

NAVIGATION DISPLAY RADAR OPERATORS HANDBOOK

HBK-2300-1 ISSUE 12 ZM-2300 SOFTWARE V3.X AND HIGHER



HBK-2300-1 Navigation Display Operators Handbooks

DOCUMENT HISTORY

Issue	Release date	Details	
1	July 2016	1 st release of the new handbook for ZM-2300 software version 1.	
2	September 2016	 Generic system overview drawing updated. See section 4.10. Keyboard USB socket added. See 'USB socket' in the index. Additional warning added regarding user passwords. See 'Alert Password' in the index. Tracked Target symbol changes. See Tracked Target/ symbols in the index. Minor corrections and updates. 	
3	October 2016	Details on viewing C-Map licence added.Minor updates and corrections.	
4	October 2017	 Updated to reflect ZM-2300 software Version 2.0 Capture Screen function added (missing from previous issue). List of alerts updated. See Alerts / list of alerts. Multiple Tracked Targets entry added. See Target Tracking (ARPA) / Multiple Tracked Target Inputs. C-Map online update facility added. See Chart Maintenance / Charts How do I? / C-Map online chart update. Anchor watch function added. Performance Monitor operation updated. See Radar control/ Performance Monitor in 'A to Z operator's instructions' and also Transmitter performance checks in crew based maintenance. Minor updates and corrections. 	
5	January 2018	 New branding applied. Track control section removed. This is now in a separate handbook reference HBK-2300-TCS. 	
6	February 2019	 UPDATED TO REFLECT ZM-2300 SOFTWARE VERSION 3.xx AND HIGHER. Networking section updated. See A to Z: Operator's instructions / Networking. Add Ruler feature added. See Route planning / creating routes / add ruler. Introduction & Getting started sections revised for APP based graphics. Sensor Indicator added. See Getting started / Sensor indicator. Target label settings added to A-Z operator's instructions / Target settings. Target Association Priority added to A-Z operator's instructions / Target settings. Networked target tracking added to A-Z operator's instructions / Target settings. Networked target tracking added to A-Z operator's instructions / Target tracking (ARPA). AIS: Set Ownship Data button added to A-Z operator's instructions / AIS. Minor updates and corrections. Master/Slave section updated. See A-Z operator's instructions / Radar control / Master - slave. Protect Route function added to Route Planning app / how do I? / Protect Route. Route planning app / how do I? / Component route creation section updated. Route planning app / how do I? / Save route changed to reflect new network settings. RangeGuard added. External Apps function added. List of alerts updated. Depth display Under-Keel Alarm (UKC) configuration and drift display added. Colour of 2nd target data panel changed from Magenta to White. 	
7	September 2019	 ADDITIONAL UPDATES FOR ZM-2300 SOFTWARE VERSION 3.XX AND HIGHER. Maximum characters in a ROUTE NAME must not exceed 30. Minor corrections and updates. 	
8	August 2021	ADDITIONAL UPDATES FOR ZM-2300 SOFTWARE VERSION 3.XX AND HIGHER Alerts Updated Fan Vent maintenance. Scale and Latitude bar detail added Minor corrections and updates	
9	December 2022	 UPDATES FOR ZM-2300 SOFTWARE VERSION 3.XX AND HIGHER Visual Indication of Operation added Minor corrections and screen grab updates 	

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10	August 2023	 ADDITIONAL UPDATES FOR ZM-2300 SOFTWARE VERSION 3.XX AND HIGHER. Updated for MDC-A24 and MDC-A27 displays TCVR control added
11	December 2023	 ADDITIONAL UPDATES FOR ZM-2300 SOFTWARE VERSION 3.XX AND HIGHER. Update Front Panel ECDIS Information Target Enhancer added Manta NEO X-Band Annex Added Changes for IEC 62288 Ed3
12	February 2024	 Autonomous Mode Annex Added Safety Related Messages updated Minor corrections and updates



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When planning any aspect of the installation, commissioning, operation, maintenance or risk analysis (RADHAZ) of the system(s) described in this handbook, it is the responsibility of the individual carrying out the required task to ensure they are working from the latest issue/ revision of the document.

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This publication supersedes all previous versions.

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HBK-2300-1 Navigation Display Operators Handbooks Chapter 2: Health & Safety

Health & Safety 2.

HEALTH & SAFETY NOTICES

The Health & Safety notices detailed in this handbook relate to the HENSOLDT UK Navigation Display equipment detailed in this publication.

TRANSCEIVER NOTICES

The transceiver specific Health & Safety notices are detailed in the respective equipment handbooks which must be read separately.

Please refer to section 3.4.3 for a list of applicable transceiver handbooks.

AID TO NAVIGATION

Navigation systems and equipment supplied by HENSOLDT UK comply with the relevant SOLAS regulations and are provided as aids to navigation and should be used in accordance with the SOLAS regulations.

HAZARDS

WARNING

ELECTRICAL HAZARDS/ AC & DC VOLTAGES Some parts of the equipment are not fitted with safety interlocks. Lethal AC and DC voltages may be present when units are open and exposed.

WARNING

SYSTEM ISOLATION

Before carrying out ANY maintenance procedure, before accessing any internal parts or working aloft, ALL power sources to the equipment must be fully electrically and mechanically isolated; this must include the isolation of all UPS supported supplies to the system and, where fitted AC supplies to Anti-Condensation heaters.

WARNING MAINS VOLTAGES

All HENSOLDT UK equipment is supplied with mains input voltage set for 220 V, 50/60 Hz AC unless otherwise stated on labels attached to the equipment.

WARNING

SCREEN CLEANING

To avoid the risk of shock, ensure the AC mains power to the navigation display is switched OFF and is fully isolated prior to cleaning the screen.

CAUTION

CLASS 1 LASER PRODUCT

The LAN fibre optic cable used in the system is considered as a class 1 laser. During installation, service or maintenance work, do not look into the end of the fibre optic cable when the system is switched ON.

> WARNING **FIRE RISK**

Some equipment contains materials which may produce toxic fumes if burnt

TRANSCEIVER RADIATION HAZARDS

WARNING

RADIATION HAZARD: NON-IONISING

Avoid exposure to the main beam of a stationary radar antenna

Please refer to the appropriate transceiver handbook(s) for the equipment fitted for full RadHaz details and safe distances.

Users of cardiac pacemakers should be aware of the possibility that radio frequency transmissions can damage some devices or cause irregularities in their operation. Anyone using such devices should understand the risks present before exposure.

CAUTION **RF LEAKAGE**

Radiation risks are greater from an unterminated, leaky or damaged waveguide. Ensure the system is not transmitting and is fully isolated from all sources of AC power prior to gaining access to the transceiver platform or before working on any part of the system.

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RADHAZ SAFE DISTANCES

TRANSCEIVER RADIATION HAZARDS

The Radiation Hazard safe working distances are detailed in the Health & Safety section of the transceiver handbook. Please refer to Section 3.4.3 for the transceiver handbook part numbers.

EQUIPMENT SERVICING

Service and equipment repair must only be undertaken by HENSOLDT UK or authorised HENSOLDT UK service agents and engineers. Un-authorised repair or servicing of equipment during the warranty period will invalidate the warranty status of the equipment.

RoHS STATEMENT

For details on RoHS statements please contact HENSOLDT UK; contact details can be found at the end of this handbook.

END OF LIFE DISPOSAL

When the equipment detailed in this handbook has reached the end of its serviceable life, the various parts that make up the system must be disposed of in accordance with local industrial waste disposal regulations. Please contact your local regulatory body for disposal instructions or contact HENSOLDT UK for a list of any potentially hazardous material contained within the system.

GROUNDING/ EARTH POINTS

All parts of the system must be fully and correctly connected to a proven earth point prior to connecting any source of AC power.

WARNING

The system must NOT be operated or have AC power switched ON with Earth/ Grounding points disconnected.

WRIST STRAPS

Fully isolate and mechanically disconnect all sources of AC before attaching ESD protective wrist straps to the various points in the system.

SOFTWARE LICENSING

Only approved software may be used on HENSOLDT UK equipment. The use of unapproved or unlicensed software on any HENSOLDT UK equipment is strictly prohibited. The use of such software voids the warranty status of the unit.

Any HENSOLDT UK designed software whether pre-installed, supplied on CD/ DVD or other removable media, is the copyright of HENSOLDT UK, which will not accept any responsibility for any damage or loss caused in whatever way by the use or misuse of the software. This copyright applies to software that can be supplied in various formats including but not restricted to CD, DVD, USB memory device, email or obtained via the HENSOLDT UK agents download area.

Software supplied with HENSOLDT UK equipment may not be resold or re-distributed without the express permission of HENSOLDT UK.

ZM-2300 SOFTWARE INSTALLATION

Attempting to install ZM-2300 software and any of its variants on standard PCs or laptops will render the unit inoperable. The HENSOLDT UK Navigation software is designed exclusively for use on authorised HENSOLDT UK Navigation Displays. HENSOLDT UK cannot be held responsible for the loss of any data caused by the use or misuse caused by the installation of this software.

VIRUS PRECAUTIONS

Many systems supplied by HENSOLDT UK are now PC based and it should be noted that such systems do not have anti-virus protection installed.

It is the responsibility of installation engineers, service engineers, maintainers and system users to ensure that virus threats are not transferred to the system via removable media.

WARNING
Prior to use, all removable media used with HENSOLDT UK products MUST be fully scanned for viruses on a PC installed with
up to date anti-virus software.
Any media containing potential virus infections must not be used.
Charges relating to systems found to be infected with a virus will be passed onto the company found to be using removable
media that has not been suitably scanned.
HENSOLDT UK cannot be held responsible for damage caused to systems by virus infections.

Removable media includes but is not restricted to USB memory sticks, USB hard drives, floppy discs, CD/ DVDs and all forms of removable media.

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3. Introduction

3.1 SOLAS/ MSC regulations

The HENSOLDT UK Navigation Display comprises of a navigation processor integrated into the display and is used with our range of X-Band and S-Band transceivers, including SharpEye[™].

The following table provides a summary of the categories and basic differential capabilities for each category of SOLAS shipborne radar equipment. Note that either the 520 mm (22/24 inch) or 650 mm (26/27 inch) displays may be used for Cat 2 and Cat 3 ships/craft, but only the 650 mm (26/27 inch) display is compliant for Cat 1 ships/craft.

	Category of ship/ craft						
Size of ship/ craft	<500 gt CAT 3	500 gt to <10000 gt HSC < 10000 gt CAT 2	All ship/ craft ≥10000 gt CAT1	ZM-2300 software capability			
Minimum operational display area diameter	180 mm	250 mm	320 mm	-			
Minimum display area	195 mm x 195 mm	270 mm x 270 mm	340 mm x 340 mm	-			
Auto acquisition of targets	-	-	Yes	Yes			
Minimum acquired radar target capacity	20	30	40	450			
Minimum activated AIS target capacity	20	30	40	500			
Minimum sleeping AIS target capacity	100	150	200	500			
Minimum total AIS target and reports capacity	120	180	240	1500			
Trial manoeuvre	-	-	Yes	Yes			

RANGE & BEARING DISCRIMINATION

MSC.192/5.5.1: In line with regulations, the radar system is capable of displaying two point targets on the same bearing, separated by 40 m in range, as two distinct objects.

MSC.192/5.5.2: In line with regulations, the radar system is capable of displaying two point targets on the same range, separated by 2.5° in bearing, as two distinct targets.

MINIMUM RANGE

The minimum range of HENSOLDT UK approved sensors installed in accordance with MSC.922/5.3.1.2 shall be less than 40 m.

3.2 IEC / IHO regulations

The HENSOLDT UK Navigation Display running software **ZM-2300 version 3.xx** and higher conforms to with the new ECDIS standard **IEC 61174 edition 4.0**. The new IHO editions bring the following improvements to ECDIS:

- Consistent use of symbols and abbreviations.
- Alarm categorisation.
- Alarm visualisation.
- Reduction in the number of audible alerts generated by ENC objects (reducing alarm fatigue).
- Default control settings.
- Anchor watch.
- Look-ahead improvements.

IHO STANDARDS

The latest standards can be viewed by visiting the IHO website at the following address:

https://www.iho.int/

Note: HENSOLDT UK is not responsible for the content of external websites.

CHART LIMITATIONS

The maximum North and South latitudes at which the ECDIS is qualified for use is 85°.

3.3 Applications / APPS

The HENSOLDT UK Navigation Display software ZM-2300 allows the processor to be used for a combination of applications (apps) which can be accessed from the standby screen.

App licences allows the enabling of additional apps using a four digit KHKey code. Licences are available from HENSOLDT UK at the time of purchase or at any time during the life of the equipment. Full details on how to use this feature can be found in the App licences section of this handbook.

Some applications are enabled by default for specific systems. For example, a radar system will have the single and dual radar display apps enabled by default but other optional features such as Chart Radar can be enabled by purchasing a 4-digit KHKey code.

Where an app is NOT enabled, it is greyed-out with the text shown in black and the app cannot be accessed.

3.4 Handbooks

3.4.1 ZM-2300 Software

This handbook has been designed to be used with ZM-2300 software version 3.xx and higher.

INS FUNCTIONALITY

The Integrated Navigation System (INS) functionality referred to in this handbook is for **ZM-2300** software **version 3.1** and higher.

3.4.2 Handbook download

PDF copies of the following handbooks can be downloaded directly from the display using the **Export Handbook** feature within the **Backup and Restore** app.

- HBK-2300-1: Radar Operators Handbook (this publication).
- HBK-2300-7: ECDIS Operators Handbook.
- HBK-2300-TCS: Track Control operator handbook (ZM-2300 software).
- HBK-2300-8: Integrated Navigation Systems (INS) system handbook ZM-2300 software

CAUTION

Prior to use, all removable media used with HENSOLDT UK products should be fully scanned for viruses on a PC that has up to date anti-virus software installed.

3.4.3 Transceiver handbooks

Please refer to the following handbooks for details on the installation, termination and maintenance of transceiver and antenna sub-systems that are compatible with the HENSOLDT UK Navigation Display running ZM-230x software. Please note that some handbooks may be chargeable.

NOTICE RADHAZ/ RADIATION HAZARD FIGURES

The following handbooks contain the individual system RadHaz figures which are NOT quoted in this handbook.

HANDBOOK	DESCRIPTION	
KH-1650	X-Band SCV/ SxV radome radar.	
HBK-2300-3	X-Band 12 kW magnetron Transceiver/ Turning Unit.	
HBK-2300-9	X-Band Manta NEO Solid State Transceiver/ Turning Unit.	NEWHORE
KH-1605-1	X-Band Mk11 SharpEye™ Transceiver/ Turning Unit and Power Control Unit.	
KH-1605-3	S-Band Mk11 SharpEye™ Transceiver/ Turning Unit and Power Control Unit.	KELVEVINGHES
НВК-2300-4	S-Band Mk7 S-SharpEye [™] ASTERIX Upmast Transceiver. DTX-A1-AMJA and Drive Control Unit.	KELMIN HJCHAS

3.5 Display overview

HENSOLDT UK Navigation Displays are available as Console or Desktop mounting.

These full HD, LED backlit TFT 16:9 displays can display a maximum of 16.7 million colours. The display resolutions and output configurations are factory set and cannot be adjusted by the user.

SCREEN RESOLUTION

Size	Resolution	Active Area	Pixel Pitch
24 inch	1920 x 1080 pixels	531.36 x 298.89 mm	0.276 x 0.276 mm/ pixel
27 inch	1920 x 1080 pixels	597.6 x 336.5 mm	0.31125 x 0.31125 mm/ pixel

NOTE: The 24 and 27 inch display will have vertical bars either side of the display area. This is not a fault.

VIEWING ANGLE

Typical R/L 178°; U/D 178°

CONTRAST RATIO

Both the MDC-A24-1 and MDC-A27-1 have a typical contrast ratio of 3000:1.

CONSOLE DISPLAY(S)

Console displays are supplied with a remote trackerball, an optional keyboard or a combined keyboard and trackerball unit. A processor running ZM-230x software is internally mounted to the rear on the display.

- MDC-A24-1: 24 " Navigation Radar Display & integrated processor.
- MDC-A27-1: 27" Navigation Radar Display & integrated processor.



The serial number label for the unit is located on the rear of the unit.

SUPPORT BRACKETS

Support brackets are available for the MDC-A24-1 and MDC-A27-1 displays that enable the display to be desktop or bulkhead mounted.

• MDC-A100-27: Desk Support for 24 and 27 inch panel PCs.

3.6 Trackerballs and keyboards Image: Section of the section

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3.7 Discontinued Displays

Displays **MDC-A22-1** and **MDC-A26-1** are now discontinued and are detailed below for information only.

SCREEN / DISPLAY PORT RESOLUTION

The display resolutions and Display Port outputs are all factory set and cannot be adjusted by the user. For reference use only, the resolutions are as follows.

Size	Resolution	Active Area	Pixel Pitch
22 inch	1680 x 1050 pixels	473.76 x 296.10 mm	0.282 x 0.282 mm/ pixel
26 inch	1920 x 1200 pixels	550.08 x 343.80 mm	0.2865 x 0.2865 mm/ pixel

VIEWING ANGLE

Typical R/L 178°; U/D 178° @ contrast ratio \geq 10 for both 22 and 26" displays.

CONSOLE DISPLAY(S)

Console displays are supplied with a remote trackerball, optional keyboard or keyboard and trackerball. A processor running ZM-230x software is internally mounted to the rear on the display.

- MDC-A22-1: 22" Navigation Radar Display & integrated processor.
- MDC-A26-1: 26" Navigation Radar Display & integrated processor.

The serial number label for the unit is located on the rear of the unit.



MDC-A26-1 Display

SUPPORT BRACKETS

Support brackets are available for the MDC-A22-1 and MDC-A26-1 displays that enable the display to be desktop or bulkhead mounted.

• MDC-A100-26: Desk Support for 24 and 26 inch panel PC.



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4. Getting Started

4.1 Switching ON

AC POWER

Ensure all AC mains supplies to the system and all associated equipment are switched ON at source. The power ON/OFF indicator on the bottom right of the display will illuminate red when power is available.

SWITCH ON

To switch the display ON, press the **Power** button for a few seconds until the LED indicator changes from red to green

START-UP SCREEN

After a short delay, the system will automatically start with the HENSOLDT UK standby screen. The 24 and 27 inch displays will have vertical bars either side of the display area. This is not a fault.

4.2 Front panel controls

4.2.1 MDC-A24-1 & MDC-A27-1

The screen and processor control buttons are located at the bottom of the display.



HDD	Disk drive activity	This will illuminate in accordance with disk drive read/write activity.
SERVICE	Not in use	This indicator is not used.
		Increase using '+' or decrease using '-' the display's LED backlight illumination.
		RESET BRILLIANCE Press Ctrl (Control) + F1 keys on the keyboard at the same time.
⊝*⊕	Screen	DAYLIGHT BRILLIANCE WARNING
BRILLIANCE	brilliance	BACKLIGHT/ DAYLIGHT Switching from Night to Daylight instantly changes the backlight brilliance to maximum. This will affect the operator's night vision due to the relative brightness of the daylight colour scheme during night-time conditions.
		See section 6.61.5 for control details and precautions.
		The 'ECDIS' indicator will be illuminated green when the brilliance settings are in the calibrated setting for 'DAY', 'DUSK' or 'NIGHT'.
+ ECDIS -		If the brilliance is set to above or below the ECDIS factory calibration point, 'ECDIS' will illuminate orange along with either the '+' or '-'.
		To ensure brilliance remains within the calibrated range please make sure that the '+' and '-' indicators remain unlit.
		Press button to switch the display and processor ON .
		WARNING
	Dower and	POWER BUTTON
	integrated	The power button is a software ON/ OFF control and does not isolate the system from AC supplies. The system must be fully isolated from the AC
CN/OFF	LED	supply prior to commencing any maintenance task including cleaning of the
		SCREEN.
		LED OFF. NO AC supply. LED Red: Unit receiving AC supply and in Standby.
		LED Green: Normal operation.

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4.2.2 MDC-A22-1 & MDC-A26-1

The screen and processor control buttons are located at the bottom of the display.

The older displays have a separate indicator for Power which illuminates yellow when in standby mode and green when turned on by pressing the Power button for a few seconds.

These displays also have built in system failure alarm that will sound in the event of a failure with the Panel PC, please note this is not an indication of on screen navigation alerts.

