short exercise per section, which tasks you to apply your knowledge using the ECDIS onboard your vessel.

The exercises can be carried out individually, as a group or the full bridge team. The benefit of conducting group training is that knowledge and practical experience with ECDIS can be shared between members of the bridge team as we all have different areas of strengths and weaknesses.

To make the most of the training material it is recommend not to conduct more than two sections and exercises in one training session.

We encourage you to take notes throughout the training session. There is a space at the end of each section to write down any thoughts or reminders. This will allow you to reflect on your training and feed back to your company training team, such as if you need to ask questions if there is something you still don't understand.

What are ENCs and how do we get to use them on our ECDIS?

Electronic Navigation Charts, (ENCs), are made up of vector data rather than being scanned versions of paper charts.

The database holds a lot of information which is presented in layers. This means that the ECDIS user can choose to display various levels of detail depending on their requirements at a particular time. All the information in the database is used by the ECDIS for display generation of an ENC. It is equivalent to an up-to-date paper chart, and when an ENC is loaded into the ECDIS system it is called a *System Electronic Navigational Chart (SENC).*

ENCs use 'cells' to divide up geographic areas. In order for the vessel to access a cell, a permit has to be purchased from the ENC supplier. Areas where the permits are not held will be highlighted to the user.
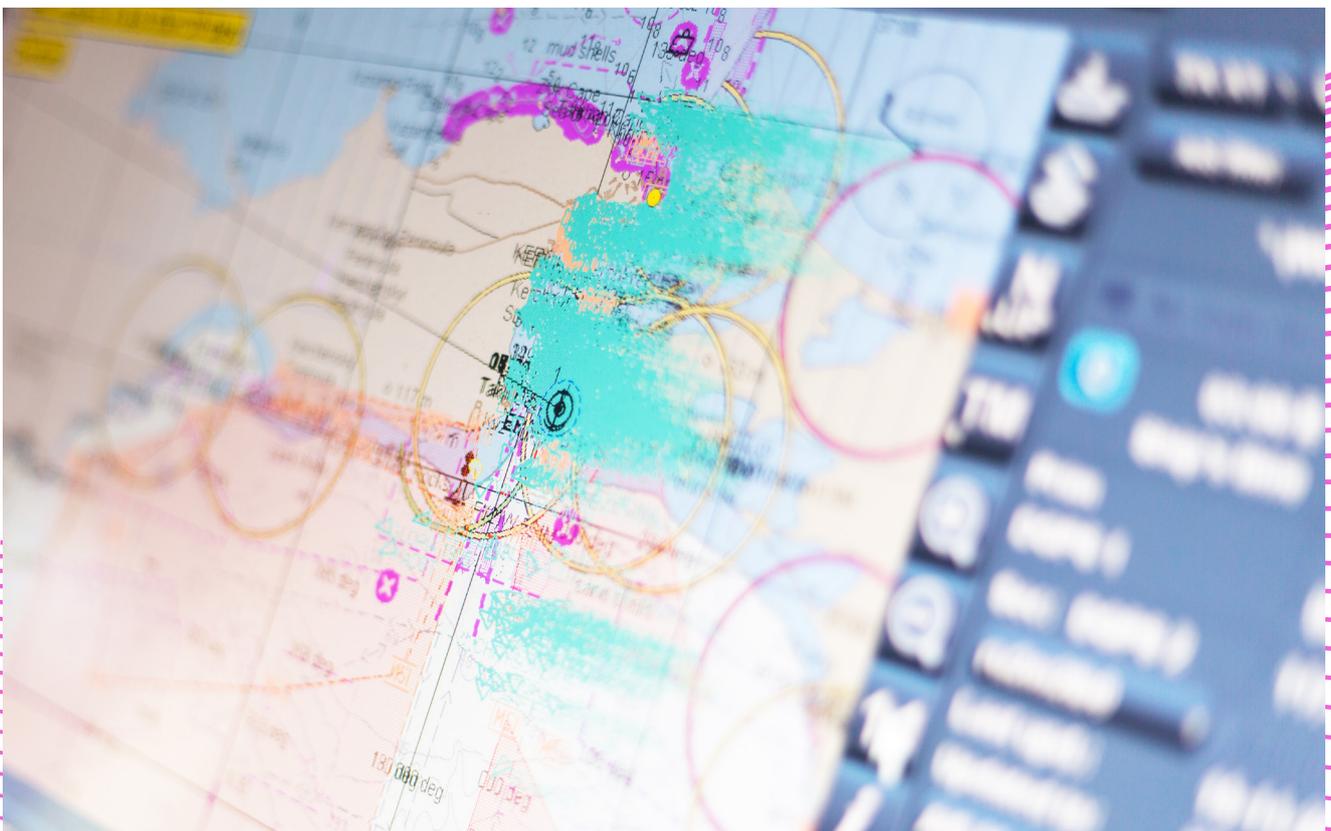
01

Display modes

In this section we will look at the various display modes that the OOW can use, what they show and when they should be used.

The information layers are grouped into three display modes available to the ECDIS user which are:

1. **Base display** – This is the minimum information which the system will display at all times. This level of information is not considered to be sufficient for safe navigation.

2. **Standard display** – This is the display mode that the ECDIS will use when first turned on. This mode incorporates the 'base' display with additional information, which includes drying heights and prohibited areas. This is considered the minimum information which must be displayed at all times when in use.

   This mode will not show all the seabed features, such as submarine cables and pipelines. It is the starting point at which the user can add additional information as required by current circumstances.

3. **All display** – This display mode presents all of the information available on the ENC. To prevent the display becoming cluttered, ECDIS systems will permit the user to either add features to the 'standard' display or remove them from the 'all' display. This will enable the user to create a **'custom' display**.

Features of these display modes are listed in the table below.

Base display	Standard display	All display
• Coastline (high water) • Scale, range and north arrow • Display mode • Units of depth and height • Own Ship's safety contour • Isolated underwater dangers of depths less than the safety contour which lie within the safe waters defined by the safety contour • Isolated dangers which lie within the safe water defined by the safety contour, such as fixed structures, overhead wires, etc.	**All 'Base' display features, plus:** • Drying line • Traffic routeing systems • Ferry routes • Fixed and floating aids to navigation • Boundaries of fairways, channels, etc. • Visual and radar conspicuous features • Prohibited and restricted areas • Chart scale boundaries • Indication of cautionary notes • Archipelagic sea lanes	**All 'Standard' display features, plus remaining features such as:** • Spot soundings • Contours and labels • Submarine cables and pipelines • Details of all isolated dangers • Details of aids to navigation • Contents of cautionary notes • ENC edition dates and update number • Geodetic datum • Magnetic variation • Place names and other labels • Graticules • Indications of ENC Quality

Source: UKHO Publication NP231

Important information may not be displayed in the 'standard' display mode, so it is essential that the ECDIS display settings are confirmed prior to taking over a navigational watch.