Gain 64 200 411112 4		100	LAT LON		Past Positions 6.0 min (Off)			
Dynamic Clutter Suppression ¹¹ 0 1 2 3 4 5 Dynamic Clutter 200 mp 110 120 120 120 120 120 120 120 120 120	MEB	OFF OFF	VRM EBL	OFF OFF	Trails Length 6.0 min (T)	Change Display Mode	Show Sync Status	Capture Screen
KELVIN HUGHES)						O · -) (+ * -	M i Alarm

		Press to switch the display and processor ON or OFF.			
		WARNING			
O Power		POWER BUTTON The power button is a software ON/ OFF control and does not isolate the system from AC supplies. The system must be fully isolated from the AC supply prior to commencing any maintenance task including cleaning of the screen.			
● I MODE	Power LED	LED OFF: No AC supply. LED Amber: Screen in Standby. LED Green: Normal operation.			
		Increase (+) or decrease (-) the main widescreen TFT display backlight illumination.			
	Screen	RESET BRILLIANCE Press both buttons for 3 seconds to reset the backlight brilliance to the default settings.			
		Alternatively press Ctrl (Control) + F1 keys on the keyboard at the same time.			
io.	Dimance	DAYLIGHT BRILLIANCE WARNING			
		BACKLIGHT/ DAYLIGHT Switching from Night to Daylight instantly changes the backlight brilliance to maximum. This will affect the operator's night vision due to the relative brightness of the daylight colour scheme during night-time conditions.			
		System Failure Alarm silence.			
₩	System	CAUTION			
Audio		AUDIO ALARM The audio alarm and alarm LED is not an indication of navigation alerts such as collision warning etc.			
● Alarm	System Failure Alarm LED	Off: No panel PC alarm conditions exist. Red flashing: A panel PC alarm condition exists.			

4.3 APPS / Standby screen

STANDBY SCREEN OVERVIEW

The Standby screen gives access to various applications that are used to run modes such as the Single Radar display, Dual Radar display, ECDIS etc. as well as configuration modes such as Route Planning, Chart Maintenance, Alert Configuration etc.

The centre section of the Standby Screen gives access to sensor section where the transceivers attached to the system can be selected as either Master or Slave.

Each app is selected by placing the cursor over the required APP graphic and left clicking to activate it.

APP AVAILABILITY

Depending on the system configuration, some apps may not be available. Please refer to section 8 (**App licences**) for further details.



Example of standby screen

4.3.1 Sensor / Transceiver selection

TRANSCEIVER SELECTION INTERSWITCHED SYSTEMS

In an interswitched system, place the cursor over the desired transceiver and left-click to select as **MASTER** or right-click to select as **SLAVE**.

Please refer to section 6.42.13 for additional details on sensor selection.

SINGLE TRANSCEIVER SYSTEMS

In single transceiver systems, the sensor is automatically selected as a Master.

READY / NOT READY?

See section 6.42.12 for additional details the Tx ready \blacksquare (green) / Tx not ready \blacksquare (red) indicators.

GO TO RUN

The system is set to RUN by selecting any of the enabled apps.

POWER ON/ RUN TIME

See section 6.42.8 for details on how to display the **Power ON** and **Run Time** for a selected transceiver.

NOTE: Items on this screen will have a two digit identification code generated from the last two digits on the item's IP address.

		Radar Senso	r Selection		
TCVR 1 MK11 X-Bend	TCVR 2 S-Band 603 Ready	TCVR 3 5.5m X-Bend Ready	TCVR4 SCV	TCVR B 12kW Fel Not Ready	TCVR 6 DTX-A20-2
Current UTC +0 12:40	Time 10:00 10:02	Ma Netv Swi Disp Displ	ster work itch play ay 91		

4.3.2 Apps...

APPLICATIONS

The apps section shown on the left hand side of the Standby screen gives access to navigation screens, route planning, chart maintenance etc.

Left clicking on the required app will open the function.

APP AVAILABILITY

Some applications are only available when they have been enabled in **App licences**. If the graphic for an app is greyed out and cannot be selected, it has not been enabled or the licenced period has expired (see Section 8 for further details).

WARNING TRANSMISSION WARNING When a transceiver is set as Master, selecting some applications can cause the selected transmitter to transmit and antenna to rotate.

CAUTION TRANSCEIVER IN STANDBY Placing the system into Standby from ANY application stops a Mastered Transceiver but does not switch it OFF.

APP OVERVIEW

APP		DESCRIPTION
	Single Radar Display	Starts the Single Radar Display app. The transceiver selected as Master is placed into RUN. Radar operation is detailed in handbook reference: HBK-2300-1 (this publication).
	Dual Radar Display	Starts the Dual Radar Display app. The transceiver selected as Master is placed into RUN. Radar operation is detailed in handbook reference: HBK-2300-1 (this publication).
	Conning Display	Starts the Conning Display app. Radar operation is detailed in handbook reference: HBK-2300-1 (this publication).
	Navigation & Conning Display	Starts the Navigation & Conning Display app. Depending on the screen configuration, the transceiver selected as Master is placed into RUN. Radar operation is detailed in handbook reference: HBK-2300-1 (this publication).
	ECDIS	Starts the ECDIS app. If the optional Radar Interlay APP is enabled, the transceiver selected as Master may go to Run. ECDIS operation is detailed in handbook reference: HBK-2300-7
	External Application	With the cursor placed over the External Application box, a list of external applications is presented and can be selected. External applications are configured during setting to work of the system and cannot be configured by the user.

APP		DESCRIPTION
	Chart maintenance	Opens the Chart Maintenance app which is automatically enabled for the Chart Radar and ECDIS apps but is also available as a purchasable optional.
	Route planning	Opens the Route Planning app which is automatically enabled for the Chart Radar and ECDIS apps but is also available as a purchasable optional.
	Alert configuration	The Alert configuration app allows the configuration of system alarms and alerts.
	Simulation	The Simulation app enables the operator to run a simulated 100 targets scenario or a short, pre-recorded voyage that can be replayed in all navigation apps. This allows the operator to familiarise themselves with the operation of the system without running the transceiver.
•2	App licenses	This allows the selection and enabling of optional features by the use of a unique four digit KHKey as detailed in section 8. Licenses are available from HENSOLDT UK at the time of purchase or can be enabled at any time during the life of the equipment.
- 	Set-up	This area is password protected and is not available to the system user/ operator.
	Backup & Restore	This app allows the backup and restoration of data to and from a virus free USB memory device. Data includes system configuration, routes, user generated maps and screen captures.

4.3.3 Display brilliance (Daylight / Dusk / Night)

BUTTON	DESCRIPTION
Daylight	With the cursor placed over the button, the screen brilliance can be changed to the following levels: Left click:Daylight.Middle click:Dusk.Right click:Night.

NETWORK/ INS systems

When the brilliance level is changed in a networked/ INS system, the screen brilliance will change on all Multi-Function Displays connected to the HENSOLDT UK network. ^{Note}

OPERATION

Refer to section 6.61.4 for full instructions and precautions.

DAYLIGHT BRILLIANCE WARNING SWITCHING FROM NIGHT TO DAYLIGHT

Switching from Night to Daylight instantly changes the backlight brilliance to maximum. This will affect the operator's night vision due to the relative brightness of the daylight colour scheme during night-time conditions.

4.3.4 Capture screen

BUTTON	DESCRIPTION
Capture Screen	Pressing this button takes a PNG screen grab of the current screen being displayed. This may be exported using the Export Debug Data function from within the Backup / Restore menu. (see section 6.6).

4.3.5 Software version

BUTTON	DESCRIPTION		
Standby	The current Software Version is displayed at the top of the standby screen as: Software version ZM-230X Vx.x.x (where X and x.x.x is the version of software currently installed).		
Software Version: ZM-2300 V3.12	Selecting the software version automatically opens a new page that shows the software loaded into various parts of the system. Using instructions supplied separately, the system software can also be upgraded.		

NOTE: INS display brilliance control requires configuration during commissioning of the system. Individual screens can be configured during setting to work to disable this function. This is not a user configurable activity.

4.4 eToken dongle

The system software, all applications, chart licenses and autonomous mode functionality are protected by the means of an eToken dongle which is a USB device fitted to the rear of the display.



Example of an eToken NOTE

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Optional Features ...

eToken NOT FITTED?

If the processor is started without an eToken fitted or the wrong eToken is installed, a dialogue box is displayed stating **eToken not detected**.

With no eToken or the incorrect eToken fitted, the system will NOT operate and all applications and functions will be disabled.

ALERTS

If an eToken alarm appears, reattach the correct eToken. If the eToken warning remains, please contact HENSOLDT UK for assistance.

UNIQUE eToken NUMBER

The eToken number can be found on a label attached to the eToken, at the top of the APP licences screen or where enabled, in the Chart licence tab of the Chart maintenance app. eTokens are unique to each processor.

LABEL

The label attached to an eToken should never be removed as it contains the unique eToken identification number.

ZM-2144 SOFTWARE

eTokens programmed for use with MantaDigital[™] ZM-2144 software will not operate in the ZM-230X software loaded onto HENSOLDT UK Navigation Displays.

Note: The eToken supplied may be different from the image shown.



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4.6 Dual Radar Display overview



Each of the PPI tabs are detailed on the following page:

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DUAL DISPLAY PPI TABS - OVERVIEW

PPI TAB: The PPI tab displays a second identical image from the transceiver currently selected by the main PPI.

A box below the gain control gives the range, bearing and position of the cursor within the 2nd PPI.

Tracked Targets and AIS targets that have been acquired are displayed on both the primary and secondary PPI regardless of which display initiates the tracking.

The following functions can be adjusted independently of the primary radar screen:

- Screen orientation (N-UP, C-UP, H-UP)
- True or relative motion

Ownship/ screen offset

Routes ON/ OFF

•

HAP TAB: Where connected to a compatible sensor, the HAP tab displays information for bow thrusters, propulsion systems, rudder, wind and depth. Apart from changing the display of Wind from true to relative, there are no operator adjustable parameters in the HAP tab. The layout of the HAP tab changes depending on the sensors configured during commissioning The layout of the tab cannot be changed.

DOCKING TAB: When connected to a compatible sensor, the Docking tab displays information on heading, speed, wind and depth. Where connected, the display can be changed between True Wind and **Relative Wind**

ROUTE TAB: A primary route can be loaded or deselected. Route settings can also be accessed allowing the level of detail for a route to be set and critical points (CP) to be added to the loaded route.

ETD MODE TAB: This tab shows Enhanced Target Detection (ETD) mode. ETD is not a standard feature but is available as an optional feature.

CAMERA TAB: This is the display and control of the optional FLIR night vision camera. The position of the camera can be adjusted using the onscreen buttons. The camera can also be locked to a radar Tracked Target, VRM/EBL or ground position.

This is not standard but is available as an optional feature.

CAMERA/ESS TABS: Not available/ under development; please contact HENSOLDT UK for details.













- Stabilised head-up
- Display of ARPA & AIS targets ON or OFF HL suppression Gain control
- Increase/ decrease range Control of trails

4.7 Interswitching

In systems installed with two or more transceivers, the interswitching is carried out via the Managed Network Switches. There will be one network switch for each sensor/ transceiver attached to the system.

The network switches have no operator controls. All interswitching is carried out from the display.

TRANSCEIVER SELECTION

Please refer to section 6.42.13 for details on selecting a transceiver.

MASTER/ SLAVE

Please refer to section 6.42.8 for details on Mastering a display.



Example of a Network Switch



Example of an interswitched X and S-Band system

SINGLE POINT OF FAILURE

In the event of a failure of one of the network switches, the other switch continues to operate normally safeguarding against a single point of failure. Similarly if an MDC-A200 serial Ethernet converter fails, the 2nd unit will continue to provide ownship's data to the system.

For example, in the above schematic, a failure of the network switch connected to the S-Band radar would stop the display of the S-Band transceiver however the X-Band system would operate normally as a standalone system.

Network switching and error detection is automatic so no user configuration is required to configure a dual system into a single stand-alone system. The system automatically switches into this configuration.

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4.8 Trackerball and buttons explained



The HENSOLDT UK multi-function display is operated using a trackerball and three buttons in a similar way to operating a mouse on a desktop computer.

- The trackerball is used to change the position of the on-screen cursor.
- The three buttons on the trackerball correspond to the 'on-screen' functions with each button action shown in the lower right hand side of the display.
- Where a button has no function, the cursor button is blank as shown below.

Regardless of the application that is running, the button functions are located in the lower right hand side of the display.

Middle	Right
	Capture
	Screen
	Middle

4.9 Virtual keyboard

Where no physical keyboard is fitted to a system, a virtual on-screen keyboard can be used to enter text. To activate the on-screen keyboard click in the area where a text entry is required and the keyboard will automatically appear. For example; when creating a new user map, selecting **Rename** will cause the on-screen keyboard to appear.



Keyboard with Shift lock OFF & Caps lock ON

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Q	W	E	R	Т	Y	U	1	0	Ρ	{	}
А	S	D	F	G	Η	J	K	L		@	~
Î	Ζ	Х	С	V	В	Ν	Μ	<	>	?	-
« Clear ALL			Shift Lock 🔹			Space bar			Backspace >>		
Cancel			Caps Lock			Num Lock			Accept		

Keyboard with Shift lock ON & Caps lock OFF

To enter text, place the cursor over the required character on the keyboard and left-click to select. Other on-screen keyboard functions are described below.

BUTTON	BUTTON FUNCTION
<< & >>	Moves the cursor position within a text entry to the left or right.
Clear all	Clears all text.
Shift Lock	Locks the shift key.
Space bar	Add a space.
Backspace	Deletes the previous character.
Cancel	Discards any entries and closes the on-screen keyboard.
Caps lock	Locks the Cap key.
	On systems where an optional QWERTY keyboard is fitted, this locks the numbers
Num lock	on the physical keyboard.
	This has no function on the virtual on-screen keyboard.
Accept	Accepts any entries and closes the on-screen keyboard.

4.10 Adjusting parameters/ sensor selection

SLIDERS

Some parameters are adjusted by the use of 'sliders':

- a) Place the cursor over the marker on the slider bar.
- **b)** Press and hold the left button; the cursor symbol will change from an arrow to a hand symbol as shown below.
- c) Keeping the button pressed, drag the slider to the desired position or value.



Vector length adjustment using the horizontal green slider bar.

Adjustment of data view using a vertical slider.

Examples of sliders

NUMERIC VALUES

Some functions require the adjustment of a numeric value.

- a) Placing cursor over the value to be adjusted, press and hold the left button and arrows will appear above and below the number to be adjusted.
- b) Keeping the button pressed, roll the trackerball up and down (north/ south) to adjust the number.





DROPDOWN BOXES

Some functions require the use of a 'drop down' box. These are opened by clicking anywhere within the button. For example; clicking anywhere in the speed sensor box will produce the drop-down box; sensors can be selected by left-clicking on any of the items in the drop down list.



Speed sensor selection

Clicking inside any part of the button will produce the drop-down box.

See the following page for a description of the sensor availability.
SENSOR AVAILABILITY

Where a drop down box is opened, a list of sensors configured during setting to work of the system will be shown. The colour of the text determines if the sensor is available for use.

Where the sensor description text is **WHITE**, the sensor is configured for use and is available for selection.

Where the sensor description text is **BLACK**, the sensor is configured for use but a signal is not being received. This could be because the sensor is switched OFF or has a fault. The sensor cannot be selected.

TABS

Certain menus are accessed by selecting tabs. These are selected by placing the cursor over the tab and left clicking. The colour of a tab changes to indicate that it has been selected.

The text label for a tab may be a different colour.

WHITE text means that the tab/ function is enabled and available for selection.

- BLACK text means the tab cannot be selected because:
- A signal is enabled but is not being received, e.g. depth.
- The tab is an optional feature that has not been enabled; e.g. CCTV input.



Example of enabled and disabled tabs:

The Spyscope and Wind tabs have WHITE text (tab enabled).

The Depth and CCTV tabs have **BLACK** text (tab disabled).

CLOSING MENUS

Some tabs and menus must be closed by clicking on X which is located at the top-right of some tabs/ menus.

NOTICE OBSCURED MENUS

Some functions may NOT be accessible until a menu or tab is closed.

TICK BOXES

Some features require a tick-box to be selected. To select a tick box, place the cursor in the box and left click.







Tick box function **DISABLED**

4.11 Sensor integrity indicator

All ownship sensors have an associated indicator that will display as either Green, Yellow or Red.

The Sensor Indicator shows the status of the input signal as reported by the external equipment connected to the system.



GREEN

The sensor input is OK. The sensor attached to the system is not reporting any errors or issues with the signal input to the display.

YELLOW

The sensor input has low integrity. The condition of the signal originating from the senor or optional DDU (Data Distribution Unit) should be checked.

A yellow indication does not mean there is a fault within the navigation display or its software.

 The sensor attached to the system is reporting that the signal it is sending has low integrity or there is an issue with signal strength at the sensor.

Where a DDU (Data Distribution Unit) is fitted, this can also indicate that the DDU has decided that the signal being sent has low integrity. $\ensuremath{\textbf{RED}}$

The sensor input is invalid or has failed. The condition of the signal originating from the senor or optional DDU (Data Distribution Unit) should be checked.

A red indication does not mean there is a fault within the navigation display or its software.

- The sensor attached to the system has either stopped sending the signal, is reporting an error with the signal it is sending or there is an issue with signal strength at the sensor.
- Where a DDU (Data Distribution Unit) is fitted, this can also indicate that the DDU has decided that the signal being sent is not plausible.

4.12 Return to Standby

Returning to the standby screen from any app that is mastering a transceiver stops the selected transceiver from transmitting and stops the antenna rotating.

CAUTION TRANSCEIVER IN STANDBY

Placing the system into Standby from ANY navigation mode places the Mastered transceiver into Standby but does not switch it OFF or isolate the system.

In all apps, it is possible to return to standby or change display modes using the Display Mode button.

Place the cursor over the Display Mode button which is located in the lower right-hand side of the display.

A new menu is presented showing the following options:



Change Display Mode (Left click):	Select Display Mode opens (detailed below):
Show Sync Status (middle click):	Opens the optional Network Settings status indicator where enabled. See section 6.31.
Capture Screen (right click):	Takes a PNG screen grab of the entire display.

SELECT DISPLAY APP

From the Select Display menu, the following apps can be selected: NOTE

Close menu

Pressing the Cross X at the top right of the screen closes the Select Display Mode function and returns to the navigation mode currently in use.

Single Radar Display

Change from the display currently selected to the Single Radar Display app.

Dual Radar Display

Change from the display currently selected to Dual Radar Display app.

Conning Display

Change from the display currently selected to Conning Display app.

Navigation & Conning Display

Change from the display mode selected to Navigation & Conning Display app.

ECDIS

Change from the display mode selected to ECDIS app.

Go to Standby

Returning to the standby screen from any app that is mastering a transceiver stops the selected transceiver from transmitting and stops the antenna rotating.

NOTE: Depending on the system configuration, some apps may not be enabled. See **APP licences** in section 8 for additional information.



Select Display Mode

4.13 Stop transmission & antenna rotation

STANDBY SCREEN

Returning to the standby screen from any app that is mastering a transceiver stops the selected transceiver from transmitting and stops the antenna rotating.

TRANSCEIVER STATUS IN STANDBY

Placing a transceiver to standby does not switch the transmitter OFF. It remains switched ON in a standby state waiting for a Run command.

DISPLAY ON/ OFF

Switching OFF the HENSOLDT UK multi-function display or the Managed Network Switch does not isolate the power to transmitters, gearboxes or any of the associated sub systems. If the display is switched OFF without returning to Standby, any transceiver that is mastered by the display will automatically revert to Standby after approximately 60 seconds.

WARNING SAFETY ALOFT Placing the system into Standby mode is not suitable protection for working aloft. When working aloft, all safety notices shown at the beginning of this handbook must be observed at all times.

4.14 System operation

To assure the user that the display system is operational and has not frozen there is a visual indication of operation in the top right corner of display consisting of five vertically alternating dots.



4.15 USB socket

The optional keyboard is provided with a lockable USB socket located on the left-hand side of the keyboard. USB memory devices can be used for a number of purposes including loading chart data, permits, backing up or restoring data, exporting data such as handbooks, and details of a route from the Route Planning menu (Save route as PDF).



- USB memory device not inserted.
- Key inserted but shown in the OFF position.
- In the OFF position, the key can be removed.



- USB memory device inserted.
- Keyswitch shown in the ON position.
- The key cannot be removed.

APPLICATION NOTES

- When not in use, the USB memory device and key should be removed and the USB socket dust cap replaced.
- Prior to use, all removable media used with HENSOLDT UK products MUST be fully scanned for viruses on a PC installed with up to date anti-virus software. Please refer to the Virus Precautions noted in the Health & Safety section of this handbook.

KEYS

The system is supplied with two keys for the USB lock. These should be safely stored as replacement is limited to replacing the whole locking mechanism.

KEYBOARD(S) WITHOUT USB SOCKET

Some keyboards are not fitted with a USB socket. In these instances, an independent USB socket will be located close to the keyboard.

4.16 Switching OFF

The following describes the process for switching OFF the HENSOLDT UK multi-function display.

- Ensure the display is set to Standby.
- Press the **Power** button on the display control panel for 5 seconds.
- After a short delay, the screen will go blank and processor fans will stop running.

WARNING SYSTEM ISOLATION

The above process shuts down the HENSOLDT UK multi-function display but DOES NOT switch off or isolate any part of the system including transceiver(s) and antenna sub-assemblies.

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4.17 Isolating power to systems

WARNING

ISOLATION GUIDANCE

The following offers a brief guide to isolating the system but is NOT a definitive guide to making a system safe as the layout of systems can vary on a case by case basis.

The system must be fully isolated as defined by an individual system or sites safety procedures which should refer to the equipment specific handbook(s).

NAVIGATION DISPLAY

The display can be switched OFF as described in Section 4.16 however this does not isolate the system from the mains supply or isolate the transmitters, gearboxes and associated sub systems.

The display must be isolated at the appropriate mains breaker before attempting any maintenance procedures.

MANAGED NETWORK SWITCH

The Managed Network Switch which controls the interswitching of a radar system is powered by a separate AC/DC power supply. The Power supply must be switched off at the appropriate breaker prior to commencing any maintenance procedures.

Switching OFF the Managed Network Switch will stop the operation and interswitching of any transceiver connected to the switch.

TRANSCEIVER SYSTEMS

Transceiver must be FULLY ISOLATED prior to commencing any form of maintenance procedure.

Regardless of the system type, all equipment must be electrically and mechanically disconnected and locked OFF from all sources of power.

Please refer to the site safety procedures and the relevant system handbook for the transceiver for full system isolation instructions.

5. Alerts/ Alert Configuration

5.1 Acknowledging an alert

ALERT LOCATION

In all applications, Alerts are located in the lower right hand side of the display.

All Alert information is coded by colour, shape and symbol as defined in IEC 62923-1 Annex A.

When a new alert is received, a magenta border appears around the alert for a set time. The default time for the magenta border to appear is two seconds.



Example of new alert received

NOTICE ALERT LISTINGS

A full list of alerts and a description of possible causes can be found in section 5.12.

With the cursor placed over an alert in the display, the following cursor options become available:

Acknowledge. Alert (left click):	Acknowledges the alert currently displayed.
No function (middle click):	The middle button has no function.
Expands Alert List (Right click):	Expands the alert list allowing all alerts to be viewed.



The following occurs when an alert is acknowledged:

- The current alert being viewed is acknowledged.
- The audible alarm associated with the condition is silenced.
- If no further alert conditions are present, the alert button ceases to flash.

A visual indication of the alert will continue to show until the alert condition is cleared.

5.2 Expand/ collapse Alert list

Right clicking on an alert produces an expanded alert list.

Where multiple alerts are active, use the scroll bar to scroll through the alerts list.

Acknowledged and caution alerts **are grouped together depending on type and can be expanded** to provide more details of the related alerts (see following page for additional details).

Grouped alerts have a +/ - at the left hand side.

Click on + to expand the alert list. Click on – to collapse the list.

When a new alert is received in this expanded mode, a magenta border appears around the entire expanded alert area.





To close the Expanded Alert dialogue, press the \mathbf{X} at the top right hand corner of the box.

When two or more alerts are present and the alert window is collapsed (i.e. only shows the topmost alert), then "More" in cyan is shown on the alert window at the bottom right

When only one alert is present, then "More" is no longer displayed.

4 100		Next WPT Next Leg Be ETA at final	earing WPT	,-° :/
RNG BRG LAT LON	Cursor ° (T) °' N °' E	Video Sett	ings Disp epth: Depth	Alarm More
/RM EBL	OFF OFF	Change Display Mode	Show Sync Status	Capture Screen

5.3 Alerts with long descriptions

When the text for an alert is too long to be displayed, the full text can be viewed by placing the cursor over the alert. The full text will be displayed. The time out of the display is configured as part of the cursor configuration; see section 6.17 for details.

5.4 Grouped alerts

Groups of unacknowledged alerts have their respective icons flashing and are separate from the grouped alerts until they are acknowledged.







5.5 Alert priority

NOTICE

Alerts priorities are pre-assigned and cannot be changed.

There are three priorities of alert placed in groups depending on their priority. Higher priority Alerts will override lower priority Alerts. For example, a collision Alert (Alarm priority) will appear as a higher priority than an ARPA: Weak Target (Warning priority).

Alerts are listed in the Alert panel in order of priority as follows:

- ALARM (highest priority).
- WARNING.
- CAUTION (lowest priority).

PRIORITIES: COLLAPSED VIEW

The most recent and highest priority unacknowledged alert is shown in the collapsed alert view.

If there are no unacknowledged alerts, the alerts are shown in rotation.

PRIORITIES: EXPANDED VIEW

When the alert view is expanded, the highest priority unacknowledged alerts are shown at the top of the list.

As the alerts are acknowledged, lower priority unacknowledged alerts are shown.



Alert collapsed view



Alert expanded view

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5.6 Alert escalation

WARNING alerts that are not acknowledged within 60 seconds of activation are promoted/ escalated to ALARM status.

Some WARNING Alerts escalate after a period defined by the relevant standards as detailed below:

- [Anchor Watch] Outside Swing Circle = 120 s:
- [Route] Track Control Position Sensor Failed = 30 s:
- [Route] Track Control Stopped Warning = 30 s:
- [Route] Early course change Warning = 30 s:
- [Route] Actual course change Warning = 30 s:
- [Route] End of Track Warning = 30 s:

IEC 61174 IEC 62065 IEC 62065 IEC 62065 IEC 62065 IEC 62065

5.7 Alert colours and symbols

	ALARM	WARNING	CAUTION
UNACKNOWLEDGED (ACTIVE)	A flashing Red triangle with a symbol of a loudspeaker in the middle presented with alert text.	A flashing yellowish orange circle with a symbol of a loudspeaker in the middle presented with alert text.	
SILENCED ALERT (ACTIVE)	A flashing Red triangle with a symbol of a loudspeaker with a prominent diagonal line through it presented with alert text	A flashing yellowish orange circle with a symbol of a loudspeaker with a prominent diagonal line through it presented with alert text	A yellow square with an
ACKNOWLEDGED ALERT (ACTIVE) Acknowledged alerts remain in the alerts display until the alert condition no longer exists	A red triangle with an exclamation mark presented with alert text	A yellowish orange circle with an exclamation mark presented with alert text	exclamation mark presented with alert text.
UN-ACKNOWLEDGED ALERT (RECTIFIED)	A flashing red triangle with a tick mark presented with alert text	A flashing yellowish orange circle with a tick mark presented with alert text	

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5.8 Deactivated Functions

Alerts related to functions that are deactivated will not be presented or reported to external systems.

The following functions can be deactivated:

- 1. Look-Ahead Enable/Disable
- 2. UKC Depth Alarm (in Depth window) by ticking/unticking box
- 3. Anchor Watch (e.g. Warning: Outside swing circle) by using the "Cancel Anchor Watch" button
- 4. Lost Targets: by setting the Lost Target Detection On/Off
- 5. Route related alarms when Route loaded/unloaded

5.8.1 Panel PC Alarm

MDC-A22-1 & MDC-A26-1

The discontinued MDC-A22-1 and MDC-A26-1 have built in audio alarms that sound in the event of a potential problem with Panel PC operation such as a screen freeze.

200 24 24 24 24 24 24 25 26 27 20		UAT LON VRM EBL	,-* (1) ** N ** E OFF OFF	Past Positions	6 min (R) 6.0 min (Of 6.0 min (T)) Change Display Mode	Show Sync Status	Capture Screen
KELVIN HUGHES)						O e -	• • •	M : Alarm
MDC-A22-1 and	d MDC-A2	26-1 co	nsole d	isplays				

変	System Fault Alarm Audio Button	Silences the audio alarm			
● Alarm	System Fault Alarm LED	Off: Red flashing:	No alarm conditions exist. An alarm condition exists.		

SYSTEM ALARM

If there is a problem with the Panel PC operation such as a program error or a screen freeze, the System Fault Alarm "Alarm" LED will flash and an audible alarm sounds.

SILENCE ALARM

In the event of a system alarm, press the system alert button to silence the audio and re-start the processor using the power switch on the front panel.

If the audio alert continues to sound after a reset please contract HENSOLDT UK for assistance. Contact details can be found at the end of this handbook.

NOTES (MDC-A22-1 and MDC-A26-1 only)

- This alarm is NOT an indication of issues with a transceiver or sub-systems attached to the Navigation Display.
- The system alarm audio is not indication of an operational alert such as collision warning, loss of position sensor etc.
- The system alarm audio button is not used to silence operational alerts such as Collision warnings, loss of position sensor etc.

MDC-A24-1 and MDC-A27-1

The MDC-A24-1 and MDC-A27-1 do not have built in Panel PC operation fault alarms. Correct operation of the Panel PC is indicated via the visual indicator on the top right corner of the screen, see Section 6.66. These displays have built in buzzers for system alerts such as collision warnings.

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5.9 Alert TEST button

The TEST button located at the top left hand side of the **Alert List** can be used to generate a test or dummy alert condition.

Pressing the **TEST** button generates an alert which is displayed in the alert list. In a networked system, Test alerts are not transferred to other workstations.

A 2nd press of the button will generate a 2nd alert called Test: Test Alert 2. Continued presses will add further test alerts to the list.

Test alerts are automatically rectified after a short period.



5.10 Alert configuration app

Alerts can be enabled, configured or disabled by selecting the **Alert Configuration** app located in the apps section located lower left of the standby screen. The list of alerts can be scrolled using the scroll bar to the right hand side of the page.

	Apps
	Single Radar Display
	Dual Radar Display
	Conning Display
	Na∨igation & Conning Display
	ECDIS
	External Apps
	Chart Maintenance
5/22	Route Planning
	Alert Configuration

Alert Configuration App

NOTICE CHANGE OF PASSWORD & SECURITY

HENSOLDT UK strongly recommend that the Alert Password is changed upon receipt/ handover of the system.

The new password should be securely stored by a senior member of the bridge crew such as the Captain and should also be recorded with the vessel Management Company/ owner. Section 5.10.8 details changing the password.

NOTICE

FACTORY DEFAULT ALERT CONFIGURATION

The system alerts are configured to all be enabled by default. Classification society rules should be followed when disabling alerts.

The Alert configuration page has the following columns which are detailed in the following pages.

Alert:	A number associated with a specific Alert. The Alert number/ ID cannot be changed. When present, IEC 62923-1 standard ID alerts will be shown in brackets. These are used for interfacing to a BAM.
Priority:	A priority status for each Alert. The priority status of each Alert is fixed and cannot be changed.
Message:	A description of each Alert.
Limit:	Some Alerts have configurable distance or time limits displayed in this column.
Unit:	The unit of measure for the limit.
Enable:	Switch the selected Alert ON (enable) or OFF (disable); see the above notice regarding the Factory default alert configuration.
Transfer:	Enable/ Disable the transfer of the selected Alert to external systems such as BAM or Bridge Navigation Watch Alert System (BNWAS)."

5.10.1 Setting Alert limits

Some Alerts have limits; for example Anchor watch. To adjust the limit, place the cursor in the limits box and use the keyboard to enter the desired value.

A							
17	7009	Alarm	ARPA: Anchor watch limit exceeded	150.000	m	enabled	enabled
15	92	Warning	Guard Zone Target Detected			enabled	enabled

5.10.2 Enable/ Disable Alerts

Individual Alerts can be switched ON (Enabled) or OFF (Disabled) by placing the cursor on the Enable or Transfer column for the required Alert and selecting Enable or Disable.

The **Transfer** column enables/ disables the transfer of Alerts via relays to external systems ← such as Bridge Navigation Watch Alert System (BNWAS).

The Enable Column switches Alerts ON/ OFF within the system.

Alarm Priority Message Limit Units Enable Transfer 156 Warning Position: Position Monitoring limit exceeded enabled d

Changes in Alert status must be saved using the Save Settings button before exiting the Alert configuration page. The Alert password will be required when saving the settings.

NOTICE FACTORY DEFAULT ALERT CONFIGURATION

The system alerts are configured to all be enabled by default. Classification society rules should be followed when disabling alerts.

5.10.3 Alert Audio ON/ OFF

The audio Alert can be switched OFF.

Change Password	
Network Settings	Close

Alarm Audio Enabled box *Ticked*: Alarm Audio Enabled box *NOT Ticked*: Audio **ON** Audio **OFF**

WARNING AUDIO DISABLED With audio switched OFF, regardless of the Alert priority or condition NO AUDIBLE ALERTS WILL BE GENERATED.

CAUTION

CLASSIFICATION SOCIETY ALERT CONFIGURATION

The system alerts are configured to all be enabled by default. Classification society rules must be followed when disabling alerts.

5.10.4 Alert volume

VOLUME LEVELS

The volume levels for audible alerts are factory set and cannot be adjusted.

- CAUTION: No Audio: *Visual indication of alert only.*
- WARNING: 2-beeps that are not repeated: *Visual indication of alert (see escalation in the next section).*
- ALARM: 3-beeps repeated every 9 seconds: Visual indication of alert.

All alerts can be temporarily silenced by receiving an external ACN message.

5.10.5 Network Settings

In a networked system, the **Network Settings** button gives access to the network management page. The system must be **Mastered** to enable or change Alerts in an INS system

With the cursor placed over the Network Settings button, the following cursor options become available:

Network Settings (left click):	Opens Network Settings.
Middle and Right click:	The middle and right clicks have no function.

SLAVE (changes cannot be saved)

When the INS resource is Slave, the Save button is not available and changes cannot be changed.

MASTER (changes saved and shared)

When the INS resource is Master, the Save button is available. Saved changes are shared across the network.

	Network Settings	Х
Own SFI:	AM1234	
Selected Resource:	INS Resource)
Resource Status:	MASTERED 🦳 🦳 Request Mastership)
Network Nodes:	✓ CS0001	
Select All		
Deselect All		
Sync Selected		

5.10.6 Save & Close Alert configuration APP

SAVE

Press Save Settings to save changes made in the Alerts configuration app.

In a networked system, changes to Alert configurations are shared across all connected displays.

- a) The system will prompt for a password.
- b) Enter the password and press accept (the password is case sensitive).
- c) The changes are saved and the system exits the Alert configuration page.

NOTICE DEFAULT PASSWORD

The factory default password for Alert configuration is: PASSWORD

SAVE BUTTON NOT AVAILABLE?

If the Save button is not available, the display is not set as an INS network Master (see Network Settings above).

Alast Audia Eachlad	Change Password	
Alert Audio Enabled	Network Settings	Close

Alert app controls with Save Dutton not available

CLOSE

Press **Close** to exit the Alerts configuration page.

If changes have been made but not saved, 'Abandon changes?' is displayed.

- Selecting YES: Closes the Alert configuration *without* saving changes.
- Selecting NO: Returns to the Alert configuration page.

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5.10.7 Alert password

A password is required to save any changes made in Alert configuration.

This password can be changed by the user.

THE DEFAULT PASSWORD FOR ALERT CONFIGURATION

The password is: **PASSWORD**

All passwords are case sensitive

CAUTION

THIS PASSWORD IS ALSO USED FOR THE FOLLOWING FUNCTIONS Clearing/ deleting past tracks.

Clearing/ deleting Mariners notes and events.

Enabling/ disabling Lookahead.

5.10.8 Change alert password

NOTICE **PASSWORDS CANNOT BE REMOTELY RESET**

Passwords cannot be remotely reset.

If a password is changed and forgotten, an engineer may need to attend to reset the password. Attendance to reset a lost or forgotten password is not covered under warranty.

CHANGE PASSWORD

Noting the above warning, to change the password, press Change Password.

Alert Audio Enabled	Change Password Save Settings Close					
Type in the default or current password and press Accept.	Change Password X					
Enter and repeat the new password and press Accept.	Repeat New Password:					
Passwords are CASE SENSITIVE.	Accept					
If the password is incorrectly entered, a warning is shown.	Alert System Setup Repeated password is different. Password NOT changed.					
Carefully re-enter the password.	ок					
NOTICE						

STORAGE OF CHANGED PASSWORD

The new password should be securely stored by a senior member of the bridge crew such as the Captain and should also be recorded with the vessel Management Company/ owner.

5.11 Supported Interfaces

The Navigation Display system supports the following interfaces:

- IEC 61162-1
- IEC 61162-2
- IEC 61162-450

Alert handling is compliant with IEC 62923-1 for BAM compliant equipment.

NOTE

• Responsibility Transfer is no longer supported.

5.12 List of Alerts

Some of the Alerts shown below are only used in custom applications. Enabling or Disabling these Alerts has no impact on system performance.

The on-screen Alert information is coded by colour, shape and symbol as defined in IEC 61924-2 Annex M.

Underlying causes of situation requiring attention are treated as caution alerts that do not provide (additional) audio.

e.g. Functional Alert is "Speed: Loss of distance (VLW)". Underlying cause is "Speed: Invalid message (VLW).

NOTICE

FACTORY DEFAULT ALERT CONFIGURATION

The system alerts are configured to all be enabled by default. Classification society rules should be followed when disabling alerts.

CHART INSTALLATION ALERTS

For error messages displayed during chart installation see section 7.3.20.

TABLE KEY

KEY TO LIST OF ALERTS	
ALERT NO. xxxxx (yyyy):	xxxxx: The HENSOLDT UK number (yyyy): The unique alert identifiers as defined in IEC 62923-1 Annex A.
PRIORITY:	The alert status i.e. Alarm, Warning or Caution.
	Shows if the alert is a Category A or B. This only applies to (yyyy) IEC defined alerts. <i>HENSOLDT UK Cautions do not have categories and are shown as '-</i> '.
CAT. (CATEGORY):	Category A alerts are specified as alerts where information at a task station directly assigned to the function generating the alert is necessary, as decision support for the evaluation of the alert-related condition, e.g. danger of collision and anger of grounding. These alerts cannot be remotely acknowledged
	Category B alerts are specified as alerts where no additional information for decision support is necessary besides the information which can be presented at the CAM-HMI. These alerts can be remotely acknowledged
ALERT TEXT:	A summary of the alert.
DESCRIPTION:	A brief description of the circumstances that caused the alert to be generated.

NOTE

 For INS Systems with a CAM-HMI, a system failure of the CAM-HMI functionality does not lead to the loss of the alert announcement functionality on this display.

LIST OF ALERTS

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION	
11003	Caution	А	Config: AlertConfig.ini error	A configuration error has occurred. Please contact HENSOLDT UK for assistance.	
12003	Caution	B	Position: Invalid	Indicates an error with a GLL message from a position sensor.	
(3006)	Caution		message (GLL)	The GLL message provides position information.	
12004	Alarm	в	Position: Datum Unknown (DTM)	Indicates that the horizontal datum of the position provided in a GLL message from a position sensor is not known.	
(5004)			Mark-up	The horizontal datum is provided in a DTM message from a position sensor.	
12005	Warning	В	Position: Datum Unknown (DTM)	Indicates that the horizontal datum of the position provided in a GLL message from a position sensor is not known.	
(5003)			Mark-up	The horizontal datum is provided in a DTM message from a position sensor.	
12007	Alarm	В	Position: Loss of	Indicates that an RMC message from a position sensor has not been received for the specified time.	
(3014)			position (GLL)	The RMC message provides position and velocity information.	
12008	Warning	в	Position: Loss of	Indicates that an RMC message from a position sensor has not been received for the specified time.	
(3015)					The RMC message provides position and velocity information.
12013	Courtier	Caution	B	Position: Invalid	Indicates an error with a GLL message from a position sensor.
(3006)			message (GGA)	The GLL message provides position information.	
12014	Alarm	в	Position: Loss of	Indicates that a GGA message from a position sensor has not been received for the specified time.	
(3014)			position (GGA)	The GGA message provides position information.	
12015	Warning	в	Position: Loss of	Indicates that a GGA message from a position sensor has not been received for the specified time.	
(3015)			position (GGA)	The GGA message provides position information.	
12019	Caution	R	Position: Invalid	Indicates an error with a GNS message from a position sensor.	
(3006)			message (GNS)	The GNS message provides position information.	
12021 (3014)	Alarm	в	Position: Loss of	Indicates that a GNS message from a position sensor has not been received for the specified time.	
(3014)			position (GNS)	The GNS message provides position information.	