To reduce the risk of the vessel accidently anchoring over a submarine cable or pipeline, an action to ensure this feature is enabled can be added to the vessel's anchoring checklist.
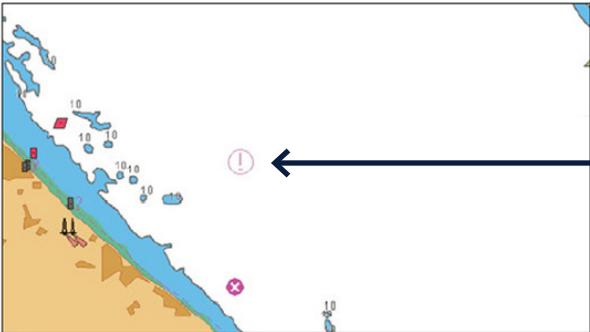
Cables and pipelines not visible in 'standard' display mode

Caution area symbol
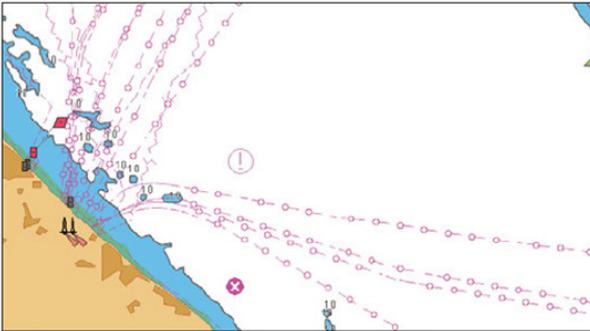
Cables and pipelines now visible in 'custom' display mode

Source: UKHO Publication NP231

Exercise – Display Modes
Now it's your turn!

- On your vessel's ECDIS, select the 'standard' display then scroll to an area with a complex Traffic Separation Scheme (TSS), such as the Malacca Straits, approaches to Shanghai, Gulf of Suez or English Channel.

- If you were navigating in that TSS, do you think the level of information is sufficient to allow you to safely navigate the vessel?

- Now activate the 'All' or 'custom' display and toggle through the additional features.

- Think about or discuss what additional information is available and how it will assist you and the bridge team assess the potential hazards during the transit. Consider:

  - The contents of any cautionary notes.

  - The presence of submarine cables and pipelines – what if the vessel had to anchor in an emergency outside the TSS?

Add your notes here

02

ENC Display Scales

In this section we will focus on the importance of ENC scale and why it is important to use it correctly, particularly when passage planning, as well as different scale related features such as SCAMIN.

Compilation scale

Just like paper charts, ENC cells are created with an intended scale to be used for navigation. This is called the *compilation scale*. There are 6 usage bands used on ENCs.

A key difference between an ENC and a paper chart, is that the scale on a paper chart is fixed while the scale on an ENC changes as the user zooms in or out.

This feature can introduce potential issues, because zooming in or out too much will change the scale too far from the intended display that the ENC was created for.

Usage Bands		Scale
1	Overview	1 : 3,000,000
		1 : 1,500,000
2	General	1 : 700,000
		1 : 350,000
3	Coastal	1 : 180,000
		1 : 90,000
4	Approach	1 : 45,000
		1 : 22,000
5	Harbour	1 : 12,000
		1 : 8,000
		1 : 4,000
6	Berthing	>1 : 4,000

Source: UKHO publication NP231

Zooming in to too large a scale introduces the risk of any positional errors that may exist on the ENC data being magnified to a point where the data becomes unsafe for use.

Zooming out to too small a scale may cause the display to become cluttered and result in important navigational features becoming obscured from view.

Scale too small
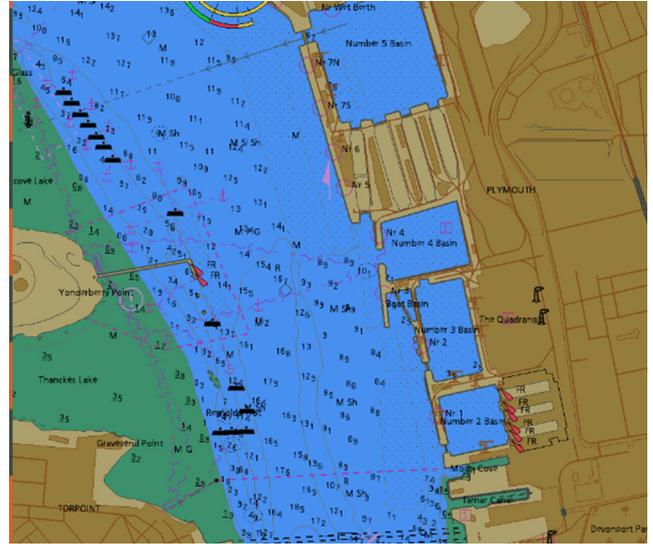
Scale too large

SCAMIN

SCAMIN or *scale minimum* is a function of the ENC that ENC manufacturers use to hide data at certain viewing scales to reduce clutter on the screen.

For example, a minor light with a SCAMIN of 1:50,000 would not be displayed at a scale of 1:75,000. Therefore, it is essential this feature is turned off during the planning stage to enable the user to see all the required data.

SCAMIN on
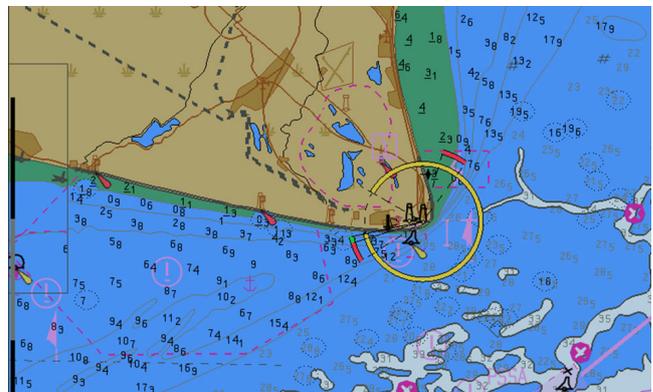
SCAMIN off

Overscale

The ability to zoom in can potentially result in a much larger scale being used than the compilation scale. Over zooming can be dangerous as it implies that the data is more accurate and could be used for a purpose that it was not intended for. Over zooming can also result in navigation hazards such as isolated dangers appearing to be further away than they actually are. Examples of this are presented below.

The following example is courtesy of the International Hydrographic Office - **Information on ENC Generalization, Over-Scaling and Safety Checking Functions in ECDIS**.