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
12022	Warning	в	Position: Loss of	Indicates that a GNS message from a position sensor has not been received for the specified time.
(0010)				The GNS message provides position information.
12026 (3056)	Caution	В	Position: Lost Differential	Indicates that the position provided in a GNS message from a position sensor no longer incorporates differential corrections.
12029	Caution	Р	Position: Invalid	Indicates an error with a DTM message from a position sensor.
(3006)	Caution	D	message (DTM)	The DTM message provides horizontal datum information.
12031 (3004)	Alarm	В	Position: Datum not WGS84 (DTM)	Indicates that the horizontal datum in the DTM message from a position sensor is not WGS84.
12032 (3005)	Warning	В	Position: Datum not WGS84 (DTM)	Indicates that the horizontal datum in the DTM message from a position sensor is not WGS84.
12034	Alarm	rm B F	Position: Loss of	Indicates that a DTM message from a position sensor has not been received for the specified time.
(3004)				datum (DTM)
12035	Warning	В	B Position: Loss of datum (DTM)	Indicates that a DTM message from a position sensor has not been received for the specified time.
(3005)	-			The DTM message provides horizontal datum information.
12039 (3006)	Caution	В	Speed Log: Invalid message (VHW)	Indicates an error with a VHW message from a speed log sensor. The VHW message provides water speed information.
12041	Alarm	В	Heading & Speed Log: Invalid Loss of	Indicates that a VHW message from a speed log sensor has not been received for the specified time.
(3014)			(VHW)	The VHW message provides water speed information.
12042	Warning	В	Heading & Speed Log: Invalid Loss of	Indicates that a VHW message from a speed log sensor has not been received for the specified time.
(3015)			(VHW)	The VHW message provides water speed information.
12046	Caution	P	Position: Invalid	Indicates an error with a VTG message from a position sensor.
(3006)	Caulion		message (VTG)	The VTG message provides SOG and COG information.
12047	Alarm	В	Position: Loss of	Indicates that a VTG message from a position sensor has not been received for the specified time.
(3014) vector (VTG)		The VTG message provides SOG and COG information.		

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
12048	Warning	В	Position: Loss of	Indicates that a VTG message from a position sensor has not been received for the specified time.
(3013)				The VTG message provides SOG and COG information.
12059			Padar: Invalid	Indicates an error with a TTM message.
(3006)	Caution	В	message (TTM)	The TTM message provides Tracked Target information.
12061	Alarm	B	Radar: Loss of	Indicates that a TTM message has not been received for the specified time.
(3014)	Aldini		target (TTM)	The TTM message provides Tracked Target information.
12062	Warning	B	Radar: Loss of	Indicates that a TTM message has not been received for the specified time.
(3015)	Warning		target (TTM)	The TTM message provides Tracked Target information.
12066	Caution	B	Depth: Invalid message (DPT)	Indicates an error with a DPT message from a depth sensor.
(3006)	Caution	b		The DPT message provides depth information.
12067	Alarm	В	B Depth: Loss of depth (DPT)	Indicates that a DPT message from a depth sensor has not been received for the specified time.
(3014)				The DPT message provides depth information.
12068	12068 Warning	в	B Depth: Loss of depth (DPT)	Indicates that a DPT message from a depth sensor has not been received for the specified time.
(3013)				The DPT message provides depth information.
12073	Caution	B	Depth: Invalid	Indicates an error with a DBT message from a depth sensor.
(3006)	Caution		message (DBT)	The DBT message provides depth information.
12074	Alarm	В	Depth: Loss of	Indicates that a DBT message from a depth sensor has not been received for the specified time.
(3014)				The DBT message provides depth information.
12075	Warning	В	Depth: Loss of	Indicates that a DBT message from a depth sensor has not been received for the specified time.
(3013)				The DBT message provides depth information.
12079	Caution	B	Heading: Invalid	Indicates an error with a HDT message from a heading sensor.
(3006)	Gaution	5	message (HDT)	The HDT message provides heading information.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
12081 (3014)	Alarm	В	Heading: Loss of heading (HDT)	Indicates that a HDT message from a heading sensor has not been received for the specified time. The HDT message provides heading information.
12082	Warning	в	Heading: Loss of	Indicates that a HDT message from a heading sensor has not been received for the specified time.
(3013)				The HDT message provides heading information.
12086	Caution	B	Speed: Invalid	Indicates an error with a VBW message from a speed sensor.
(3006)	Caution	Б	message (VBW)	The VBW message provides water and ground speed information.
12087	Alarm	в	Speed: Loss of	Indicates that a VBW message from a speed sensor has not been received for the specified time.
(3014)			speed (VBW)	The VBW message provides water and ground speed information.
12088	Warning	в	Speed: Loss of	Indicates that a VBW message from a speed sensor has not been received for the specified time.
(3015)	(3015)		speed (VBW)	The VBW message provides water and ground speed information.
12093	Caution	в	Position: Invalid	Indicates an error with a ZDA message from a position sensor.
(3000)		message (ZDA)	message (ZDA)	The ZDA message provides time information.
12094 (3014)	Alarm	В	Position: Loss of time (ZDA)	Indicates that a ZDA message from the position sensor has not been received for the specified time.
				The ZDA message provides time information.
12095 (3015)	Warning	в	Position: Loss of time (ZDA)	Indicates that a ZDA message from the position sensor has not been received for the specified time.
				The ZDA message provides time information.
12113 (3006)	Caution	В	Speed: Invalid message (VLW)	Indicates an error with a VLW message from a speed sensor. The VLW message provides log distance information.
12114	12114 (3014) Alarm B	в	Speed: Loss of	Indicates that a VLW message from a speed log sensor has not been received for the specified time.
(3014)			distance (VLVV)	The VLW message provides water speed information.
12115	Warning	в	Speed: Loss of	Indicates that a VLW message from a speed log sensor has not been received for the specified time.
(3015)				The VLW message provides water speed information.
12119 (3006)	Caution	в	Wind: Invalid message (MWV)	Indicates an error with a MWV message from a wind sensor. The MWV message provides wind information.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION	
12121 (3014)	Alarm	В	Wind: Loss of wind (MWV)	Indicates that a MWV message from a wind sensor has not been received for the specified time. The MWV message provides wind information.	
12122 (3015)	Warning	В	Wind: Loss of wind (MWV)	Indicates that a MWV message from a wind sensor has not been received for the specified time. The MWV message provides wind information.	
12133			AIS: Invalid	Indicates an error with a VDM message from a position sensor.	
(3006)	Caution	В	message (VDM)	The VDM message provides horizontal datum information.	
12134	Alarm	B	AIS: Loss of AIS	Indicates that a VDM message from AIS has not been received for the specified time.	
(3014)	<i>r</i> uarin		(VDM)	The VDM message provides AIS information.	
12135	Warning	B	AIS: Loss of AIS	Indicates that a VDM message from AIS has not been received for the specified time.	
(3015)	Warning		(VDM)	The VDM message provides AIS information.	
12139	Caution	в	Heading: Invalid	Indicates that a ROT message from a heading sensor has not been received for the specified time.	
(3008)	6)			message (ROT)	The ROT message provides Rate Of Turn information.
12141	12141 Alarm (3014)	P	B Heading: Loss of ROT (ROT)	Indicates an error with a ROT message from a heading sensor.	
(3014)		Б		The ROT message provides Rate Of Turn information.	
12142			Heading: Loss of	Indicates an error with a ROT message from a heading sensor.	
(3015)	Warning	В	ROT (ROT)	The ROT message provides Rate Of Turn information.	
12146 (3006)	Caution	В	Propulsion: Invalid message (RPM)	Indicates an error with an RPM message from a propulsion sensor. The RPM message provides shaft or engine revolution rate and propeller pitch information.	
12147 (3014)	Alarm	В	Propulsion: Loss of RPM (RPM)	Indicates that an RPM message from a propulsion sensor has not been received for the specified time. The RPM message provides shaft or engine revolution rate and propeller pitch information.	
12148 (3015)	Warning	В	Propulsion: Loss of RPM (RPM)	Indicates that an RPM message from a propulsion sensor has not been received for the specified time. The RPM message provides shaft or engine revolution rate and propeller pitch information.	
12153 (3006)	Caution	В	Rudder: Invalid message (RSA)	Indicates an error with an RSA message from a rudder sensor. The RSA message provides rudder angle information.	
12154 (3014)	Alarm	в	Rudder: Missing Rudder (RSA)	Indicates missing rudder angle information.	
12155 (3015)	Warning	В	Rudder: Missing Rudder (RSA)	Indicates missing rudder angle information.	

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
12157	Alarm	в	Rudder: Loss of rudder (RSA)	Indicates that an RSA message from a rudder sensor has not been received for the specified time.
(3014)				The RSA message provides rudder angle information.
12158	Warning	В	Rudder: Loss of	Indicates that an RSA message from a rudder sensor has not been received for the specified time.
(0010)				The RSA message provides rudder angle information.
12169 (3006)	Caution	В	Alerts: Invalid message (ACK)	Indicates an error with an ACK message from a central alarm unit. The ACK message provides alert acknowledgement information.
12171	Alarm	В	Alerts: Loss of acknowledgement	Indicates that an ACK message from a central alarm unit has not been received for the specified time.
(3014)			(ACK)	The ACK message provides alert acknowledgement information.
12172	Warning	В	Alerts: Loss of acknowledgement (ACK)	Indicates that an ACK message from a central alarm unit has not been received for the specified time.
(3015)				The ACK message provides alert acknowledgement information.
12176 (3006)	Caution	В	Alerts: Invalid message (ALR)	Indicates an error with an ALR message from a central alarm unit. The ALR message provides alert information.
12177	Alarm	В	Alerts: Loss of alert	Indicates that an ALR message from a central alarm unit has not been received for the specified time.
(3014)				The ALR message provides alarm information.
12178	Warning	B Alert	Alerts: Loss of alert	Indicates that an ALR message from a central alarm unit has not been received for the specified time.
(3013)				The ALR message provides alarm information.
12181 (3014)	Alarm	В	Speed: VBW Water speed invalid	Indicates an error with a VBW message from a speed log sensor. The VBW message provides water speed information.
12182 (3015)	Warning	В	Speed: VBW Water speed invalid	Indicates an error with a VBW message from a speed log sensor. The VBW message provides water speed information.
12184	Alarm	B	Speed: VBW	Indicates an error with a VBW message from a speed sensor.
(3014)	Aldilli	Б	invalid	The VBW message provides water and ground speed information.
12185	Warning	Р	Speed: VBW	Indicates an error with a VBW message from a speed sensor.
(3015)	(3015) Warning B Ground speed invalid	The VBW message provides water and ground speed information.		

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
12189	Caution	в	Heading: Invalid	Indicates an error with a THS message from a position sensor.
(3006)			message (THS)	The THS message provides position and velocity information.
12191	Alarm	в	Heading: Loss of	Indicates that a THS message from a heading sensor has not been received for the specified time.
(3014)			neading (THS)	The THS message provides heading information.
12192	Warning	В	Heading: Loss of	Indicates that a THS message from a heading sensor has not been received for the specified time.
(3015)	U		neading (THS)	The THS message provides heading information.
12196	Caution	B	Position: Invalid	Indicates an error with an RMC message from a position sensor.
(3006)	oution		message (RMC)	The RMC message provides position and velocity information.
12197	197 Alarm	в	B Position: Loss of position (RMC)	Indicates that an RMC message from a position sensor has not been received for the specified time.
(3014)				The RMC message provides position and velocity information.
12198	Warning	/arning B	Position: Loss of position (RMC)	Indicates that an RMC message from a position sensor has not been received for the specified time.
(3015)				The RMC message provides position and velocity information.
12236	Coution	P	Transducer: Invalid	Indicates an error with the XDR message from a transducer or a HENSOLDT UK VDR-A4 data interface unit.
(3006)	Caution	В	message (XDR)	The XDR message can be configured during commissioning to give a number of different types of information.
12237	Alarm	В	Transducer: Loss of Transducers (XDR)	Indicates that the XDR message from a transducer or a HENSOLDT UK VDR-A4 data interface unit has not been received for the specified time.
(3014)	3014) Dianin B			The XDR message can be configured during commissioning to give a number of different types of information.
12238	Warning	в	Transducer: Loss of	Indicates that the XDR message from a transducer or a HENSOLDT UK VDR-A4 data interface unit has not been received for the specified time.
(3015)			Transducers (XDR)	The XDR message can be configured during commissioning to give a number of different types of information.
12243 (3006)	Caution	В	Label: Invalid message (LBL)	This alarm has no function on commercial equipment.
12244 (3014)	Alarm	в	Label: Loss of Track Label (LBL)	This alarm has no function on commercial equipment.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
12245 (3015)	Warning	В	Label: Loss of Track Label (LBL)	This alarm has no function on commercial equipment.
12249 (3006)	Caution	В	Autopilot: Invalid message (HTD)	Indicates an error with an HTD message from an autopilot. The ASD message provides autopilot status information from a C-Plath autopilot.
12251 (3014)	Alarm	В	Autopilot: Loss of autopilot data (HTD)	Indicates Loss of track data from Autopilot
12252 (3015)	Warning	В	Autopilot: Loss of autopilot data (HTD)	Indicates Loss of track data from Autopilot
12256 (3006)	Caution	В	Autopilot: Invalid message (SSA)	Indicates an error with an SSD message from the EMRI Autopilot
12257 (3014)	Alarm	В	Autopilot: Loss of autopilot data (SSA)	Indicates loss of SSA data from EMRI Autopilot
12258 (3015)	Warning	В	Autopilot: Loss of autopilot data (SSA)	Indicates loss of SSA data from EMRI Autopilot
12263 (3006)	Caution	В	Autopilot: Invalid message (SSD)	Indicates an error with an SSD message from the EMRI Autopilot
12264 (3014)	Alarm	В	Autopilot: Loss of autopilot data (SSD)	Indicates loss of SSD data from EMRI Autopilot
12265 (3015)	Warning	В	Autopilot: Loss of autopilot data (SSD)	Indicates loss of SSD data from EMRI Autopilot
12279 (3006)	Caution	В	Speed: Missing distance (VLW)	Indicates that a VLW message from a speed sensor has not been received for the specified time. The VLW message provides speed log distance information.
12283 (3006)	Caution	В	BAM: Invalid message (ACN)	Indicates an error with an ACK message from a central alarm unit. The ACK message provides alert acknowledgement information.
12286 (3006)	Caution	В	Heartbeat: Invalid message (HBT)	Indicates an error with an HBT message from a central alarm unit. The HBT message provides alert acknowledgement information.
12287	Alarm	В	Heartbeat: Loss of heartbeat data	Indicates that an HBT message from a central alarm unit has not been received for the specified time.
(3014)			(HBT)	The HBT message provides alert acknowledgement information.
12288	Warning	в	Heartbeat: Loss of heartbeat data	Indicates that an HBT message from a central alarm unit has not been received for the specified time.
(3013)			(HBT)	The HBT message provides alert acknowledgement information.
12291 (3014)	Alarm	В	Loss of data (DoAll)	Loss of DoAll data from an external interface
12292 (3015)	Warning	В	Loss of data (DoAll)	Loss of DoAll data from an external interface
12296 (3006)	Caution	В	Pitch & Roll: Invalid message (PRDID)	A single Pitch & roll (PRDID) message from the sensor has been lost or is bad.
12297 (3014)	Alarm	В	Pitch & Roll: Loss of pitch & roll (PRDID)	>10 Pitch & roll (PRDID) messages have been lost or the signal is missing.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
12298 (3015)	Warning	В	Pitch & Roll: Loss of pitch & roll (PRDID)	>10 Pitch & roll (PRDID) messages have been lost or the signal is missing.
12301 (3014)	Alarm	В	Position: Loss of Vector (RMC)	The Vector RMC message from the sensor has been lost.
12302 (3015)	Warning	В	Position: Loss of Vector (RMC)	The Vector RMC message from the sensor has been lost.
12304 (3014)	Alarm	В	Heading: Loss of Heading (VHW)	The heading VHW message from the sensor has been lost.
12305 (3015)	Warning	В	Heading: Loss of Heading (VHW)	The heading VHW message from the sensor has been lost.
12309 (3006)	Caution	В	Navtex: Invalid message (NRM)	Indicates an error with the message from the Navtex input.
12311 (3014)	Alarm	В	Navtex: Loss of Receiver Mask (NRM)	An invalid or corrupt message has been received from the Navtex.
12312 (3015)	Warning	В	Navtex: Loss of Receiver Mask (NRM)	An invalid or corrupt message has been received from the Navtex.
12314 (3031)	Alarm	Α	Depth: Depth Alarm	The Under Keel Clearance (UKC) depth threshold has been breached.
12319 (3006)	Caution	В	INS invalid message (NSR)	An invalid or corrupt Navigation Status Report (NSR) has been received from Data Distribution Unit (DDU).
12321 (3011)	Alarm	В	INS loss of navigation status report (NSR)	The Navigation Status Report (NSR) from the Data Distribution Unit (DDU) is missing or has not been received.
12322 (3012)	Warning	В	INS loss of navigation status report (NSR)	The Navigation Status Report (NSR) from the Data Distribution Unit (DDU) is missing or has not been received.
12326 (3006)	Caution	В	Radar: Invalid message (TTD)	An invalid or corrupt Tracked Target Data (TTD) message has been received.
12327 (3014)	Alarm	В	Radar: Los of targets (TTD)	A Tracked Target Data (TTD) message is missing or has not been received.
12328 (3015)	Warning	В	Radar: Los of targets (TTD)	A Tracked Target Data (TTD) message is missing or has not been received.
12333 (3006)	Caution	В	AIS: Invalid message (SSD)	An invalid or corrupt AIS configuration message (SSD –Station Static Data) has been received.
12334 (3014)	Alarm	В	AIS: Loss of AIS (SSD)	The AIS configuration message (SSD –Station Static Data) is missing or has not been received.
12335 (3015)	Warning	В	AIS: Loss of AIS (SSD)	The AIS configuration message (SSD –Station Static Data) is missing or has not been received.
12339 (3006)	Caution	В	AIS: Invalid message (VSD)	An invalid or corrupt AIS configuration message (VSD –Voyage Static Data) has been received.
12341 (3014)	Alarm	В	AIS: Loss of AIS (VSD)	The AIS configuration message (VSD – Voyage Static Data) is missing or has not been received.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
12342 (3015)	Warning	В	AIS: Loss of AIS (VSD)	The AIS configuration message (VSD – Voyage Static Data) is missing or has not been received.
12346 (3006)	Caution	В	Radar: Invalid message (TLB)	An invalid or corrupt Target Label (TLB) message has been received.
12347 (3014)	Alarm	В	Radar: Loss of Target Labels (TLB)	A Target Label (TLB) message is missing or has not been received.
12348 (3015)	Warning	В	Radar: Loss of Target Labels (TLB)	A Target Label (TLB) message is missing or has not been received.
12351 (3014)	Alarm	В	Speed log: Loss of speed (VHW)	A Speed log message (VHW) is missing or has not been received.
12352 (3015)	Warning	В	Speed log: Loss of speed (VHW)	A Speed log message (VHW) is missing or has not been received.
12356 (3006)	Caution	В	Display: Invalid message (DDC)	An invalid or corrupt Display Dimming message (DDC) has been received.
12357 (3014)	Alarm	В	Display: Loss of colour scheme (DDC)	The Display Dimming message (DDC) is missing or has not been received.
12358 (3015)	Warning	В	Display: Loss of colour scheme (DDC)	The Display Dimming message (DDC) is missing or has not been received.
12363 (3006)	Caution	В	Route: Invalid message (RRT)	An invalid or corrupt Route Report Transfer (RRT) message has been received.
12364 (3014)	Alarm	В	Route: Loss of route transfer (RRT)	A Route Report Transfer (RRT) message is missing or has not been received.
12365 (3015)	Warning	В	Route: Loss of route transfer (RRT)	A Route Report Transfer (RRT) message is missing or has not been received.
12369 (3006)	Caution	В	Autopilot: Invalid message (HTC)	An invalid or corrupt Track Control message (HTC) has been received from the WECDIS.
12371 (3014)	Alarm	В	Autopilot: Loss of autopilot data (HTC)	A Track Control message (HTC) from the WECDIS is missing or has not been received.
12372 (3015)	Warning	В	Autopilot: Loss of autopilot data (HTC)	A Track Control message (HTC) from the WECDIS is missing or has not been received.
12376 (3006)	Caution	В	RangeGuard: Invalid message (RangeGuard)	An invalid or corrupt message has been received from the RangeGuard system.
12377 (3014)	Alarm	В	RangeGuard: Loss of range data (RangeGuard)	The RangeGuard system has stopped operating or has timed out.
12378 (3015)	Warning	В	RangeGuard: Loss of range data (RangeGuard)	The RangeGuard system has stopped operating or has timed out.
12383 (3006)	Caution	в	Autopilot invalid message (XTE)	An invalid or corrupt Autopilot message (XTE) has been received.
12384 (3014)	Alarm	в	Autopilot loss of data (XTE)	An autopilot message (XTE) is missing or has not been received.
12385 (3015)	Warning	В	Autopilot loss of data (XTE)	An autopilot message (XTE) is missing or has not been received.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
13003	Caution	В	Config: Device Configuration Error	Indicates Config error alert.
15003	Caution	В	VDR: Screen output grab failure.	No response/ confirmation of the screen grab has been received from the Voyage Data Recorder.
15006	Caution	В	VDR: Screen output not acknowledged.	No response/ confirmation of the screen grab has been received from the Voyage Data Recorder.
15009	Caution	В	VDR: ENC output failure.	No response/ confirmation of the ENC output has been received from the Voyage Data Recorder.
16001 (3014)	Alarm	В	Position: Sensor failed. Using DR	Indicates that the currently selected position sensor has failed and that dead reckoning is being used.
16002 (3015)	Warning	В	Position: Sensor failed. Using DR	Indicates that the currently selected position sensor has failed and that dead reckoning is being used.
16007	Alarm	В	Position: Fix needed to update DR	Indicates that the system has been using dead reckoning for longer than the time specified and requires a position fix by the user.
16008	Warning	В	Position: Fix needed to update DR	Indicates that the system has been using dead reckoning for longer than the time specified and requires a position fix by the user.
16011 (3014)	Alarm	В	Position: Sensor failed. Reverted to alternative	Indicates that the selected position sensor has failed and an alternative sensor has been automatically selected.
16012 (3015)	Warning	В	Position: Sensor failed. Reverted to alternative	Indicates that the selected position sensor has failed and an alternative sensor has been automatically selected.
16014 (3014)	Alarm	В	Heading: Sensor failed. Reverted to alternative	Indicates that the selected heading sensor has failed and an alternative sensor has been automatically selected.
16015 (3015)	Warning	В	Heading: Sensor failed. Reverted to alternative	Indicates that the selected heading sensor has failed and an alternative sensor has been automatically selected.
16017 (3014)	Alarm	В	Speed Log: Sensor failed. Reverted to alternative.	Indicates that the selected water speed log sensor has failed and an alternative sensor has been automatically selected.
16018 (3015)	Warning	В	Speed Log: Sensor failed. Reverted to alternative.	Indicates that the selected water speed log sensor has failed and an alternative sensor has been automatically selected.
16024 (3014)	Alarm	В	Speed: Sensor failed. Reverted to alternative	Indicates that the selected water speed sensor has failed and an alternative sensor has been automatically selected.
16025 (3015)	Warning	В	Speed: Sensor failed. Reverted to alternative	Indicates that the selected water speed sensor has failed and an alternative sensor has been automatically selected.
16027 (3014)	Alarm	В	Position: Position monitoring limit exceeded	Indicates distance between EPFS devices has exceeded the Maximum value

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
16028 (3015)	Warning	В	Position: Position monitoring limit exceeded	Indicates distance between EPFS devices has exceeded the Maximum value
16031 (3031)	Alarm	A	Anchor watch: Outside swing circle.	Ownship has moved outside the user configured swing circle configured in the Anchor Watch menu.
16032 (3032)	Warning	A	Anchor watch: Outside swing circle.	Ownship has moved outside the user configured swing circle configured in the Anchor Watch menu.
16034 (3031)	Alarm	A	Anchor Watch: Dragging risk.	The alongship speed (shown on the Anchor watch dialog) exceeds the threshold in Alert setup (alert 17027).
16035 (3032)	Warning	A	Anchor Watch: Dragging risk.	The alongship speed (shown on the Anchor watch dialog) exceeds the threshold in Alert setup (alert 17027).
17003 (3043)	Caution	Α	AIS: Targets nearing display capacity	Indicates that the number of AIS targets displayed is 95% of the display capacity.
17004 (3041)	Alarm	A	AIS: Target display capacity exceeded	Indicates that the number of AIS targets has exceeded the display capacity and some targets are therefore not displayed.
17005 (3042)	Warning	A	AIS: Target display capacity exceeded	Indicates that the number of AIS targets has exceeded the display capacity and some targets are therefore not displayed.
17009 (3043)	Caution	A	ARPA: Tracked Targets nearing processing capacity	Indicates that the number of Tracked Targets displayed is 95% of the processing capacity.
17011 (3041)	Alarm	A	ARPA: Tracked Target processing capacity exceeded	Indicates that the maximum number of Tracked Targets that can be processed has been reached. Existing Tracked Targets must be deleted before further targets may be tracked.
17012 (3042)	Warning	A	ARPA: Tracked Target processing capacity exceeded	Indicates that the maximum number of Tracked Targets that can be processed has been reached. Existing Tracked Targets must be deleted before further targets may be tracked.
17014 (3051)	Alarm	A	ARPA: Lost Tracked Target	Indicates that a Tracked Target has been lost.
17015 (3052)	Warning	Α	ARPA: Lost Tracked Target	Indicates that a Tracked Target has been lost.
17017 (3051)	Alarm	Α	ARPA: Lost reference target	Indicates that a tracked reference target has been lost.
17018 (3052)	Warning	Α	ARPA: Lost reference target	Indicates that a tracked reference target has been lost.
17021 (3051)	Alarm	Α	AIS: Lost AIS target	Indicates that an AIS target has been lost.
17022 (3052)	Warning	A	AIS: Lost AIS target	Indicates that an AIS target has been lost.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
1702/				A Tracked Target / AIS target is on a collision course with ownship.
(3044)	Alarm A	A	Collision warning	The 'Collision Warning' alarm is excluded from the displayed list of alerts and cannot be disabled.
17027 (3031)	Alarm	A	ARPA: Anchor watch limit exceeded	Indicates that ownship's position has moved by more than the limit set since the anchor watch was started, based on the relative positions of all anchor watch Tracked Targets.
17031 (3047)	Alarm	A	Guard Zone Target Detected	A new radar return (target) has entered the user defined and activated Guardzone. The radar return will be automatically acquired as a Tracked Target.
17032 (3048)	Warning	A	Guard Zone Target Detected	A new radar return (target) has entered the user defined and activated Guardzone. The radar return will be automatically acquired as a Tracked Target.
17043	Caution	A	ARPA: Weak Target	A radar Tracked Target can no longer be found (see target tracking in the contents of this handbook).
17046	Caution	A	ARPA: Target Found	A previously 'lost' target has been found or reacquired (see notes and warnings in target tracking in the contents of this handbook).
17051 (3041)	Alarm	A	Target: Unique target ID capacity exceeded	The number of targets being tracked across the network has exceeded 450 targets.
17052 (3042)	Warning	A	Target: Unique target ID capacity exceeded	The number of targets being tracked across the network has exceeded 450 targets.
17054 (3051)	Alarm	Α	AIS: Lost AIS ATON	Indicates that an AIS ATON has been lost.
17055 (3052)	Warning	A	AIS: Lost AIS ATON	Indicates that an AIS ATON has been lost.
17057 (3051)	Alarm	A	AIS: Lost AIS locating device	Indicates that an AIS locating device (AIS-) has been lost. AIS locating devices are AIS SART, AIS EPIRB and AIS MOB.
17058 (3052)	Warning	A	AIS: Lost AIS locating device	Indicates that an AIS locating device has been lost. AIS locating devices are AIS SART, AIS EPIRB and AIS MOB.
17060 (3041)	Alarm	A	AIS: Data report display capacity exceeded	Indicates that the number of AIS data reports has exceeded the display capacity and some data reports are therefore not displayed. Data reports are AIS Aids to Navigation, AIS Search and Rescue Aircraft and AIS Base Stations.
17061 (3042)	Warning	A	AIS: Data report display capacity exceeded	Indicates that the number of AIS data reports has exceeded the display capacity and some data reports are therefore not displayed. Data reports are AIS Aids to Navigation, AIS Search and Rescue Aircraft and AIS Base Stations.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
17063 (3041)	Alarm	A	AIS: Locating device display capacity exceeded	Indicates that the number of AIS locating devices has exceeded the display capacity and some locating devices are therefore not displayed. AIS locating devices are AIS SART, AIS EPIRB and AIS MOB.
17064 (3042)	Warning	A	AIS: Locating device display capacity exceeded	Indicates that the number of AIS locating devices has exceeded the display capacity and some locating devices are therefore not displayed. AIS locating devices are AIS SART, AIS EPIRB and AIS MOB.
18001 (3014)	Alarm	В	TCVR: No Sync	Indicates that the display has not detected the sync signal from the selected radar sensor.
18002 (3015)	Warning	В	TCVR: No Sync	Indicates that the display has not detected the sync signal from the selected radar sensor.
18004 (3014)	Alarm	В	TCVR: No Azimuth	Indicates that the display has not detected the azimuth signal from the selected radar sensor.
18005 (3015)	Warning	В	TCVR: No Azimuth	Indicates that the display has not detected the azimuth signal from the selected radar sensor.
18007 (3014)	Alarm	В	TCVR: No Heading Line	Indicates that the display has not detected the heading line signal from the selected radar sensor.
18008 (3015)	Warning	В	TCVR: No Heading Line	Indicates that the display has not detected the heading line signal from the selected radar sensor.
18011 (3007)	Alarm	В	RIU: Unit Failed. Reverted to default TCVR	Indicates that the RIU has failed, and the display can only use the default radar sensor.
18012 (3008)	Warning	В	RIU: Unit Failed. Reverted to default TCVR	Indicates that the RIU has failed, and the display can only use the default radar sensor.
18016	Caution	В	RIU: Unit now available	Indicates that the RIU is available after having failed and that a radar sensor other than the default one can now be selected.
18019	Caution	В	TCVR: SharpEye Rx sensitivity test failed	Indicates a receiver sensitivity fault in the SharpEye™ radar sensor.
18021	Alarm	В	TCVR: SharpEye Tx VSWR test failed	Indicates a VSWR test failure in the SharpEye™ radar sensor.
18022	Warning	В	TCVR: SharpEye Tx VSWR test failed	Indicates a VSWR test failure in the SharpEye™ radar sensor.
18026	Caution	В	TCVR: SharpEye low Tx power	Indicates that the Tx power output from a SharpEye™ radar sensor has been set to low.
18027	Alarm	в	TCVR: SharpEye hardware error (PLO lock)	Indicates a phase locked oscillator fault in the SharpEye™ radar sensor.
18028	Warning	В	TCVR: SharpEye hardware error (PLO lock)	Indicates a phase locked oscillator fault in the SharpEye™ radar sensor.
18031	Alarm	В	TCVR: SharpEye hardware error (synthesizer lock)	Indicates a hardware fault in the SharpEye™ radar sensor.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
18032	Warning	В	TCVR: SharpEye hardware error (synthesizer lock)	Indicates a hardware fault in the SharpEye™ radar sensor.
18036	Caution	В	TCVR: SharpEye over-temperature	Indicates that the SharpEye TM radar sensor has exceeded normal operating temperature and is operating on low power.
18037	Alarm	В	TCVR: SharpEye over temperature shutdown	Indicates that the SharpEye [™] temperature has exceeded a second threshold and the radar sensor has therefore shut down.
18038	Warning	В	TCVR: SharpEye over temperature shutdown	Indicates that the SharpEye TM temperature has exceeded a second threshold and the radar sensor has therefore shut down.
18041 (3014)	Alarm	В	TCVR: SharpEye loss of Azimuth/ Heading line	Indicates that the SharpEye [™] radar sensor is not receiving an azimuth or heading line signal.
18042 (3015)	Warning	В	TCVR: SharpEye loss of Azimuth/ Heading line	Indicates that the SharpEye [™] radar sensor is not receiving an azimuth or heading line signal.
18043 (3016)	Caution	В	TCVR: SharpEye loss of Azimuth/ Heading line	Indicates that a SharpEye™ radar sensor not currently in use is not receiving an azimuth or heading line signal.
18044	Alarm	В	TCVR: Performance monitor not commissioned. (Run test)	The performance monitor on the selected transceiver has not been run. This alert appears if the operator activates the PM function when the 12 kW transceiver has not been successfully commissioned. The performance monitor values are automatically set when the Commission
				tab in Setup. The performance monitor on the selected
18045	Warning	В	TCVR: Performance monitor not commissioned. (Run test)	transceiver has not been run. This alert appears if the operator activates the PM function when the 12 kW transceiver has not been successfully commissioned. The performance monitor values are automatically set when the Commission Sensor button is pressed in the Radar Sensor tab in Setup
18047	Alarm	В	TCVR: Transmitter performance degraded (Min magnetron current)	The magnetron current is too low across 10 consecutive scans. The Magnetron current has dropped since the system was commissioned. This would indicate that the performance of the magnetron has degraded.
18048	Warning	В	TCVR: Transmitter performance degraded (Min magnetron current)	The magnetron current is too low across 10 consecutive scans. The Magnetron current has dropped since the system was commissioned. This would indicate that the performance of the magnetron has degraded.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
18051	Alarm	В	TCVR: Transmitter performance degraded (Max magnetron current)	The magnetron current is too high across 10 consecutive scans. The Magnetron current has increased since the system was commissioned. This would indicate that the performance of the magnetron has degraded.
18052	Warning	В	TCVR: Transmitter performance degraded (Max magnetron current)	The magnetron current is too high across 10 consecutive scans. The Magnetron current has increased since the system was commissioned. This would indicate that the performance of the magnetron has degraded.
18054	Alarm	В	TCVR: Transmitter performance degraded (Avg magnetron current)	The average magnetron current across 30 consecutive scans is too high. The average Magnetron current since the system was commissioned is high. This would indicate that the performance of the magnetron has degraded.
18055	Warning	В	TCVR: Transmitter performance degraded (Avg magnetron current)	The average magnetron current across 30 consecutive scans is too high. The average Magnetron current since the system was commissioned is high. This would indicate that the performance of the magnetron has degraded.
18057	Alarm	В	TCVR: Receiver performance degraded (Max MBS)	The average magnetron current across 30 consecutive scans is too high. The average Magnetron current since the system was commissioned is high. This would indicate that the performance of the magnetron has degraded.
18058	Warning	В	TCVR: Receiver performance degraded (Max MBS)	The average magnetron current across 30 consecutive scans is too high. The average Magnetron current since the system was commissioned is high. This would indicate that the performance of the magnetron has degraded.
18061	Alarm	В	TCVR: Transmitter performance degraded (Magnetron current spread)	The magnetron is modding/ spluttering (inconsistent & high current being drawn). The magnetron should be replaced as soon as possible.
18062	Warning	В	TCVR: Transmitter performance degraded (Magnetron current spread)	The magnetron is modding/ spluttering (inconsistent & high current being drawn). The magnetron should be replaced as soon
18066	Caution	в	TCVR: Performance monitor test passed.	The performance monitor has passed the internal tests.

ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
18069	Caution	В	Config: Autonomous control capability mismatch.	There is a configuration error. There is a mixture of units (display and transceivers) with Autonomous Transceiver Control enabled and disabled. This may result in a radar antenna turning unexpectedly.
18071	Alarm	В	Config: Autonomous control capability mismatch.	There is a configuration error. There is a mixture of units (display and transceivers) with Autonomous Transceiver Control enabled and disabled. This may result in a radar antenna turning unexpectedly.
18072	Warning	В	TCVR: Error	The Manta NEO X-Band transceiver has reported an internal error.
18074	Alarm	В	TCVR: Performance monitor test passed.	The performance monitor has passed the internal tests.
19003	Caution	в	CODEC: Master request denied	In a networked system, a workstation has requested mastership, but the request has been denied by the existing master workstation. This can be due to the current master being busy or if it is editing the resource.
19006	Caution	В	CODEC: Duplicate priorities detected	Workstation priorities have been incorrectly configured. This is a commissioning / setting to work alert.
19009	Caution	В	CODEC: Chart outfit out of date	In an INS system, the charts on a specific workstation (SFI) do not match the charts on the Master INS workstation.
19013	Caution	В	CODEC: Route updated via network	A route update has been received via the network and has been automatically loaded
20003	Caution	A	Chart: No ENC Available. Refer to paper chart	No ENC chart data is loaded or available at ownship position.
20006	Caution	Α	Chart: Updates available	Chart updates are available for installation.
20009	Caution	A	Chart: Permit expiry	The permit for the cell at ownship position has expired. The data on screen could be out of date. A new permit for the cell is required.
20011 (3031)	Alarm	A	Look-Ahead: Safety Contour	Indicates a look-ahead caution
20014 (3034)	Alarm	A	Look-Ahead: Area with special conditions	Indicates a look-ahead caution
20015 (3035)	Warning	A	Look-Ahead: Area with special conditions	Indicates a look-ahead caution
20019	Caution	Α	Look-Ahead: Other	Indicates a look-ahead caution
20023	Caution	A	Chart: Overlap. Some chart data is overlapped by other chart data and is not visible.	Two charts are overlapped. Data may be obscured by the top level chart. Switching between chart data types may assist.
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ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
20026	Caution	В	Chart: Non-ECDIS presentation.	A non-ECDIS approved chart is being displayed. i.e. the colour pallet is set to Chart Radar.
20029	Caution	В	Chart: Non-ENC data present	This alert is presented when some of the chart data displayed on screen not official ENC data.
20033	Caution	В	Chart: Chart information not up-to-date.	An S63 or S57 cell being displayed is not up to date.
21001 (3024)	Alarm	A	Route: Cross track limit exceeded	Ownship has deviated beyond the cross track limit (channel width) of the route currently loaded.
21004 (3037)	Alarm	Α	Route: Approaching Critical Point	Route: Alerts the user that they are approaching a critical point on a loaded route
21005 (3038)	Warning	Α	Route: Approaching Critical Point	Route: Alerts the user that they are approaching a critical point on a loaded route
21007 (3031)	Alarm	Α	Route: Off course	Indicates ownship position is off course against a route.
21008 (3032)	Warning	Α	Route: Off course	Indicates ownship position is off course against a route.
21011 (3064)	Alarm	В	Route: Speed too low for track control	Indicates the current speed is too low for track control.
21012 (3065)	Warning	В	Route: Speed too low for track control	Indicates the current speed is too low for track control.
21014 (3014)	Alarm	В	Route: Track Control Position Sensor Failed	The GNSS position sensor in use for track control has failed.
21015 (3015)	Warning	В	Route: Track Control Position Sensor Failed	The GNSS position sensor in use for track control has failed.
21017 (3007)	Alarm	В	Route: Track Control stopped Alarm	Indicated track control has stopped
21018 (3008)	Warning	В	Route: Track Control stopped Warning	Indicated track control has stopped
21021 (3037)	Alarm	В	Route: Early course change Alarm	Indicates Vessel is on approach to turn
21022 (3038)	Warning	В	Route: Early course change Warning	Indicates Vessel is on approach to turn
21024 (3027)	Alarm	В	Route: Actual course change Alarm	Indicates Vessel is currently changing course
21025 (3028)	Warning	В	Route: Actual course change Warning	Indicates Vessel is currently changing course
21027 (3024)	Alarm	В	Route: End of track Alarm	Indicates Vessel is coming to the end of its route
21028 (3025)	Warning	В	Route: End of track Warning	Indicates Vessel is coming to the end of its route

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ALERT NO.	PRIORITY	CAT.	ALERT TEXT	DESCRIPTION
21033 (3006)	Caution	В	Route: Invalid message (RTE/ WPL)	A bad or incorrectly formatted RTE/ WPL message has been received.
21034 (3014)	Alarm	В	Route: Loss of route data (RTE/WPL)	Loss of RTE/WPL message
21035 (3015)	Warning	В	Route: Loss of route data (RTE/WPL)	Loss of RTE/WPL message
21039	Caution	В	Route: Route exceeds 85° latitude.	The maximum North and South latitudes at which the ECDIS is qualified for use is 85°.
21043	Caution	В	Route: Route Load Error	A route file received via the network has been corrupted and could not be loaded.
22003 (3079)	Caution	A	System: Restart the system at a convenient opportunity	Indicates system is running out of memory. When safe to do so, restart the display/ processor.
22103	Caution	В	IMO: Auxiliary display presentation	This indicates that the selected mode is not Type Approved/ does not fully comply with the Radar or ECDIS standards i.e. HAP or Conning modes.
22201 (0997)	Alarm	В	Test: Test Alert	This is a test alert (see Alert Test button in the Alert Configuration App section).
22202 (0998)	Warning	В	Test: Test Alert	This is a test alert (see Alert Test button in the Alert Configuration App section).
25001 (3061)	Alarm	В	USB: FSD-A178 Interface failed	Indicates that the USB interface between the Processor Unit and the Systems Interface PCB (FSD-A178) has failed.
25002 (3062)	Warning	В	USB: FSD-A178 Interface failed	Indicates that the USB interface between the Processor Unit and the Systems Interface PCB (FSD-A178) has failed.
25004 (3014)	Alarm	В	Heading: Analogue Gyro Invalid	Indicates an invalid analogue gyro input from the System Interface PCB (FSD-A178).
25005 (3015)	Warning	В	Heading: Analogue Gyro Invalid	Indicates an invalid analogue gyro input from the System Interface PCB (FSD-A178).
25101 (3061)	Alarm	В	USB: FSD-A232 Interface to input Relays failed	Indicates that the USB interface between the Processor Unit and the input relays on the Relay Interface PCB (FSD-A232) has failed.
25102 (3062)	Warning	В	USB: FSD-A232 Interface to input Relays failed	Indicates that the USB interface between the Processor Unit and the input relays on the Relay Interface PCB (FSD-A232) has failed.
25104 (3061)	Alarm	В	USB: FSD-A232 Interface to Output Relays failed	Indicates that the USB interface between the Processor Unit and the Output relays on the Radar Interface PCB (FSD-A232) has failed.
25105 (3062)	Warning	В	USB: FSD-A232 Interface to Output Relays failed	Indicates that the USB interface between the Processor Unit and the Output relays on the Radar Interface PCB (FSD-A232) has failed.
25201 (3061)	Alarm	В	USB: FSD-A179 Interface to Output Relays failed	Indicates that the interface between the Processor Unit and the output relays on the Display Interface PCB (FSD-179) has failed.
25202 (3062)	Warning	В	USB: FSD-A179 Interface to Output Relays failed	Indicates that the interface between the Processor Unit and the output relays on the Display Interface PCB (FSD-179) has failed.