Over-scale indication and over-scale pattern on ECDIS.
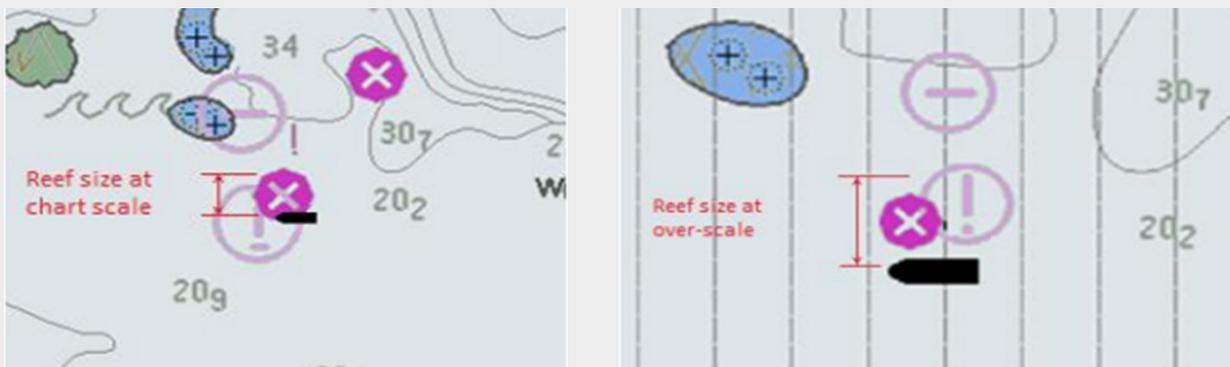
In the image on the left, shown at maximum intended viewing scale, a Mariner can immediately see that passing close to the charted isolated danger would be unwise. In contrast, in the image on the right, shown over-scaled, passing the same distance from the same isolated danger appears safe. Unfortunately, as the symbol has not been enlarged in proportion to the display scale, it no longer fully covers the reef, resulting in a hazardous navigation situation.

*Source: AHO via **The International Hydrographic Office**.*

To minimise the risks caused by an ENC being viewed beyond the maximum intended viewing scale, the system will provide the user with a warning message and an overscale pattern (the jail-bar lines) as shown in the example on the next page.

Over-scale indication

Over-scale display pattern (vertical lines)
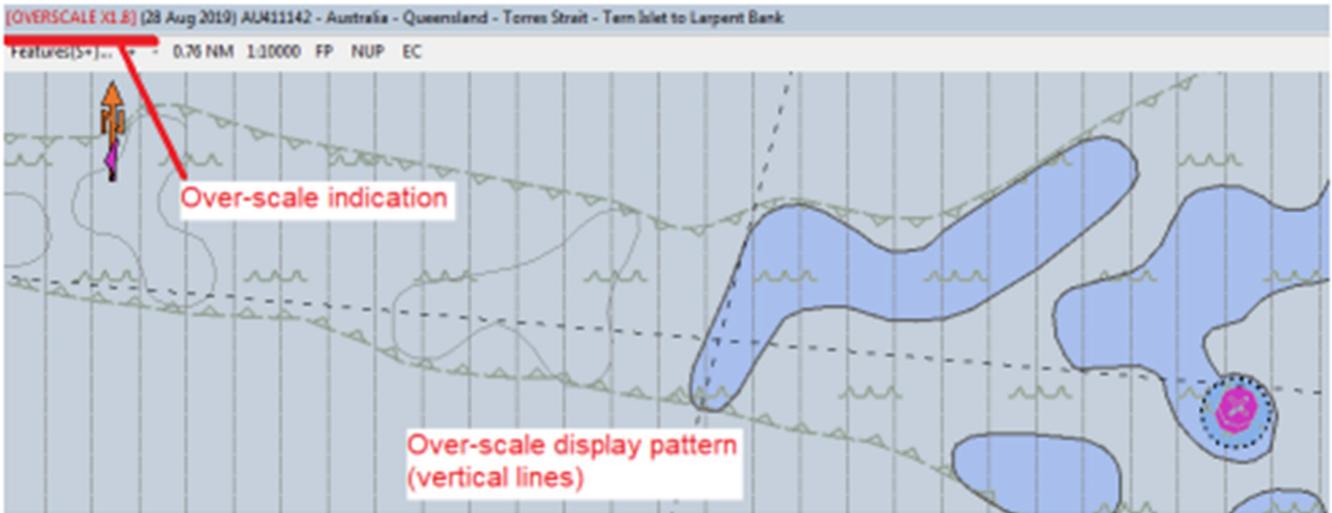
It is generally considered unsafe to zoom into a magnification of more than twice the complication scale.

The overscale pattern will also be displayed when two ENCs with different compilation scales are being displayed. This is because all chart data on the display must be shown at the same scale. An example of this is when a vessel is departing port limits and the next ENC is a much smaller scale, as shown below.

Overview ENC at 1:750,000   General ENC at 1:187,500

Display scale = 1:250,000   Coastal ENC at 1:150,000
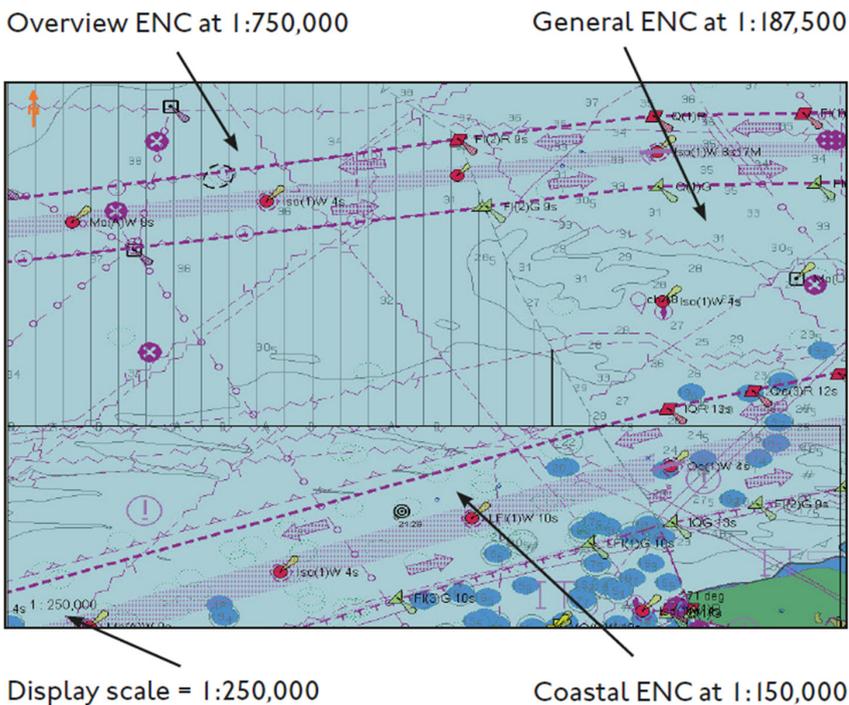
Source: Admiralty publication NP231

Exercise – Display Modes

Once again, it is your turn to try this
exercise on your ECDIS.

- Select an area of coastline with many navigational features and information. Note the compilation scale (ideally either 1:180,000 or 1:90,000).

- Firstly, zoom in to at least x2 scales larger than the compilation scale. Then think about or discuss the risks that navigating using this scale has, such as:

    - Position errors due to accuracy of the survey data used to compile the ENC.

    - Point objects such as isolated danger marks remain the same size as the scale is increased. This can give a false sense of sea room and safety.

- Note the presence of the overscale patten (jail-bar lines) which should indicate that the ENC is being used beyond the maximum intended magnification. If this is not currently displayed, zoom in a further scale.

- Now, zoom out to at least two scales past the compilation scale. Think about or discuss the risk of navigating using this scale, such as:

    - The screen becoming overly cluttered and key navigational information being missed.

- While the screen is zoomed out, activate the *SCAMIN* function. Note the difference in the information being displayed. Think about or discuss:

    - Why this feature could be appropriate for use during route monitoring but is not suitable at the route planning stage.

Add your notes here

03

Category Zone of Confidence

In this section we highlight the importance of understanding the accuracy of the ENC data. This accuracy can affect the choices the user must make when planning or monitoring the passage.

The *Category Zone of Confidence* or *CATZOC* is used to indicate the accuracy of the data presented for an assigned area on an ENC.

When assigning a CATZOC to an area, the ENC producer will choose the minimum value where all three criteria (positional accuracy, depth accuracy and seafloor coverage) are met. However, this may mean that in some cases specific accuracy ratings are understated.

Six stars indicates the highest level of data quality (i.e., most accurate), which is classed as A1.

Two stars indicates the lowest level of data quality, which is classed as D.

Areas that have not been assessed for CATZOC are indicated by the symbol U for unassessed areas:

6 stars	A1	All significant seafloor features detected; very high accuracy survey
5 stars	A2	All significant seafloor features detected; high accuracy survey
4 stars	B	Uncharted features dangerous to navigation are not expected but may exist; medium accuracy survey
3 stars	C	Depth anomalies may be expected; low accuracy survey or passage surroundings
2 stars	D	Large depth anomalies may be expected; poor quality data
U		Quality of bathymetry yet to be assessed

Whilst planning, if you find a CATZOC symbol indicating low confidence in the data, you should consult your SMS to check your company requirements.

Then, alongside the Master you should conduct a risk assessment to assess what adequate safety margins are required for the situation or find a viable alternative route where possible.

Exercise – CATZOC
Your turn!

During the passage planning stage, the planned route will take the vessel through areas with the following CATZOC values:

1.   2.   3.

Referencing your company's procedures, establish what additional precautions are to be applied when navigating in these three areas when the vessel is loaded condition. Assume the vessel will be navigating in open waters.

After consulting the company's procedures conduct a risk assessment and identify adequate safety margins to implement to navigate in these areas or if an alternative route is necessary.

Add your notes here

04

Symbols

Chart symbols are something we learn from an early stage in our career. However with ECDIS, symbols are represented in different ways. In this section we will learn more about the symbols you may find on an ENC and the different ways they can be displayed.

Isolated danger

The *'Isolated Danger'* symbol is displayed in ECDIS using a conspicuous magenta octagon symbol:

This is a generic symbol and represents obstructions, rocks or wrecks with a depth less than or equal to the mariner-defined safety contour, and which lie within the safe waters defined by that safety contour. Features that are hazardous to navigation and do not have a sounding value will be assessed by the ECDIS and may be displayed with the isolated danger symbol.

Buoyage

An ECDIS enables the user to view chart symbols as either traditional (as used on paper charts) or simplified (designed for optimal display on an ECDIS screen). The different options mainly relate to navigational buoys and beacons.

Examples shown - Cardinal marks north/east/south/west

Simplified

All simplified symbols are positioned at the centre of the feature they are marking, while traditional symbols are positioned using the base of the symbol.

The following tables can be referred to for an explanation of ENC symbols and relevant additional information.
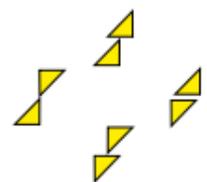
Traditional

ENC Symbol	Explanation		Additional Information	5011 Ref
⊗	Generic isolated danger symbol - with less depth than user-selected safety contour or where the depth is unknown		Wreck, rock or obstruction	K
3_2	Sounding of low accuracy		Equates to sounding of doubtful depth	12 114
	6 stars	**A1**	All significant seafloor features detected; very high accuracy survey	
	5 stars	**A2**	All significant seafloor features detected; high accuracy survey	
	4 stars	**B**	Uncharted features dangerous to navigation are not expected but may exist; medium accuracy survey	
	3 stars	**C**	Depth anomalies may be expected; low accuracy survey or passage surroundings	
	2 stars	**D**	Large depth anomalies may be expected; poor quality data	
	U		Quality of bathymetry yet to be assessed	
	Caution area where a specific caution note applies		Refer to cursor enquiry to access additional information Refer to ECDIS Chart 1 for more examples	N27
	Dredged area deeper than safety contour Darker blue indicates water shoaler than safety contour		Refer to cursor enquiry for more information	120
	Vertical lines indicate areas of charted data at significantly smaller scale than main display		Zoom out until vertical lines disappear to view at scale appropriate to data	
—A— —B— —A— —B—	Indicates boundary between IALA A and B buoyage systems		See NP735	
	Isolated query indicates insufficient information to symbolise the feature Query associated with symbol indicates absence of a mandatory attribute, such as beacon shape, direction or orientation		Query may appear alone at a point, on a line or in a defined area. Further information may be obtained from cursor enquiry of the query	Q80 H40-43 M27.2
ENC DATA NON-ENC DATA	Limit between area of unofficial vector data and official ENC data, marked by orange pecked line - pecks angled towards unofficial vector data		May be shown the other way around on older ECDIS. Within areas of non-ENC data, an alternative, official chart must be used for navigation	
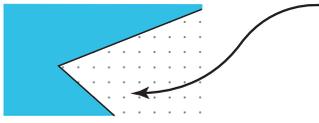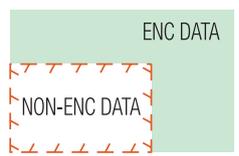
Source: Admiralty – Quick Guide to ENC Symbols.

ENC Symbol	Explanation	Additional Information	5011 Ref
	Indicates that an additional information note or picture file is available	The information, note or graphic can be found using cursor enquiry	
	Non-tidal current direction		H42
	Spring tide - Ebb Flood		H41 H40
	Light vessel/lightfloat		P6 Q30
	Daymarks		Q82–I26
	New Object - Point New Object - Line New Object - Area	New type of feature not yet known to ECDIS - further information available by cursor enquiry	

Symbol setting on ECDIS		For details of the IALA Maritime Buoyage System refer to NP 735		
Simplified	Traditional	Explanation	Additional Information	5011 Ref
		Lateral beacons - red/green	IALA applicable system	
		Lateral conical buoys - red/green, according to applicable IALA system	IALA applicable system	Q130.1
		Lateral can buoys - red/green	IALA applicable system	Q130.1
		Cardinal marks north/east/south/west (Cardinal mark north shown for Traditional)		Q130.3
		Isolated danger marks		Q130.4
		Safe water buoy		Q130.5
		Special marks	Shape/topmarks are optional - colour yellow	Q130.6
		Special purpose buoys, for example; TSS lane markers	Shape/topmarks are optional - colour yellow	Q130.6
		Buoy - mooring		Q40

Source: Admiralty – Quick Guide to ENC Symbols.

Exercise – Symbols
Your turn again!

- On your vessel's ECDIS select a port with a large amount of buoyage.

- Consult the ECDIS user manual (if required) and switch the setting from 'simplified' to 'traditional' (or vice versa).