6. A to Z: Operator's Instructions

6.1 AIS

6.1.1 Switching AIS On and OFF

With the cursor placed over the **AIS ON/ OFF** button, the following options are available.

AIS ON/ OFF (left click):	Switches the Display of AIS targets ON/ OFF.
AIS Settings (middle click):	Opens the AIS settings dialog.
Safety-Rel-Msgs (right click):	Opens the AIS Safety Related Messages.

Target Name		
ID		
Source		
RNG		
BRG		
T COG] [
T SOG		
CPA		
TCPA		
BCR		
CPA L	imit 0.0 NM	AIS ON
TCPA L	imit 0 min	Tgt Assoc. ON
Guard Zone		Tgt Tote OFF
Target Settings		Trial Manoeuvre
Mont		C main (D)
vecu	or Length	
Past	Positions	6.0 min (Off)

NOTICE

The system continues to process AIS targets when the AIS feature is switched OFF. When the AIS is switched ON again, symbols are immediately shown.

AIS ON / OFF BUTTON NOT AVAILABLE

If the text for the **AIS ON/ OFF** and **Tgt Assoc.** (Target Association) button is black and the AIS function cannot be accessed, the following condition(s) may exist:

- An AIS signal is not being received by the processor. Check that the AIS system is switched ON and is working without alerts or a fault condition.
- The system is not configured to receive AIS signals.



6.1.2 AIS Target symbols explained

AIS symbol	Description	Normal view	Lost signal
	An un-activated or 'sleeping' target is shown as a triangular symbol without a vector. This is an indication of the position and heading of a vessel equipped with AIS.		
Sleeping target	No additional information is presented on the target until the target is activated or selected.		
	Note: Sleeping target symbols are smaller than Active symbols and are not shown as lost targets.		
Activated target	A manually or automatically activated target shows as a triangular symbol with a vector (speed and course over ground), heading and a rate of turn or direction of turn indicator (if available).		≫

AIS symbol	Description	Normal view	Lost signal
Selected target	A selected target is surrounded by a square symbol. Information received from the target and calculated CPA and TCPA values are displayed in the target data box. <i>(see notes on AIS target data later in this section)</i>		×
Dangerous targets (Activated and sleeping)	Activated and sleeping targets that contravene user defined CPA and TCPA limits change colour to red. Note: Sleeping target symbols are smaller than Active symbols and are not shown as lost targets.	Activated D Sleeping	Activated Sleeping
Turn indicator	A turn indicator is displayed when the vessel is turning.	Vessel turning to port	Vessel turning to starboard

AIS colours shown above are for reference only and do not represent the actual colours displayed.

6.1.3 Select, deselect AIS targets

SELECTING A SLEEPING AIS TARGET

Sleeping targets are shown as triangles with no vector information or target data displayed.

When the cursor is placed over an AIS target, the cursor changes from a cross-hair to a square around the target and the following options are available:

Select target (left Click):	Selects the target at the cursor location.
Acquire (middle clock):	Acquires a radar target.

No function (right click): The right button has no function.

Target Name	VESSEL NAME	VESSEL NAME
ID		
Source	AIS	AIS
RNG	9.40 NM	10.77 NM
BRG	131.4°	117.8°
T COG	000.0°	035.8°
T SOG	0.0 kn	11.1 kn
CPA	9.40 NM	10.66 NM
ТСРА	23:59:59	-00:08:07
BCR	999.00 NM	13.74 NM

SELECTING AN ACTIVE AIS TARGET



Active targets are shown as triangles with vector information and turn information. When the cursor is placed over an AIS target, the cursor changes from a cross-hair to a square and the following options are available:

Select target (left click):	Selects the target at the cursor location.
	Target data is displayed in the Target Data Panel.

Acquire (middle clock): Acquires a radar target.

No function (right click): The right button has no function.

DESELECTING AN AIS TARGET

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With the cursor placed over a selected AIS target, the following options are available.

Deselect target (left click): Deselects the target.

Acquire (middle clock):	Acquires a radar target.
Sent to sleep (right click):	Sends the selected target to sleep



Press **Deselect target**: The broken square box around the target is removed indicating that the target has been de-selected.

Target data for the deselected target is no longer shown in the target data panel however, the target is still active and continues to show a vector.

SENDING AN AIS TARGET TO SLEEP With the cursor placed over an AIS target, the following options are available.

Send to sleep (right click):	Sends the selected target to sleep.
Acquire (middle click):	Acquires a radar target.
Deselect target (left click):	Deselects the target.

When an active AIS target is 'sent to sleep,' its vector is switched OFF and any selected target data is no longer shown.

See section 6.1.8: AIS settings menus for details on auto activation of sleeping AIS targets.

6.1.4 AIS Target data

When an AIS target is selected, information received from the target vessel's AIS system is displayed in the target data panel (see section 6.53: Target Data for additional information).

AIS target data is received as two signals; Dynamic and Static data

DYNAMIC DATA

This is shown in the target data panel as soon as the target is selected/ activated.

- Ships position with accuracy indication.
- Course over ground (COG).
- Speed over ground (SOG).
- Heading.
- Navigation status (e.g. at anchor, underway using engines).
- Rate of turn (where available).

STATIC DATA (INCLUDING VOYAGE RELATED DATA)

This is shown in the target data panel when a target is selected/ activated but can take up to 6 minutes to be received and displayed.

Note: Some static data is not available for Class B targets, ATONs, SAR aircraft and base stations.

- MMSI number.
- IMO number.
- Call sign & name.
- Vessel length & beam.
- Position fixing antenna position and offset(s).
- Ships' draught.
- Hazardous cargo types.
- Destination, route plan and ETA (data entered at master's discretion).

AIS TARGET NAME

Very long AIS target names will be truncated in the target data panel however the vessel name will always be displayed in full next to an activated target on the main display.



Large target name shown in full on screen

Target Name	W1W2W3W 4W5W6W7	
Source	AIS	

Large target name shortened in target display panel

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6.1.5 AIS capacity alerts

There are two types of capacity; processing capacity and display capacity. Processing capacity is the number of targets that it is possible to process simultaneously. Display capacity is the number of targets that it is possible to display at same time. Processing capacity may be higher than display capacity.

TRACKED TARGET AND AIS CAPACITIES

	Processing Capacity	Display Capacity
Tracked Targets	450	Greater than
		processing capacity
AIS targets (Class A & Class B)	Greater than maximum	500
	possible input	
AIS locating devices (AIS SART, AIS EPIRB & AIS MOB)	Greater than maximum	500
	possible input	
AIS data reports (AIS AtoNs, Base stations & SAR Aircraft)	Greater than maximum	500
	possible input	

Capacities for Tracked targets, AIS targets, AIS locating devices and AIS data reports are treated independently e.g. There can be 450 Tracked targets, 500 AIS targets, 500 AIS locating devices and 500 AIS data reports displayed at the same time.

AIS TARGETS NEARING DISPLAY CAPACITY

When the number of activated and sleeping AIS targets being displayed reaches 95% of the maximum display capacity of 500, a warning is triggered noting that 'AIS Targets nearing display capacity'.

AIS TARGET CAPACITY EXCEEDED

When the number of activated and sleeping AIS targets available for display reaches more than 100% of the maximum display capacity of 500, a warning is triggered noting that 'AIS: Target display capacity exceeded'.

When the maximum display level is reached, new AIS targets that come into ownship's AIS range continue to be processed. New targets that are deemed to be of 'greater importance' will be displayed rather than targets that are of 'less of importance' where the target importance levels are configured by the user using the AIS filters, CPA, TCPA etc.

Using the **Maximum sleeping AIS targets** slider has no effect on the capacity alerts.

Maximum sleeping AIS targets

6.1.6 Dangerous AIS targets

AIS Targets that become Dangerous i.e. those that breach the CPA/ TCPA limits, will activate a collision alert.

AIS targets will change colour to Red and will flash. See Target Tracking in Section 6.55 for further details.

Other AIS objects do not show as dangerous and do not activate collision alerts.

6.1.7 Lost AIS objects

If no data is received from an activated AIS target, AIS AtoN or AIS locating device for a specified period and if the target is of interest i.e. is within the user specified distance from own ship, a **Lost AIS target**, **Lost AIS ATON** or **Lost AIS locating device** alert is raised in the alert panel and a lost symbol is drawn at the last known position. Note: An AIS locating device in TEST mode will not raise an alert or display a lost symbol.

Lost alerts are not generated for AIS objects that are switched OFF in the AIS filter settings.

NOTICE LOST TARGET TIMEOUT

The time before a lost AIS alert is generated depends on the type of AIS object, the speed and the navigational status of the AIS object in question.

6.1.8 AIS Display Settings menu

With the cursor placed over the	AIS ON/ OFF button, the following	AIS Display Settings AIS ATONs, physical
options are available.		AIS ATONs, virtual
AIS ON/OFF (left click):	Switches AIS targets ON or OFF.	AIS ATONS, mobile physical AIS ATONS, mobile virtual AIS ATONS, synthetic
AIS settings (Middle click):	Opens the settings dialogue.	AIS Locating Devices
Safety-Rel Msgs (Right click):	Opens AIS safety related messages.	AIS Air Search & Rescue (ASAF AIS Base Stations AIS safety related messages

The features of the AIS Display Settings menu are detailed below:

SELECTING THE AIS DISPLAY LEVEL



The level of sleeping and activated AIS targets displayed on screen can be selected or deselected by ticking (selected/ ON) or un-ticking (deselected/ OFF) the relevant box.

AIS ATONs, physical	Any device external to a vessel or aircraft specifically
	intended to assist havigators in determining their position
	of sale course, or to warn them of dangers of
	fitted.
AIS ATONs, virtual	An AtoN where no physical aid exists, but for which AIS
	messages are broadcast from another (usually land-
	based) location.
AIS ATONs, mobile physical	A physical AtoN which can move.
AIS ATONs, mobile virtual	A virtual AtoN which can move.
AIS ATONs, synthetic	A physical AtoN structure, without an AIS transmitter, but
	for which AIS messages are broadcast from another
	(usually land-based) location.
AIS Locating Devices	Displays AIS Search and Rescue Transponder (SART),
(AIS SARTS, AIS EPIRBS & AIS MOBS)	AIS Emergency Position Indicating Radio Beacon
	(EPIRB) and AIS Man Over Board (MOB) data reports.
AIS Air Search & Rescue (ASARs)	AIS Air Search & Rescue data reports which may be fixed
	wing aircraft or helicopters.
AIS Base Stations	AIS base stations.
AIS safety related messages	Display the symbol for an unread Safety Related
	Message on AIS objects with unread Safety Related
	Messages
Sleeping Targets	SELECTED: Both sleeping and active AIS targets are
	Shown.
	DESELECTED: Only active targets are shown. Sleeping
	targets are not snown.
Ownship's AIS	vvnen selected, ownsnip s AIS target symbol is displayed.
	data can be selected and displayed in the target data
	panel. Diago the outport over ownohin's AIS overheal (the outport
	realtin shows "Select Terret") and prove the left butter
	Ownshin's data as reported by the AIS system will appear
	in the target data panel. This is the data that will be
	transmitted to other vessels fitted with AIS receiving
AIS Target Labels	Shows the vessel name associated with the AIS target
Ale ranget Eurolo	cheme the vesser name associated with the Alb target.

MAXIMUM SLEEPING AIS TARGETS

Using the slider, the **Maximum non-dangerous sleeping AIS targets** displayed on screen can be adjusted from between zero (no targets shown) to 500.

NOTICE

Active and dangerous targets continue to be displayed regardless of the slider setting. When an AIS display level is deselected, dangerous AIS targets will always display and cause an alert if they violate ownship's CPA or TCPA limits.

AIS SLEEPING TARGET FILTERS

There are four filters for the display of sleeping AIS targets. With the cursor placed over the current filter level, left clicking allows the selection of the following filter levels:

Filter on Range Filter on Range Filter on +ve TCPA Filter on +ve TCPA within CPA limit Filter on CPA with +ve TCPA

aximum sleeping AIS targe

Filter on range (<i>default setting</i>):	Sleeping AIS targets are filtered using the distance from ownship only. The nearest AIS targets to ownship are shown subject to the maximum number selected for display.
Filter on +ve TCPA:	Filters sleeping AIS targets using the time to closest point of approach (TCPA) criteria. Subject to the +ve TCPA criteria and the maximum number of sleeping AIS targets selected for display, this displays sleeping AIS targets that will approach ownship the soonest.
Filter on +ve TCPA within CPA Limit:	Filters sleeping AIS targets using the TCPA and CPA criteria. Subject to the maximum number of sleeping AIS targets selected for display, this displays sleeping AIS targets that will approach ownship the soonest and are also within the CPA limit.
Filter on CPA with +ve TCPA:	Filters sleeping AIS targets using the CPA and TCPA criteria. Subject to the maximum number of sleeping AIS targets selected for display, this displays sleeping AIS targets that will pass closest to ownship and are approaching.

AUTO ACTIVATION OF SLEEPING AIS TARGETS

When an AIS target violates the user configured CPA and TCPA limits, the target automatically activates and is displayed as a dangerous target showing vectors and collision alerts.

Show Sleeping targets deselected (OFF). Auto-activation of sleeping targets selected (ON). No sleeping AIS targets are shown on screen until an AIS target violates the vessel's CPA or TCPA limits. At that point it will be activated, displayed as dangerous and a collision alert raised.

With auto activation of sleeping targets selected, passages through

areas with numerous moored AIS targets will cause multiple sleeping targets to auto activate. This effect can be lessened by reducing the CPA and TCPA limits, but this may hinder safe and timely acquisition of genuine targets.

DANGEROUS AIS TARGETS

Dangerous AIS targets will be displayed even if they are filtered out.



Dangerous active target



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Show Sleeping targets deselected (OFF).

Auto-activation of sleeping targets deselected (OFF). When an AIS target violates the user configured CPA and TCPA settings the target is shown on the display as a red 'sleeping target' (i.e. without vectors etc.).

In this mode, when an AIS target no longer represents a danger it will disappear from the display. If the operator considers the target is of interest he can activate it as normal.

6.1.9 AIS Ownship Data menu

Static and Voyage data that is usually entered at the AIS console can be entered/ updated in the AIS Ownship Data menu (see notes for limitations and exclusions).

In AIS Settings, left click on AIS Ownship Data to open the menu.

Data is entered using the on-screen keyboard or option console keyboard.

STATIC DATA

The vessel Name and Call Sign can be added or updated.

USE PASSWORD

With **Use Password** Ticked (selected), the password set at the AIS is required to make changes to the Vessel Name/ Call sign.

With **Use Password** NOT Ticked (de-selected), changes made to the vessel name/ Call Sign are made when the **Set Static Data** button is pressed.

SET STATIC DATA

Depending on the status of the **Use Password** check box (see above), when **Set Static Data** is pressed (left click), the Name and Call Sign entries configured are sent to the AIS (see notes for limitations and exclusions).

The Ship name and Call Sign displayed on all Apps is automatically updated from the AIS data in a networked system



ship name and call sign in the Single Radar App

VOYAGE DATA

- The relevant Ship Type, Cargo Type and Nav Status can be selected from the drop down list.
- The ETA date and time can be entered. The date format is DD/MM/YYYY, all times are 24 hour.
- The Draught, Destination and Persons On Board can be configured.

SET VOYAGE DATA

When **Set Voyage Data** is pressed (left click), the details configured/ updated are sent to the AIS (see notes for limitations and exclusions).

OWNSHIP DATA NOTES

- The transfer of data between the workstation and the AIS is system dependent. Please contact HENSOLDT UK for details.
- There is no confirmation notice when data is transferred. When pressing the **Set Static / Voyage Data** buttons, operators should ensure that the data is correct at both the AIS and the workstation.
- When the Set Static Data button is pressed and the Use Password box is ticked, no Static Data is sent to the AIS. There is no warning or alert to advise that data has NOT been updated.



AIS Ownship Data

MV Shipname

Set Static Data

Nav Status 🛛 Under way using engine 🔻

Set Voyage Data

Use Password

Use Password

0.0

05/ 03/ 2018 13:39

Not Available

Not Available

Name

Call Sign ????

Ship Type

Cargo Type

ETA

Draught

Destination ----Persons On Board 0

6.1.10 Safety Related Messages (SRM)

When a new AIS Safety Related Message (SRM) is received, the AIS control button will change from Blue to Magenta.

With the cursor placed over the **AIS ON/ OFF** button the following options are available:

	AIS	ON/OFF	(left	click)
--	-----	--------	-------	-------	---

Switches AIS targets ON or OFF.

AIS settings (Middle click):

Safety-Rel Msgs (Right click):

Opens AIS safety related messages.

Opens the settings dialogue.

DELETE ALL

With the cursor placed over Delete all, left clicking allows all the messages which have not been marked to be retained, to be deleted.

MESSAGE STATES

Unread messages are shown with Magenta text.

Read messages are shown with White text.

Messages that have been marked as to be retained are shown with Blue text.

FILTERED MESSAGES

If the safety related messages have been accessed from the target data panel, only messages from the source AIS object will be displayed. (See section 6.53: Target Data for additional information), With the cursor placed over the **Source:** ... button a left click will clear the filter and all messages will be displayed.

With the cursor placed over an SRM, the following options become available:

Ack. Msg. (left click):	Acknowledges an unread SRM.
Toggle retained (middle click):	Marks the message to be retained, or if retained, marks the message not to be retained.
Delete Msg (Right click):	Deletes the selected SRM (unless marked as retained).

EXPAND MESSAGE

SRMs can be expanded and collapsed using the +/- symbols next to the message. When expanded, a left click on the last entry will select the AIS object which was the source of the message.

MESSAGE TIME

The time displayed against an SRM is the UTC time when the message was received.

BACKUP & RESTORE

SRMs can be backed up and restored using the backup and restore functions (see section 14).

F	Vect	or Length	6 m	in (R)
050	Delet	e ALL Tgts	Trial N	lanoeuvre
	AIS ON/	OFF AIS Set	ttings	Safety-Rel. Msgs
	CPAL	imit 2.0 NM	Al	S ON
di la	BCT		00:00	1:27
ON	BCR		6.32	NM
HL	10 I O	and a second		0.20

Safety-Related Msgs List	X
Delete all	
MORE SAFETY RELATED INF	
● PLEASE COME AND RESCUE	
THIS IS A SAFETY RELATED	







SRM collapsed

SRM WITH LONG MESSAGE

Where an SRM has a long message, the full text can be read by hovering the cursor over the text and an extended display will be shown.



SRM expanded

Text can also be read by using the scroll bar located at the base of the SRM message box while the message is expanded.

RECEIVED SAFETY RELATED MESSAGE CAPACITY

There is capacity to process a total of 60 AIS safety related messages as follows:

- 20 Addressed Safety Related Messages.
- 20 Broadcast Safety Related Messages.
- 20 Retained Safety Related Messages.

6.1.11 AIS target with large data

Some AIS target data has a maximum limit. When this limit is exceeded, the data values stop showing the actual figure received and will display them as equal to or greater than. These limits apply to target data for altitude, draught, rate of turn (ROT) and speed.

ALTITUDE

DRAUGHT

will indicate:

DRAUGHT >=25.5 m

RATE OR TURN (ROT)

figure for ROT and shows:

ROT Port or Starboard.

Where a vessels ROT is more than

708°/min, the target data stops indicating a

Where an aircraft/ SAR is being tracked, the altitude is displayed in the Nav status.