- Note the difference in how various types of buoys are displayed. Discuss with the Bridge Team which type you find easier to identify and prefer to use, and why. What does your company SMS say?

Add your notes here

05

Depths and Contours

One of the main features of ECDIS is the fact the user can be alerted to dangerous navigational situations such as shallow water. These functions are important, and in this section we learn about depths and contours; what they are and how to use them correctly.

ECDIS enables you to quickly determine where the vessel can safely be navigated by colour coding different depth areas. This is achieved by the user entering appropriate values for a number of settings, including:

Safety contour

A safety contour should be considered the most important safety setting in ECDIS. This is because it will trigger an alarm if the vessel is heading into that area within a mariner-defined time or distance.

The safety contour marks the boundary between safe-water and shallow water with an extra wide isoline. If it is not set, the ECDIS default value is 30m.

The safety contour value entered in ECDIS must take into account the vessel's draught CATZOC and the required safety margin.

Shallow contour

The shallow contour is usually set to the vessel's deepest draught. Any water shallower than the mariner-defined shallow contour will be contained within a blue contour.

The ECDIS will round up the highest closest contour. For example, if a vessel's deepest draught is 9m, the shallow contour will be set to 10m.

Safety depth

The safety depth is set by the mariner and is used by the ECDIS to display spot soundings either in grey for deeper depths or black for shallower depths. If not set by the user, the default value is 30m.

Sometimes depths above the safety contour may be unsafe, such as an isolated shallow patch. This would be shown by the safety depth. Also, remember that the safety contour may set to the nearest available contour, for example if you set it to 9m it may actually go to the 10m contour. The safety depth will therefore highlight these areas.
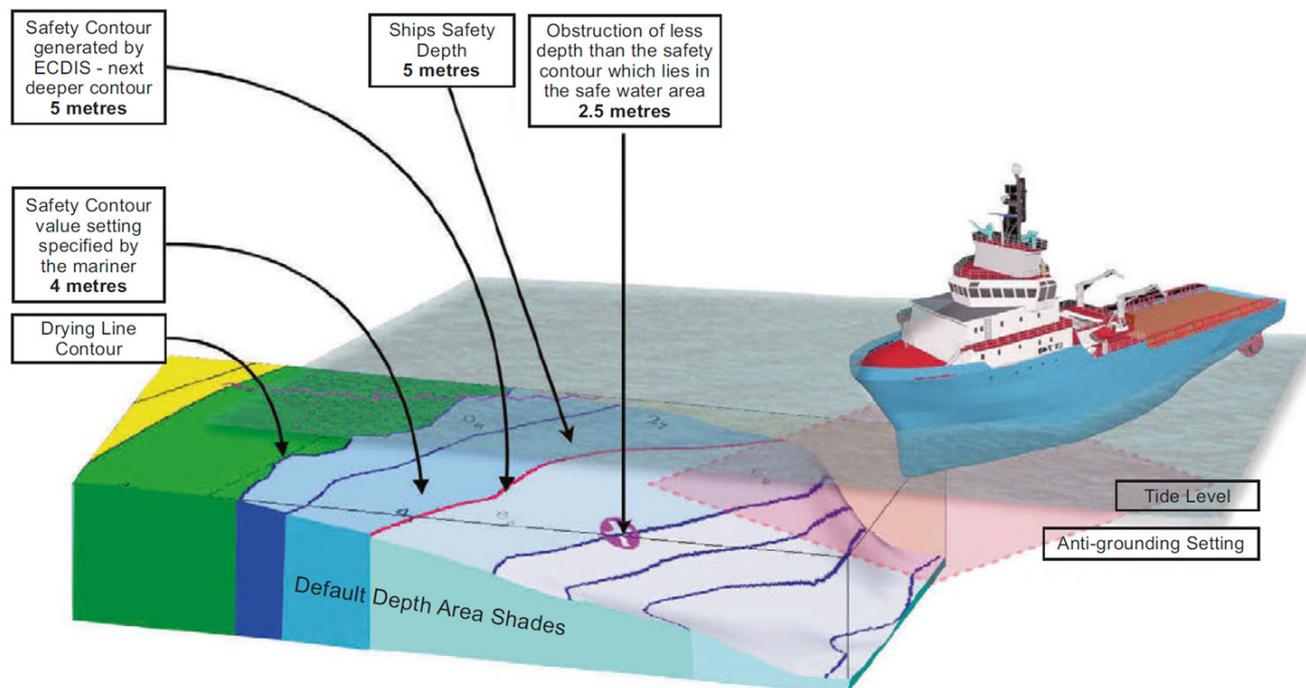
Source: Admiralty publication NP231

Look at the examples of the same ENC, below. You will see here one screen has the safety depth set at 10m and the other is showing the safety depth at the default 30m. Note the difference in the spot soundings:
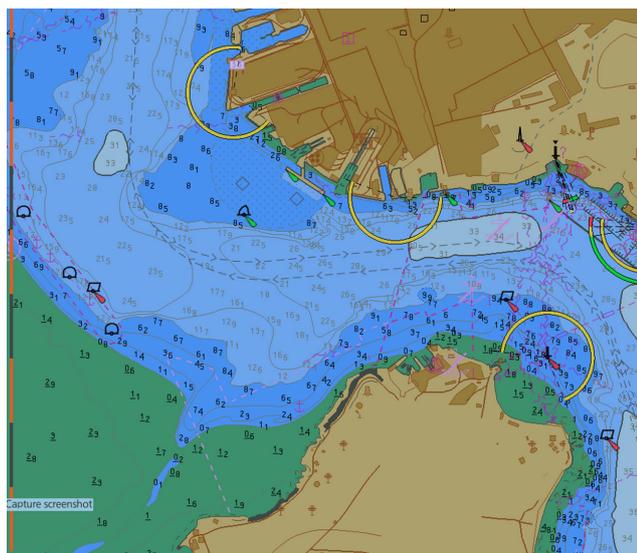
10m safety depth set
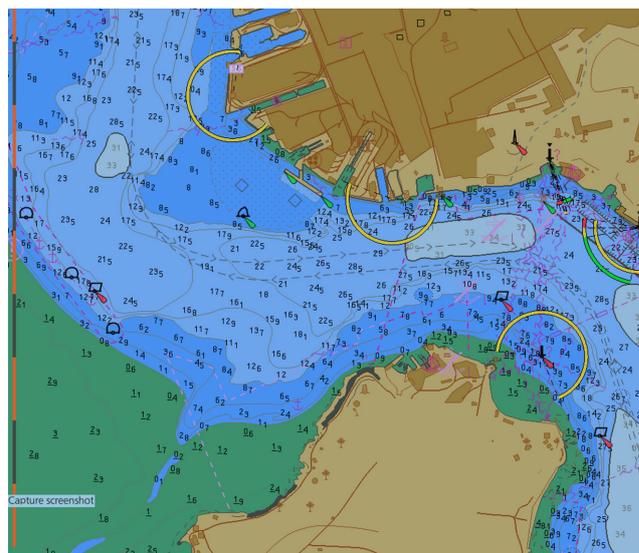
30m safety depth set

Two and four depth shades

The mariner is given the option of a simple two-colour or more elaborate four-colour shading. To support the four-colour options, all ECDIS types allow the user to set their own shallow and deep water contours in addition to the safety contour.

Two depth shades

This is the default setting and will only show two depth shades in addition to the inter-tidal area which is exposed at low water:

· Shallow / unsafe waters – Between 0 (zero) metres and the safety contour

· Deep / safe waters – Deeper than the safety contour
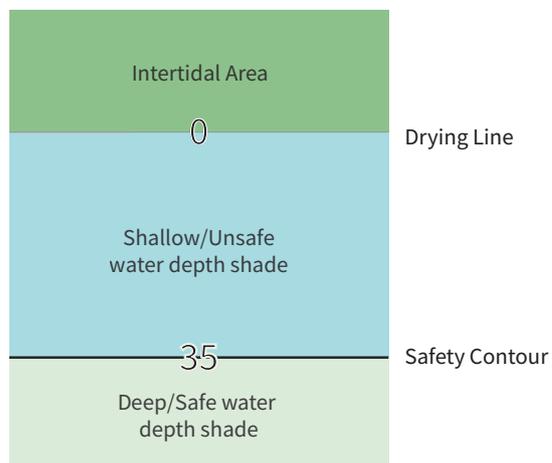
Four depth shades

If the two shades option is turned off, the system will switch to displaying four shades using values that are set for the shallow and deep contour.

The use of four depth shades reduces the contrast difference between adjacent depth areas. This may make it more difficult to distinguish between safe and unsafe waters under certain lighting conditions, particularly at night where its use is not recommended.

Intertidal Area	
0	Drying Line
Very shallow water depth shade	
	Shallow Water Contour
Medium shallow water depth shade	
10	Safety Contour
Medium deep water depth shade	
35	Safety Contour
Deep water depth shade	
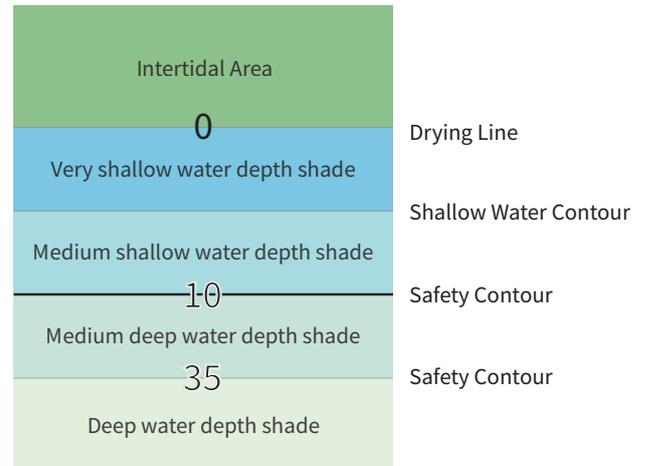
No-go areas

In addition to the user selecting the appropriate depth settings to indicate where the vessel can be safely navigated, the user has the option to identify 'no-go' areas. This feature can be used to identify areas that should be avoided despite having an adequate depth of water. For example, marking the shallow areas either side of the channel with no-go zones / restricted areas.
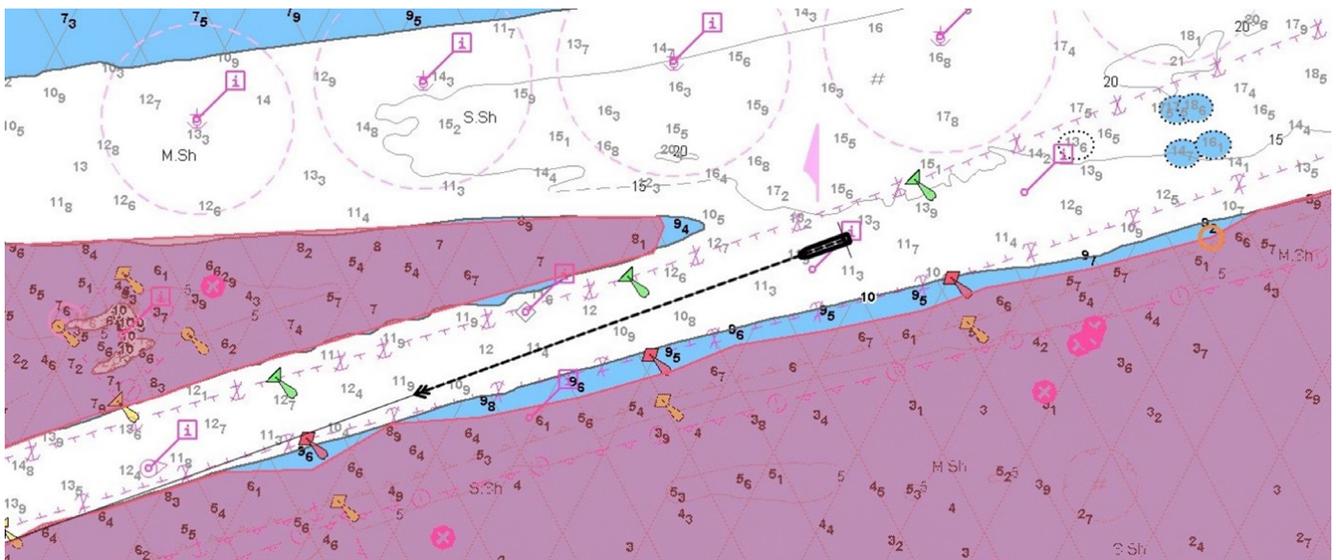
No-go areas identified

Exercise – Depths and Contours
Your turn again!

Review your company procedures relating to ECDIS settings. Establish the appropriate settings for the vessel in the current condition, for navigating in open waters:
- Shallow contour
- Safety contour
- Safety Depth

Now repeat this for navigating in confined/restricted waters (to allow for height of tide).

Ensure the vessel's ECDIS is set to the 'two depth' shade setting and select an area which features a narrow channel or coast waters. Switch through the various day/dusk/night contrast settings. Check and discuss if it is easy to distinguish between safe and unsafe waters using any of the contrast settings.

Now select the 'four depth' shade setting (and enter an appropriate deep contour setting). Again, switch through the various day/dusk/night contrast settings. Check and discuss if it is easy to distinguish between safe and unsafe waters using any of the contrast settings – particularly in night mode.

This exercise should help you identify your preferred depth shade setting for various light conditions.

Discuss the use of 'no-go' areas and identify an area where they should be applied. What does your SMS say? Now highlight the identified area as a 'no-go' area. Consult the user manual if necessary and establish if the 'look ahead' function will alarm if the 'no-go' area is going to be entered.

Add your notes here

06

ENC Coverage

There have been accidents in the past as a result of the passage planning officer not having access to the correct ENCs. In this section we will look at how the user can recognise the limits of ENC coverage.