When the altitude is more than 4094 m, the target data will indicate: NAV STATUS >=4094 m

Where a vessels draught is more than 25.5 metres, the target data for the vessel





Altitude less than 4094 m

Target Name	SHIP SIX
Source	AIS
RNG	2.56 NM
BRG	192.3° 0 /min Pon
Length	95 m
Beam	82 m
Draught	23.3 m
Nav Status	Underway Engine
Type	Her

Draught less than 25.5 m

CLASS A

5.22 NM

001°20.759'E Quality Differential

0°/min Port

351.2°

arge lame

RNG

BRG

ROT

LONG

Source AIS

leading 287.0°

Length 250 m

Beam 40 m

Altitude more than 4094 m

	LICC
Nav Status	Underway Engine
Draught	>= 25.5 m
Beam	82 m
Length	95 m
NUT	o min Pon
BRG	195.4°
RNG	2.75 NM
Source	AIS
Name	SHIP SIX

Target Name CLASS A Source RNG 5.41 NM BRG LONG 001°21.520'E Quality Differential Heading 033.0° ROT Starboard Length 250 m Beam 40 m

ROT more than 708 °/min

ROT less than 708 °/min

SPEED

Where a target speed is more than 1022.0 kn (aircraft/ SAR), the target data for will indicate: S STW >=1022.0 kn

Target Name	
Source	AIS
RNG	18.49 NM
BRG	358.8°
TCTW	360.0°
T STW	1000.0 kn
CPA	0.44 NM
тсра	-00:01:06
BCR	0.65 NM
вст	-00:01:04

	Target Name	areas and	
	Source	AIS	
	RNG	19.42 NM	
	BRG	358.9°	
	TCTW	360.0°	
	T STW	>=1022.0 kn	
	CPA		
	TCPA		
	BCR	nev ne	
	BCT		
Sp	eed m	ore than 1	022

Speed less than 1022

6.1.12 **AIS Collision avoidance**

Search for Collision Avoidance, Target Tracking and Interpreting the Radar Display in the contents of this handbook for details.

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6.2 Anchor watch



The Ownship Settings button provides access to the tabs for Ownship Settings, Past Track, look-ahead, Anchor Watch and MAX ROTs

The button is located in the top right hand side of the PPI.

With the cursor placed over the **Ownship Settings** button, the following cursor options are available:

Ownship Settings (left click):	Opens the Ownship Settings tabs.	
Anchor Watch (middle Click):	Activates the Anchor Watch function.	
Max ROTs (right click):	Allows the configuration of the Maximum Rates of Turn.	

Middle click on Anchor Watch and the Anchor watch control panel opens.

An anchor watch swing circle can be configured, placed on screen and edited within this menu. Only one anchor watch can be generated at any one time.

SWING CIRCLE DIAMETER

The diameter of the swing circle should be set before to selecting the Drop Anchor function. This value can be edited later in the process.

Left click in the **Swing Circle Diameter** box and enter the required value between zero and a maximum of 2000 metres.

DROP ANCHOR

When Drop Anchor is pressed, the following occurs:

- An anchor watch is placed on-screen with the origin placed at the current ownship's position.
- A graphic displays an anchor symbol in the centre and a green circle indicating the Swing Circle Diameter.
- Additional details on range and bearing are also shown as detailed below.
- Ground Speed is automatically selected however the speed source may be changed by the operator.

DISTANCE TO ANCHOR

When an anchor watch has been dropped, the distance between CCRP and the origin of the Anchor Watch is displayed in metres and shackles where 1 shackle = 27.5 metres.

BEARING TO ANCHOR

When an anchor watch has been dropped, the True bearing to the origin of the Anchor Watch is displayed in degrees.

SPEED SENSOR SELECTION

The speed sensor can be changed from within the Anchor Watch menu.

- Ground speed is automatically selected when Drop Anchor is pressed.
- When the sensor is changed, the selected sensor is changed in all other navigation modes.
- See Section 6.48 for full details on Speed Sensor selection and related settings.







Example of on-screen Anchor Watch graphic

TRANSFER TO OTHER DISPLAYS

When an Anchor Watch is activated, the anchor watch parameters are shared and displayed on all HENSOLDT UK MFD displays attached to the network.

Changes (alerts, editing or deletion of an anchor watch) carried out on any network connected MFD display are automatically shared across the network. For example, if the Swing Circle Diameter is changed on one display running a Radar mode, the change is shared across the network to all other connected displays including those running in ECDIS mode.

When an Anchor Watch is enabled on a networked MFD, the **Drop Anchor** button is replaced by the **Edit Anchor** function on all other networked systems.

ALERT PRECAUTIONS

There are two alert conditions associated with the Anchor watch. When an alert is generated, it is activated on all networked MFD stations. The anchor watch for each MFD are independent so if different sensors are selected the alerts may not be at the same time. Additionally, the Dragging Risk alert threshold may be different on the MFD stations.

When an alert condition exists, the Anchor Watch graphic will change colour to magenta indicating that one of the following alert condition exists.

Outside Swing Circle: An alert is raised if any part of ownship is outside of the swing circle.

Risk of Dragging:

This alert is raised if the alongship speed (as shown on the Anchor watch dialog) exceeds the threshold in Alert setup.

ALERT CONFIGURATION

The speed threshold that triggers the **Risk of Dragging alert** is set in the Alert configuration screen (see section 5.10). Go to alert numbers 16034/10635 where the speed in knots can be set.

EDIT ANCHOR

When selected, the **Edit Anchor** button and the on-screen graphic change colour to Magenta indicating that the Edit Anchor function has been enabled.

ADJUST SWING CIRCLE DIAMETER

With **Edit Anchor** selected and the cursor placed on the Swing Circle Diameter, let click to adjust the range.

The original diameter is displayed in Green, the new value is shown in Magenta.

When a new position has been set, left click and the following is displayed:

Confirm Update of Swing Circle Diameter?

- Yes: The new value is accepted and the Swing Circle Diameter value is updated in the display.
- No: The action is cancelled and Edit Anchor is switched OFF.



EDIT ORIGIN

With **Edit Anchor** selected, the origin (centre) of the Anchor Watch can be moved. Left click on the anchor symbol and move the graphic to the desired position.

When a new diameter has been set, left click and the following is displayed:

Confirm Update of Anchor Position?

Yes: The new position of the Anchor watch is accepted. No: The action is cancelled and Edit Anchor is switched OFF.

The origin of the anchor watch cannot be selected when it is at ownship's position.

DELETED/ CANCEL

Left clicking on **Cancel Anchor Watch** deletes the anchor watch from the display and all networked MFDs.

There are no warnings associated with the deletion/ cancellation function. All Anchor Watch display and monitoring is immediately suspended.

6.3 Beacons

See section 6.41

6.4 Bearing Scale

The bearing scale is a 360° marked circle which will be onscreen when an active radar is present.



Example of Bearing Scale



6.5 Camera (night vision)

In the Dual Radar Display app only, an optional HENSOLDT UK approved night vision camera can be displayed and controlled using the optional Camera tab.

From this tab, users can control the camera using the following modes:

- Manually control using the cursor to move the camera position.
- The Camera position tracks a user defined EBL/VRM position.
- Camera tracks a user defined fixed position.
- The Image is locked to an assigned radar Tracked Target.



Dual Radar Display with Camera tab selected

NOTICES OPTIONAL FEATURE

For the Camera tab to operate the optional camera mode must be enabled in optional features and a HENSOLDT UK approved camera system installed and commissioned into the system.

CONTROL MODES

The Camera tab is not available in single radar display, Conning or Navigation & Conning display modes. The camera cannot be controlled using the CCTV tab.

Control of the camera from other HENSOLDT UK Navigation Displays is currently not possible.

6.5.1 Camera tracking modes

With the camera tab of dual radar display selected, left clicking on the Camera tracking mode opens a dropdown list of tracking options for the camera.

IIIII	MIII 27	2.6° (T)	Free Motion	Setup	
Target Name	arget		Sir Free Motion	272.9° 🔻	
Source			Mc Locked to Target1	kn (M) 🔻	

FREE MOTION:

The camera can be positioned at the current cursor position within the camera image.

Place the cursor in the Camera display and click the left button.

The camera will automatically centre at the current cursor position.



Camera tracking mode set to free motion

NOTICE

MANUAL CONTROL AUTOMATICALLY SELECTS FREE MOTION

When manual on-screen camera controls are used, the camera tracking mode automatically switches to Free motion.

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LOCKED TO EBL / VRM

When the Locked to EBL/ VRM tracking mode is selected, an ERBL (Electronic range and bearing line) is automatically switched ON and appears on the main radar screen as an orange EBL / VRM.

- When the EBL or VRM has been selected and repositioned, the camera will move to the ERBL position. As the camera is moving, the ERBL is redrawn to show the cameras current position.
- The EBL sets the camera bearing relative to the vessel's CCRP, the VRM sets elevation.
- As the VRM range decreases the camera moves DOWN, as the VRM range increases the camera moves UP.

NOTICE CAMERA ELEVATION

Camera elevation is limited and cannot be raised above the horizon.

By selecting the junction of the EBL and the VRM, both range and bearing can be adjusted at the same time.

LOCKED TO GROUND

An ERBL (Electronic range and bearing line) is automatically switched ON and appears on-screen as an orange EBL/ VRM.

The camera is fixed to and tracks the ground position of the EBRL where the bearing is referenced to the CCRP.

CAUTION

If the position of the ERBL, EBL or VRM is moved, the camera tracking mode automatically switches to 'Locked to ERL/VRM' mode.

The camera no longer tracks the original ground position and will track the current ERBL position.

LOCKED TO TARGET 1

When selected, the camera automatically tracks the radar Tracked Target, AIS target selected or Man overboard (MOB) symbol and displayed as **Target 1** in the target data panel. When Locked to target is selected, a camera shaped graphic appears next to the Tracked Target on screen.

The ERBL is automatically placed on the target.

If the Tracked Target becomes dangerous, the target automatically becomes target 2. The camera will continue to track the target.

CAMERA BEARING

The **true** or **relative** position of the camera with respect to the heading line is shown at the bottom left-hand side of the camera tab.

With the cursor placed over the digital indication of bearing, the following options are available:

True Bearing (left Click):	Shows the camera bearing as TRUE (T)
No function (middle click):	The middle button has no function
Relative Bearing (right click):	Shows the camera bearing as relative (R)

The camera bearing is relative to the vessel's CCRP.

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6.5.2 Manual camera control

The controls for manually positioning the camera left, right, up or down are located at the left hand side of the Camera tab.

The controls are activated by left clicking on the required button.

The camera can also be moved by clicking on the screen (see Free motion in the previous pages).

Each button is detailed below:



Example of optional Camera tab

<	Move left:	Rotates the camera to the left (anticlockwise)
>	Move Right:	Rotates the camera to the right (clockwise).
	Move up:	Tilts the camera UP.
V	Move down:	Tilts the camera DOWN.
	Play / Pause:	Pauses the image but does not stop camera from tracking or rotating.
	Go to Home	position: Moves the camera to a user defined home position (See Setup).

NOTICE When manual on-screen camera controls are used the camera tracking mode automatically switches to Free motion.

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6.5.3 Camera Setup

Pressing the **Setup** button opens the setup menu where users can adjust the presentation of the camera image and set the camera position of the **Home** button.



Set Colou	r Inve	ert Colours	Indicate	or On/Off
Brightne	:SS:			
1 1 0 2	i i 5 40	1 60	1 80	100

Select Setup

Camera Settings

SET COLOUR

The Set Colour button switches the image between a greyscale and one or more colour modes. Press the Set Colour button to cycle through the different colour settings.

INVERT COLOUR

Inverts the colours of the selected colour palette.

INDICATOR ON/OFF

Switches the on-screen brackets indicating the centre of the camera ON/ OFF

BRIGHTNESS

Using the cursor, the brightness of the camera image can be adjusted from zero to 100%.

NOTICE CAMERA BRILLIANCE

The brilliance control within Camera settings is NOT linked to the control for backlight brilliance located on the front panel of the display or the levels as set by the Day/ Dusk / Night colour palettes.

SET HOME

Pressing Set Home sets the camera position used for the Home button.

To set the camera home position, place the ERLB at the desired position and press the **Set Home** button in the Setup page.



Pressing 'Home' on the operation panel will automatically return the camera to the designated position.

6.5.4 FLIR 'M' series camera control unit

The HENSOLDT UK Navigation Display is configured to use a selected FLIR 'M' series camera and Joystick Control Unit (**JCU**).



When installed, the FLIR system is integrated into the system and <u>may</u> be supplied with the FLIR joystick control unit (JCU).

The JCU is provided with a separate manufacturer's operator handbook.

The JCU controls are not shown in this handbook. Please refer to the manufactures handbook supplied with the equipment.

CAUTION

FLIR JCU SETTINGS

Some of the user configurable functions that can be selected within the FLIR JCU can inhibit camera functionality on the HENSOLDT UK Navigation Display.

NOTICE

OPTIONAL FEATURE

For the Camera tab to operate the FLIR camera must be enabled in optional features and a HENSOLDT UK approved camera system installed and commissioned into system.

AVAILABLE MODES

The Camera tab is not available in single radar display; Conning or Navigation & Conning display modes.

CCTV TAB

The camera cannot be displayed or controlled using the CCTV tab.

6.6 Capture Screen

The Capture Screen function allows a screen grab of the current screen display to be taken.

With the cursor placed over the **Display Mode** button located in the lower right hand side of the display, the following options are available.

Change Display Mode (left click):	Change display mode or return to standby.	Video Settings Display M
Show Sync Status (middle Click):	Opens the optional Network Settings status indicator where enabled. See section 6.31.2.	Change Show Sync Capi Display Mode Status Scru
Capture Screen (right click):	Takes a PNG Screen Grab of the current screen display.	

RECOVERING CAPTURED IMAGES

Captured screen grabs can be recovered to a USB memory device using the Export Debug data function. See Section 14.5 for details.

APPLICATION NOTES

- Captured images cannot be viewed on the Navigation Display.
- Images are exported in PNG format.
- Images are deleted from the system when the Export Debug function is used.

6.7 CCRP

The Consistent Common Reference Point (CCRP) is a location on own ship to which all horizontal measurements are referenced for example, range, bearing, relative course, relative speed, closest point of approach (CPA) or time to closest point of approach (TCPA).

All measurements are referenced to the CCRP and are not referenced to the antenna position, except where specifically selected and clearly indicated; for example, bow crossing range and bow crossing time (BCR/BCT).

In Chart Radar systems, the chart information uses the same CCRP, coordinate criteria and operational properties as the radar and AIS.

If the radar presentation is centred, the CCRP is positioned at the centre of the bearing scale, but the radar antenna is placed at the centre of the screen (this is evident for large ships when using a small range scale).

When the CCRP is outside the radar operational area the bearing scale is not shown over the half of the display where the CCRP is outside the display area.

CCRP CONFIGURATION

The CCRP position is set during commissioning and cannot be configured by the operator.

STANDALONE/ NETWORKED SYSTEMS:	In standalone systems or those without a central Data Distribution Unit (DDU), the CCRP offsets are configured at each individual workstation during commissioning of the system.
INS SYSTEMS WITH DDU:	In an INS system where data is provided via a Data Distribution Unit, the CCRP offsets are configured at the DDU NOT at the workstation. In an INS system it is recommended that the conning position is used for the CCRP.

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6.8 Chart consistency / Are my charts up to date?

INTEGRATED NAVIGATION SYSTEMS (INS) ONLY

If a workstation connected to an INS system has a chart / cell that is not at the same version as the Master workstation, alert is raised noting that **MFDxxx is out of date**.

This alert is only generated on the MASTER MFD in an INS system, it is not displayed on any other workstation.

If this alert is active, operators should check the chart update status of all workstations connected to the network.

Refer to section 7.3.13 for details on checking the chart update status of a workstation.

6.9 Chart Query

When Chart Radar is enabled in a navigation mode, details of chart features such as marker buoys, lights etc. can be displayed. With the cursor placed anywhere on the chart, the following cursor button options are available:

Chart Query (left click):

Press to select chart information. Details of chart features such as marker buoys, lights etc. are displayed.

The middle & right buttons have no function.

No function (middle & right click):

When Chart Query is pressed, Chart Features automatically opens and the information on the selected chart feature is shown.

To close Chart Features and return to the normal display, press \mathbf{X} .

The information for each chart feature field can be expanded and collapsed using the +/ - buttons.

PICREP ATTRIBUTES

Some ENC cells contain objects which have a pictorial representation (PICREP attributes).

It is possible to view these images when querying a chart object containing a PICREP.

Where a PICREP is available, Nautical Publication information is shown in the Chart Query dialogue.



Click on the + symbol next to this entry and a button is available called **Pictorial Representation: Cell number.tif** where cell number is the number of the cell containing the file. Click on this to open the picture. To close Chart File Data or Chart Features, press the red X at the top of each feature.

TIDAL DATA

Depending on the chart data available, PICREP tidal data may show as either a chart table or tidal chart (graph).

NOTICES

RADAR MODES

In radar and Navigation and Conning display modes, the Chart Query function is only available when Chart Radar is enabled in optional features.

CURSOR NEAR TRACKED TARGET OR AIS TARGETS

When the cursor is close to an AIS target, a Tracked Target or ownship's position, the 'Cursor Cue' changes from Chart query to Select Target.

CHART RADAR / ECDIS

When a feature is selected on a Chart Radar/ ECDIS an orange square is placed around the selected object in the chart presentation area.

The orange square is removed when the menu selection is changed or you close the chart Query tab but reappears when the Chart Query tab is reopened.

UNITS OF MEASURE

The units of measure and chart presentation library details can be found by scrolling to the end of the Chart Query.



eneral Advanced Ouery Min Latitude: 51113.439N Min Longitude: 000'51.800'E Horizontal Datum: WGS 84 Vertical Datum: Mean high water springs Sounding Datum: Approximate lowest astronomical tide HO Presentation Library: 4.0 Projection: Mercator Depth Units: metres Height Units: metres Height Units: INM Position Format: DD mm.mmm

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6.10 Chart Radar

When enabled in optional features, Chart Radar allows electronic navigation charts to be used in conjunction with a radar display or in navigation and conning display.

The chart functionality is described in the various topic headings of this chapter, i.e. for Chart Query functions see the Chart Query section.

Where enabled, Chart Radar is enabled and disabled by selecting the **Chart ON/ OFF** button located in the top right hand section of the radar PPI.

NOTICE
OPTIONAL FEATURE
The Chart Query function is only available if optional Chart Radar is enabled in optional features.
DUAL PPI TAB
Charts cannot be displayed on the PPI tab of dual radar display mode.
CHART MAINTENANCE
Charts are maintained/ managed in the using the chart maintenance. See section 7 for more details.
With the cursor over the Chart ON/ OFF button the following options are available:

Chart ON/ OFF (left click):Toggles Chart presentation ON/OFF.Chart Settings (middle Click):Open Chart Settings.Set Chart Radar Display Level (Right click):Reverts the display level to Chart Radar.

6.10.1 Chart Radar ON/ OFF

Chart ON/ OFF (left click):	Toggles Chart presentation ON/OFF.
Chart Settings (middle Click):	Open Chart Settings.
Set Chart Radar Display Level (Right click):	Reverts the display level to Chart Radar.

Left clicking on **Chart ON/ OFF** toggles the display of Chart data ON/ OFF. Please refer to the following page for details on the button outline colour.

Toggles Chart presentation ON/OFF.
Open Chart Settings.
Reverts the display level to Chart Radar.

The chart settings menu can be opened by middle clicking on the **Chart ON/ OFF** button. Please refer to section 6.11 and 6.12 for details.



6.10.3 Set Chart Radar display level			
Chart ON/ OFF (left click):		Toggles Chart presentation ON/OFF.	
Chart Settings (middle Click):		Open Chart Settings.	
Set Chart Radar Display Level (Right click):		Reverts the display level to Chart Radar.	

The Chart Radar display can be quickly reset to the factory defaults by right clicking on the **Chart ON/OFF** button. This resets the display level set in section 6.11.1 to the default Chart Radar settings.

Where the display level is already set to Chart Radar, the button has no action.

6.10.4 Chart Scale Indicator

The outline colour of the **Chart ON** button changes depending on the range selected and the Chart type installed.

There are three outline colours as follows:

GREEN OUTLINE

Best Scale is in use The chart is using the best scale as defined by the chart data.

YELLOW INDICATION

Close to Best The chart is within a factor of 2 of the Best Scale.

ORANGE INDICATION

Under or Over scale The chart is more than a factor of 2 above or below the Best Scale. Chart ON Chart Radar

Chart ON Chart Radar

Chart ON Chart Radar

6.11 Chart Settings: GENERAL Tab

Chart Settings is selected by placing the cursor over Chart ON/ OFF button and middle clicking on Chart Settings.

This opens the menu that shows three tabs, General, Advanced and Query.

The **GENERAL** Tab allows the configuration of the following:

- Chart Display
- Palate
- Data Source for charts
- Safety contours



6.11.1 Display Level

With the cursor placed over the **Display Level** button within the Chart Settings/ General Tab, the following cursor option is available:

Display Level (left click):	Sets the level of detail displayed on the chart.
No function (middle & right click):	The middle & right buttons have no function.

C	hart	Feature	S	X
General	Ad	lvanced	Query	
Display Le	vel	Cha	ntRadar	-
Display Level	das /ta		e oth Shat Simplified	les

The button name will change to reflect the display level selected.