Most ENC service providers will provide ECDIS users with access to the graphical catalogue which displays the 'data limits' of the ENCs. This allows the user to make sure that there is sufficient overlap with regard to data as opposed to just the ENC cell limits. Checking only the cell limits of an individual ENC may mean that there is not a seamless data set when in use.

The ECDIS should also have a 'planning mode' which will display the available ENC coverage.

The ECDIS will indicate the boundary between ENC cells available to the user and non-ENC data by lines that are hatched on the side of the line containing the unofficial data. Examples of this are shown below:

Graphical catalogue example
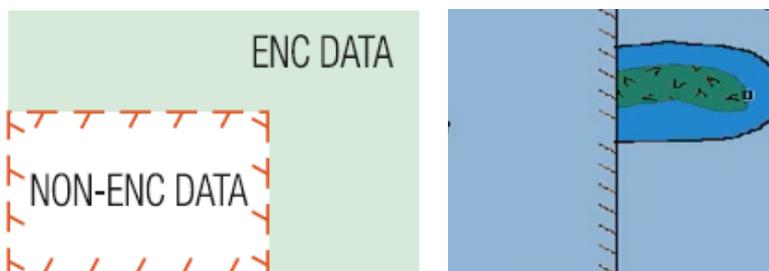
Boundary between ENC cells available to the user and non-ENC data

There have been incidents of vessels running aground when navigating in areas where the vessel did not have the permit for the relevant ENC cell. The ENC service provider should provide the vessel with the details on purchasing additional cells when required.

Exercise – ENC Coverage
Now over to you!

- Access the planning mode on your ECDIS and establish the areas which have adequate ENC coverage available to the user.

- During the planning stage for the next voyage, assume that an area without adequate ENC coverage is identified. Establish how you would acquire additional ENC cells from the ENC service provider, referring to your SMS.

Add your notes here

07

ECDIS alarms, indications, and alarm management

Since ECDIS was introduced there has been many changes to its alarms and indications, causing misunderstandings, resulting in misuse of ECDIS. This section looks at the differences between alarms and indications and the triggers.

When the planning officer is planning a route, ECDIS provides a warning if the vessel will pass too close to a navigational hazard. This is done at various stages.

Planning stage - Route check function

The route check function will check the planned route against safety settings which have been selected by the user. Therefore, before conducting the ECDIS route check, the user must make sure all the safety settings are correct for each leg and all relevant alarms are set to 'on', such as:

- The safety contour
- The safety depth
- The XTD

Vessel-handling characteristics such as the turning circle MUST be entered correctly to allow the check to function correctly.

This is all an additional verification of the planned route and is not a substitution for the Master and navigating officers from visually inspecting and approving the passage plan.

Monitoring stage – Lookahead function

The lookahead or watch vector is selected by the user and is expressed either as a distance or a time. This will activate an alarm if the vessel is going to enter an area which is within a safety setting.

For example:

- Approaching boundaries of prohibited areas.
- Areas where special conditions apply.
- Crossing a safety contour.
- Proximity to danger.
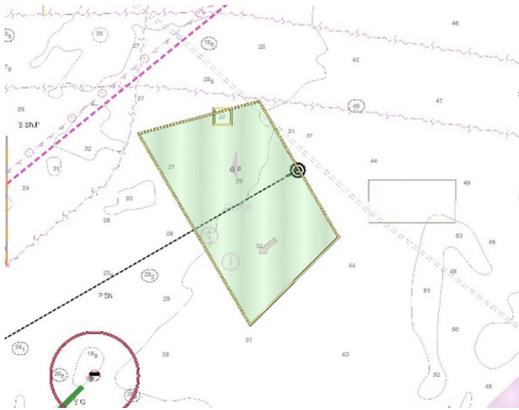
Lookahead set on distance
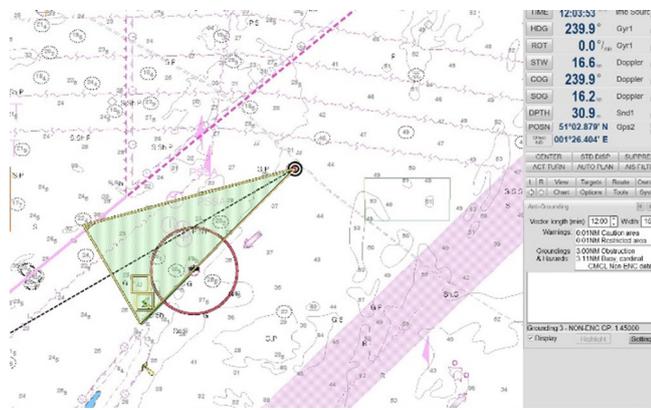
Lookahead set on time

The appropriate lookahead settings will vary depending on where the vessel is navigating. For example, when navigating within narrow channels in close proximity to shallow waters, it may be tempting to reduce or turn off the safety contour alarms. This should be avoided, except in exceptional circumstances where the alarms become dangerously distracting, and only if appropriate extra caution is then applied to maintain proper situational awareness.

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Exercise – ECDIS alarms and alarm management

Prior to conducting this exercise, review your company procedures for passage planning and monitoring the route. This is to establish whether your company has any requirements or guidance on the settings to be used during route check and lookahead functions.

● Route check function: Select a previous passage plan which takes the vessel through coastal waters and port limits or create a new plan. Ensure the appropriate safety settings are entered as well as an appropriate XTD and vessel handling characteristics.

Now activate the route check function and check and discuss:
- Any potential hazards identified.
- Why this check can supplement visual checks by the Master and navigating officer.

● Check and discuss the appropriate lookahead settings on the ECDIS for navigating in the following areas:
- Deep sea/open waters
- Coastal
- Port approaches
- Pilotage/within port limits

It may help to display examples of each area on the ECDIS while discussing the appropriate settings.

Add your notes here

08

Object highlighting – interrogating ENC data

In this section we learn how the ECDIS user can get information from the ECDIS by interrogating objects on the ENC.

'Object highlighting' or the 'pick report' function of the ECDIS allows the mariner to interrogate features within the ENC. This is because there is a large amount of data that sits inside any ENC and not all of it can be shown on the screen all the time.

Only the features at the specific geographical location that is interrogated will be returned in the ECDIS pick report. Examples of the navigational information available from this function are the characteristics of light structures, positional accuracy of features, data quality information.

Details relating to the safety of navigation, such as cautionary notes from this function, can be noted down during the appraisal stage and listed in the narrative section of the passage plan.

Example of a pick report.
Source: Admiralty publication NP231.

Exercise – Object highlighting
Your turn!

Display an area with a large amount of navigational information such as a busy TSS. Select a pick report on the following objects/features:

- Buoyage
- Information notes
- Cautionary notes

Check and discuss how the information from the pick reports can be used during the planning and monitoring stage of a voyage.

Add your notes here

09

Cross checking GPS and other sensor inputs

As with any navigation, when you plot a position, it is important to verify this with as many sources as possible. ECDIS is no different. Here we will look at the different methods we can use to verify the vessel's position.

The radar overlay function is a useful tool that verifies whether the GPS and other inputs such as gyro are operating correctly. This is done by checking that coastlines and other charted fixed navigational features align with the radar overlay.

Screen with the radar overlay activated.

ECDIS will also allow the user to verify the ship's position using traditional methods, for example by plotting bearings taken visually or by radar ranges and bearings. Anytime the GPS position has been verified, an 'event mark' should be used to log this action. If it becomes apparent that there is an error in the GPS position, the ECDIS will have an option to use manually fixed positions rather than relying on the GPS input.

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Exercise – Cross checking GPS and other sensor input
Let's try this....

● Refer to the ECDIS user manual if necessary and demonstrate the process of:

- Verifying the GPS position by traditional methods, such as plotting radar ranges and bearings and adding an event mark.

- Set up of Parallel Indexes (P.I.) to be used on the vessel's radar

- Selecting the radar overlay feature if available.

- Using manually fixed positions as the primary position input (in the event of GPS failure).

Add your notes here

10

Installation and maintenance of ENCs

In section ten we learn about installing and maintaining ENCs so they can be used accurately and can be relied on. This includes the use of the AIO and T&Ps all of which is important to the user and passage planning officer.

Installation

Installation and updating methods will vary depending on the ECDIS manufacturer and ENC Service Provider. After subscribing to an ENC service provider, the user will normally receive a pack containing:

- A user guide and associated pack which includes an end-user licence agreement, a list of subscribed ENC cells, and a certificate confirming the license status.
- A set of ENC cell permits (the PERMIT.TXT file).
- A set of 'Base' exchange sets, usually on CD-ROM or DVD.
- The latest 'Update' exchange set containing all the new ENC data not yet on the 'Base' exchange set.

Updating ENCS

Once the ENCs are installed they will then be kept up to date via weekly updates. Again, the update process will vary depending on equipment manufacturer and ENC Service Provider.

The updates can usually be applied by one of the following methods:

- Downloaded directly on the ECDIS if the equipment (if the ECDIS is connected to the internet).
- Transferred from a file which is emailed to from the ENC Service Provider.
- Transferred from a file which is downloaded from updating software.
- Updated via CD/DVD provided by the ENC Service Provider.

Prior to installing new ENCs, it is important that the user purges all ENC permits and ENCs from the system. This is because old unlicensed ENCs cannot be updated, and the user may be unaware of this and in the future could accidently navigate using an outdated ENC.

When ENC data is installed or updated, the ECDIS should provide the following validation checks:

- Data integrity – confirms the data has been decrypted successfully.
- Verification of application – ensures that the ENC data has been correctly applied to the SENC.
- Distinguished update changes – updates are clearly visible on the display. Once these are accepted, they will be indistinguishable from the ENC data.
- Recall for display – ECDIS provides functionality that allows users to review previously installed updates.
- Compatibility – a check that confirms the ENC data complies with the correct version of the IHO S-57 product specification.
- Installing ENC data in sequential order – the user will get a warning when an ENC update is applied out of sequence, terminate the update operation and restore the SENC to as it was previously. IT will also check edition number are installed in ascending order.

The United Kingdom Hydrographic Office (UKHO) provides **comprehensive guidance** on updating ENCs which they have produced, as well as updating methods for many other ECDIS manufacturers.

Reviewing updates

An ECDIS can show the user which updates have been applied so they can review their contents and ascertain that they have been included in the SENC. This is shown below.

Screen showing updates applied

Temporary and Preliminary Notices to Mariners

Temporary and Preliminary Notices to Mariners (Ts & Ps) contain temporary information of navigational interest to mariners or information which needs to be promulgated quickly. For example:

- Temporary buoyage which will be in position for a limited time.
- Changes to the charted depths in a particular area.

These notices will then be issued as an NTM/correction once the issuing hydrographic office has had time to update the relevant charts/ENCs with the latest information.

Hydrographic offices which produce ENCs use a variety of methods to promulgate Ts & Ps, however some may not include Ts & Ps in their ENC data at all. In this case, users will have to refer to paper Notices to Mariners or utilise the Admiralty Information Overlay (AIO) feature.

The UKHO publishes an **ENC update list** on a weekly basis sharing its best and latest understanding of how individual producers update their ENC data of Ts & Ps.

It is essential that ECDIS users understand how Ts & Ps are promulgated by their registered ENC service provider. Below is an example of a T&P on an ECDIS screen on the AIO.
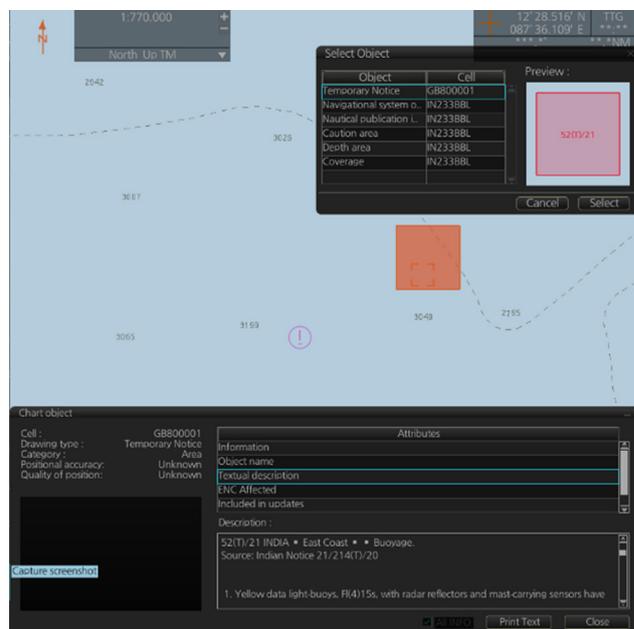
Example of a T&P on an ECDIS screen on the AIO

Admiralty Information Overlay (AIO)

The Admiralty Information Overlay is a digital layer that sits over the ENC and provides T&P information where the ENC producer nation is not including this data within the ENC. The AIO also includes 'ENC Preliminary' (EP) NMs, these are significant differences identified by the UKHO between the ADMIRALTY paper charts and the Foreign ENC data.

The AIO shows the T&P notice as a red hatched polygon, usually rectangular. You can then view the text for the notice using the pick report function. The text will be the same as that found in the weekly notice to mariners.

Further information on the Admiralty Information Overlay (AIO) feature is available **online here**.

Exercise – Installation and Keeping ENCs up to date
Over to you for the final exercise!

● Refer to the ECDIS user manual and ENC service provider's instructions for installing and updating ENCs. Practise the following processes:

- Installing new ENCs

- Applying weekly updates

- Verifying that the weekly corrections have been applied (view update report and visually confirm the corrections have been applied).

- Establish how Temporary and Preliminary (Ts & Ps) are promulgated by the ENC service provider and displayed on the ECDIS.

Add your notes here

11

References

NorthStandard briefing PDFs links

ECDIS briefing

ENC Accuracy briefing

UKHO publications links

UKHO publication NP231 - Admiralty guide to the practical use of ENCs

UKHO publication NP232 - Admiralty guide to ECDIS Implementation, Policy and Procedures

UKHO Publication NP5012 - Admiralty Guide to ENC Symbols used in ECDIS

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