	Base	Displays the Base set of chart features as defined by the IMO
	Standard	Displays the Standard set of chart features as defined by the IMO
General Advanced Query	ALL	Displays all chart features as defined by the IMO
Display Level ChartRadar v Depth Shades ChartRadar Base Symbol Style Standard Current Palette All Coastline	Custom Selection	Creation and saving of custom chart display levels. This is detailed further in the Chart settings / Advanced tab
Display level in Chart settings	Chart Radar (Chart radar only)	This level is similar to Base but with some areas removed to make the radar display more prominent.
	Coastline (Chart radar only)	Removes all ENC data leaving coastal outlines only.

NOTICE

When enabled and subject to the data source selected, all monitoring such as Guardzones continue to use the ENC data available regardless of the display level selected.

6.11.2 Depth shades

With the cursor placed over the **Depth Shades** button within the Chart Settings/ General Tab, the following option is available.

2 Depth Shades (left click):	Selects two depth shades.
No function (right click):	The middle button has no function.

4 Depth Shades (right click): Selects four depth shades.

The parameters for Shallow, safety and depth contours are set using the sliders that can be found in Chart settings/ General tab, see section 6.11.3.

DEPTH SHADES EXPLAINED



Chart Features				
General	Ad	vanced	Query	
Display Level		Cha	rtRadar	-
Depth Shades Fou		Four D	epth Shad	es
2 Depth			4 Dep	th
Shades			Shade	s

4 DEPTH SHADES When Four Depth Shade is selected, the chart displays depth contours as follows:		
Dark Blue:	Displays depths less than the shallow contour setting	
Light Blue:	Displays depths less than the safety contour, but greater than the shallow contour	
Grey:	Displays depths greater than the safety contour, but less than the deep contour	
White:	Displays depths greater than the deep contour	

UNDER-KEEL CLEARANCE ALARM

Refer to section 6.19 for details on the Under-Keel Clearance alarm (UKC).

6.11.3 Shallow, Safety and Depth contours



The Shallow contour can be adjusted by from 0 to 50 Meters.

- Two Depth Shade: There is no differentiation between changes in depth either side of the shallow contour, as only one shade (blue) is used.
- Four Depth Shade: The shallow contour defines the depth shade boundary between zero and the safety contour setting. The area between zero and the shallow contour is shaded blue and the area between the shallow contour and the safety contour setting is shaded light blue.

SAFETY CONTOUR

The safety contour can be adjusted from zero to 50 Meters and is used as part of the 3-dimensional Guardzone.

The safety contour setting should allow for the draught of the vessel, plus an additional safety margin.

The safety contour on the chart is picked out by a bold black line.

DEEP CONTOUR

The depth contour can be adjusted from 0 to 50 meters.

The Depth Contour can be linked to the Safety Depth. Details can be found in **Chart settings/ Advanced Tab**.

- Two Depth Shade: There is no differentiation between changes in depth either side of the deep contour, as only one shade (white) is used.
- Four Depth Shade: The Deep Contour defines the depth shade boundary between the safety contour setting and depths greater than the safety contour. The area between the safety contour and the deep contour is shaded grey and the area below the deep contour is white.

WARNING CONTOUR SETTINGS

All contour settings must be checked prior to every voyage and/ or prior to safety checking routes.

CAUTION DEPTH DATA

If the chart data does not contain a depth contour at the selected depth, then the next deepest contour is used.

Safety Contour: 30 metres

Shallow Contour



CONTOUR ADJUSTMENT NOT AVAILABLE?

INS or networked systems can be configured by the operator as INS Resource Master or Slave.

- INS SLAVE: When the MFD is assigned as an INS Resource Slave, a number of settings are locked including the adjustment of contours. The shallow, safety and depth limits are set by the MFD currently assigned as the INS Resource Master.
- INS MASTER: Shallow, safety and depth limits can be adjusted and the settings are shared with all networked Multi-Function Displays.

The generation of depth related alerts is unaffected by the INS Resource Master/ Slave status.

See section 6.31 for additional details on Networking.

6.11.4 Chart Symbol styles

With the cursor placed over the **Symbol Style** button within the Chart Settings/ General tab, the following options are available:

S52 Simplified (left click):	Chart features are displayed in S52 Simplified style.	Chart Features		
S52 Traditional (middle Click):	Chart features are displayed in	General	Advanced	Query
	S52 Traditional style.	Display Leve	l Char	tRadar 🔻
No function (right aliak):	The right button has no function	Depth Shades Four Depth		pth Shades
rio ranotion (nght click).	The light batter has no function.	Symbol Style	S52 S	implified

The button name will change to reflect the style selected.



S52 Simplified S52 Traditional Examples of Chart Symbol styles (shown with Radar switched off for clarity)

6.11.5 Current palette

With the cursor placed over the **Current palette** button the following options are available.

Chart Radar (left click):	Charts are displayed in the chart Radar Colour Palette.
No function (middle click):	The middle button has no function.
Standard (right click):	Charts are displayed in the S52 Colour Palette.

The button name will change to reflect the colour palette selected:



Auto

nced Query

Four Depth Sha S52 Simplified

ChartRadar

ChartRadar

Auto ENC

winhol Style

ata Source

Chart Radar palette



6.11.6 Data source

With the cursor placed over **Data Source** within the Chart Settings/ General tab, the following option is available.

Select Chart Data Source (left click): When selected, a drop down list of available chart formats is shown.

No function (middle & right click):

The middle & right buttons have no function.

The drop-down list allows the user to select Auto or a specific type of chart.

DATA TYPES

- Auto: Merges the data sources available so that any gaps in coverage of official data are filled with unofficial data.
- **ENC etc.:** The contents of the drop down list will vary depending on the chart type(s) installed on the system.

Depending on the selection, the Data source button name will change to Auto or the chart type selected.

Depending on the chart in use, the name of the chart radar control button will change as follows:



Chart ON/ OFF: When Chart is displayed, official ENC data is in use/ being displayed.

ECS ON/ OFF: When **ECS** is displayed, unofficial (e.g. C-Map) data is in use/ being displayed.

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6.12 Chart Settings: ADVANCED tab

Chart Settings is selected by placing the cursor over Chart ON/ OFF button and middle clicking on Chart Settings.

The **ADVANCED Tab** allows the configuration of the following:

- Objects to display on the chart
- Save Chart profile
- Display and control of soundings
- Display and control of time varying objects

6.12.1 Chart features selection

Chart features can be selected (*ticked*) and deselected (*un-ticked*) as required. When deselected, the chosen feature is no longer shown on the chart.

Use the scroll bar to view all available features.

A full list of chart features is shown below

Features highlighted below cannot be deselected.

N-UP	TM(T)	GND ST	АВ	Target Name		
~	Danao	12 1	INA	ID		
070	Ringe			Source		
	rangs	ULL.	$ \rightarrow $	RNG		
	Profi	le: Defa	ult	BRG		
	-080	Chart (DEE	T COG		
		ChartRa	dar	T SOG		
			HL I	CPA		
			ON	TCPA		
		C090	~	BCR		
				CPA L	imit 0.0 NM	AIS ON

~	Anchorage	
	Background Areas	
~	Buoys and Beacons	
	Chart Coverage Display	
	Coastline	
	Data Quality	
	Depth Contour	

Coastline	Cart Scale Boundaries Service And Small Craft Facilities	
Safety Contour	Cautionary Notes	Data Accuracy
Land	Archipelagic Sea Lanes	Chart Information
Depth Area	Ship Routing System & Ferry	Magnetic Variation
Docks, Locks & Waterways	Drying Line	Highlight Information Mark
Isolated Under-Water Dangers	Mariners Objects	Highlight Document Mark
Isolated Above-Water Dangers	Miscellaneous	Highlight Date Dependent Mark
ENC Boundary	Shallow Pattern	Full Light Lines
No Data Pattern	Spot Soundings	Scamin Enabled
New Objects	Depth Contours	Symbolized Boundaries
Unknown	Contour Labels	Text – Important
Buoys & Beacons	Tidal	Text – Lights Info
Lights	Natural And Man-Made Features	Text – Mariner Events Info
Isolated Shallow Water Dangers	Seabed	Text – Mariner Notes Info
Prohibited & Restricted Areas	All Isolated Dangers	Text – Other
Conspicuous Features	Submarine Cables And Pipelines	T&P Notices To Mariners
Boundaries & Limits	Special Areas	Text – T&P Notices To Mariners
Fairways		

Predefined and custom chart feature levels can be selected and loaded using the drop down list next to the Save/Delete button (see chart settings/ General Tab for a description of each level).

Save/Delete	Test chart features v
Soundings	Base Standard
Chart Sounding	All I ^S Custom Selection
	Test chart features

The button name will change to reflect the select chart feature level.

6.12.2 Save and Delete custom display levels

The Save/Delete button is used to manage custom chart display levels.

With the cursor placed over the Save/ Delete button the following options are available.

3 NM Save Selection (left click): Saves the currently Range Coastline selected chart features Safety Contour Profile: Last Settings as a custom display Land Chart ON level. Docks, Locks & Waterways HL ON Isolated Under-water Dangers The middle button has no No function (middle Click): function. Remove saved selection (right click): Remove a previously saved selection.

Anchorage

Data Quality

Depth Contou

nd Area

Select features

Buovs and Beacons Chart Coverage Display

SAVE A SELECTION

Select the chart feature(s) required then, with the cursor placed over Save/ Delete, select Save Selection.

In the Save Custom Selection as box, enter a name for the selection then press Accept.

The saved selection now appears in the Chart Features selection drop down list.

Test chart features has been saved in the example.

DELETE/ REMOVE A SAVED SELECTION

Select the custom chart feature to be deleted then with the cursor placed over Save/ Delete, select Remove Saved Selection and press OK to confirm the deletion.

> NOTICE FACTORY DEFAULT SETTINGS

The factory default chart features selections cannot be deleted.

Attempting to delete the default settings of Base, Standard, All etc. will result in a warning noting that the display level cannot be deleted.





Save Custom Selection as

Save selection

Base

Base

Standard

Standard All

Test chart features

Custom Selection

Test chart features

Test chart features v

Cancel

Test chart features

Accept

Save/Delete

Chart Sounding

Save/Delete

Soundings

Soundings



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6.12.3 Soundings

The Soundings tab within the Chart Settings / Advanced tab contains controls for chart soundings.

With the Soundings tab selected and with the cursor placed over the **Chart Sounding** button, the following options are available.

ON (left click):	All chart soundings are shown.
Shallow Only (middle Click):	The Chart soundings Safety Depth can be adjusted and linked to the Depth contour (see below).
OFF (right click):	Chart soundings are NOT shown.

SHALLOW ONLY / SAFETY DEPTH

When Shallow Only is selected, The Chart soundings Safety Depth can be adjusted and the linked to the Depth contour.

NOTES:

- The Shallow contour, Safety Contour and Deep contour levels can also be adjusted in the **General Tab** of the **Chart Settings Button**.
- Soundings that are less than the safety depth are shown in bold (Black). Soundings that are greater than the safety depth are shown in grey (see below and on the following page).
- Safety depth values can be set to match the safety contour value by selecting Link safety depth and contour.

6.12.4 Link Safety Depth & Contour

When **Link Safety Depth & Contour** is selected (ticked), the Safety Depth and Safety Contour are linked together.

6 1 2 5	Time Validity	

With the **Time Validity** tab selected, the display of Time Varying Objects on a chart can be controlled as follows:

When Display objects valid between dates is selected, a span of dates can be selected and adjusted.

Place the cursor over the date(s) and use the trackerball to roll up & down to adjust the date fields.

When the span of **Display Objects valid between Dates** is set to a date earlier than the current date, the following is displayed in orange at the bottom of the chart display:

Display not in real time – Display is based on date dd/mm/yyyy

 Docks, 	✓ Docks, Locks & Waterways					
Isolated	I Under	-water I	Dangers			
 Isolated 	Above	-water	Dangers			
Save/Dele	ete	1	All	▼		
Soundings		Time \	/alidity			
Chart Soundings			On			
ON	Shallow Only		OFF			
Link Safety Depth to Contour						



Link Safety Depth & Contour

Soundings Time Validity Time Varying Objects

- Display currently valid objects
- Display all time dependent objects
- Display objects valid at date



- Display currently valid objects
- Display all time dependent objects
- Display objects valid between dates
- Start 04/03/2018 End 18/08/2018

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6.13 Chart Settings: Query tab

Please refer to section 6.8 for details on the Chart Query tab.
6.14 Collision avoidance

FURTHER DETAILS CAN BE FOUND IN TARGET TRACKING.

The task of collision avoidance uses the radar image, target trails, past positions, target tracking (TT) and reported AIS targets.

The radar image provides the initial awareness of the presence of surface objects; these objects or radar echoes may be valid targets, clutter or noise. It is therefore important to use the appropriate signal processing to reduce the clutter and noise so that the target tracking can operate efficiently. Targets that move towards own ship on a constant bearing pose a collision threat; however, it is by constant user observation or by comparison with, for example, an EBL, that this threat will be evident.

Radar targets generate trails. Relative trails provide an initial indication of a collision threat; if the trail and movement of a particular target point towards the ship and the target range is reducing, that target is of interest. The user may then acquire the target and the Target Tracking (TT) process is initiated (see section 6.55 for details on the use of target tracking).

Past Positions perform a similar function to trails, however whereas radar targets automatically develop trails, reported AIS targets may only have a graphical representation denoted by Past Position symbols. Tracked Radar Targets also provide Past Position symbols.

TRACKED ARPA: The Target Tracking facility complies with and exceeds the IMO requirements for Target Tracking. Up to 450 surface targets with relative speeds of up to 150 knots can be tracked across all displays connected to a network. I.e. a standalone displays can track 450 targets whereas three INS/ network connected displays can track a maximum of 450 targets across all three displays.

- Manual acquisition using the trackerball and selection from 0.1 to 80 nautical miles.
- Automatic acquisition for surface targets by use guard zones which allows automatic acquisition from 0.5 to 24 nautical miles.

The design of Target Tracking minimises the effects of error sources on tracking accuracy and also minimises target swap. However, as with all tracking systems, error sources, such as excessive clutter or poor signal to noise ratio, have a detrimental effect on accuracy.

AIS TARGETS: The automatic Identification System (AIS) facility complies with and exceeds the IMO requirements for an Automatic Identification System aid. All AIS target data is processed and filtered according to user set parameters. Up to 500 AIS targets may be shown as either sleeping or activated targets. AIS targets may be activated either manually or automatically by zones or defined activation areas. These areas are common to Tracked Target acquisition zones and areas.

AIS targets are visible in adverse weather conditions and provide an earlier indication of a target manoeuvre. The accuracy of the AIS information depends on the navigation systems and information entered by each ship and each ship has the facility to switch off the transmission of AIS, for example in cases of security. It should be noted that not all surface objects will have an AIS system. The AIS system has two major classifications, Class A for large ships providing a full set of data and Class B for small craft, which provide a subset of the full data.

The AIS facility compliments the target tracking functions to support radar in an anti-collision role. While the user functionality of Target Tracking and AIS is very similar, there are important differences.

Target Tracking systems are subject to error sources that do not apply to AIS, for example

- Low Signal-to-Noise ratio. Targets may appear to fade on the screen. The Target Track may indicate a Weak Target alert, and in extreme cases, lose the target. Other echoes or clutter appearing in the tacking window may result in target swap or cause vector instability.
- Side Lobes/Reflections. Own ship structures within the antenna beam or presence of other large targets, can generate false targets or elongated targets. This may result in tracking errors and could give false indications of CPA. Reference targets affected by reflections may become unreliable and it is advised that multiple reference targets are used to reduce error.
- Own ship pitch and yaw.

The Target Tracking and AIS functions provide the following facilities:

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Target Acquisition (Target Tracking only)	Surface Targets with relative speeds of up to 150 knots can be tracked. Up to 450 targets may be acquired either manually, using the cursor, or automatically using guard zones, areas and sectors. Auto acquisition is also possible by sectors. For auto acquisition, the target is acquired and shown with a vector after approximately 12 sweeps.
Tracking (Target Tracking only)	Acquired radar visible targets are automatically tracked up to a range of 24 NM, and vectors are generated which indicate the course and speed of the target. All acquired targets may be labelled, and data on the true target course, true speed, range, and bearing, BCR/BCT, CPA and TCPA may be shown for selected targets.
Target Activation (AIS only)	Targets can be presented out to a range of 48 NM. Up to 500 AIS targets may be activated either manually using the cursor, or automatically using guard zones.
Guard Zones	Guard zones are available, all of which are variable. Guard zones can be either inclusion or exclusion sectors. When a target, which has not previously been acquired, enters an inclusion guard zone, an alert is generated; Target Tracking automatically acquires a radar target and activates an AIS target.
Target History	The Trails and Past Position on-screen buttons provide a presentation of track history, showing past positions and trails.
Reference Targets (Target Tracking only)	Tracked (radar) targets may be designated as Reference Targets and used for manual stabilisation.
Anchor Watch	All designated Anchor Watch Targets are monitored for movement relative to Own ship, and if any one target moves in excess of the Anchor Watch limit, the ANCHOR WATCH alert is triggered.
TCPA/CPA Limit	The limits define the time and closest point of approach of a target, violation of both CPA and TCPA triggers the COLLISION WARNING alert. The target must violate both parameters to trigger the alert. TCPA limit may be varied between 0 and 60 min, in 1 minute increments. CPA limit may be varied between 0.0 and 6.0 NM in increments of 0.1 NM. The default values are 30 minutes and 2.0 NM.
Trial Manoeuvre	Simulates the intended change of course or speed to assess planned action in advance either for navigational purposes or when a potential collision situation exists.
Lost target (Target Tracking Only)	If a target is not seen for 20 consecutive scans, and the target is of interest, a Lost Target message is shown in the alert box, and a lost target symbol is drawn at the last known position of the target. If the target is not of interest, it is deleted.
Lost target (AIS Only)	If no data is received from the target for a specified period, and if the target is of interest, a Lost Target message is shown in the alert box, and a lost target symbol is drawn at the last known position of the target. If the target is not of interest, it is deleted. Note that the specified period depends on speed and navigational status of the AIS target.
Tracking Overload (radar Tracked Targets)	An alert indicates attempted acquisition of the 451 st target. To track another target, requires one or more currently tracked (radar) targets to be released from tracking.
AIS target capacity	An alert indicates when the AIS capacity is nearing or has exceeded 500 targets.

NOTES

• For Target Tracking, when using the manual speed input method, the User MUST adjust the speed input manually every time that the Own ship changes speed.

- In order for AIS reception to be available GPS position (preferably GGA), valid heading and non-manual log must be supplied correctly.
- Target tracking/ collision avoidance is not possible without a valid source of COG and SOG.
- In a networked/ Integrated Navigation System, Target data is shared across the network. Refer to the Tracked Target section for details.

COG and SOG 6.15

The source of Course over Ground (COG) and Speed over Ground (SOG) can be selected as follows. With the cursor placed over the current source of COG / SOG, the following option becomes available:

Select COG/ SOG Source (left click):	Opens a drop down list of available sources of SOG and GOG.	
No function (middle & right click):	The middle & right buttons have no function.	co

	SI	М	V
LAT		51°1	9.675'N
LON		001°2	25.379'E
WGS	584 v	Fix	Check
UTC +00:00			14:00:44
	SIM (Auto)	
COG	165.0°	SOG	0.0 kn

The button name will change to reflect the selected source.

GROUND STABILISED SPEED SOURCE

With a ground stabilised speed source selected, the COG/ SOG value is taken from that sensor.

WATER SPEED SENSOR

When a water speed sensor is selected, the operator can select a COG/ SOG source using the drop down list.

AUTO COG & SOG

Using Auto selects the best current COG and SOG values from the available EPFS sources.

SENSOR FAILURE

If the currently selected navigation system fails, the COG and SOG will search for a working sensor in the sequence:

- Position Sensors (EPFS etc.). 1st:
- 2nd: Any Doppler Log(s).
- 3rd: Radar reference (if reference targets are available).

4th: Manual.

SENSOR INDICATOR

See section 4.11 for details on the sensor indicator (Green or Amber).

NOTICE 1

If manual speed is selected, Set and Drift can be entered using the DR Position sensor.

NOTICE 2

The Geodetic Datum defaults to WGS84 at switch ON but can be changed by the operator to the required datum.

All positions entered will then be referenced to the selected datum.

6.16 CPA and TCPA

The limits for Closest Point of Approach (**CPA Limit**) and Time to Closest Point of Approach (**TCPA Limit**) can be viewed and adjusted.

CPA LIMIT ADJUSTMENT

With the cursor placed over the **CPA Limit** button, the following options are available

Set CPA Limit (left click):	Enables the adjustment of the CPA time.
No function (middle click):	The middle button has no function.
Accept CPA limit (right click):	Accepts CPA limit set and closes adjustment slider (the cursor must be over the button text).

To adjust the limit, left click on **Set CPA Limit**, set the required value then right click on **Accept CPA Limit**.

TCPA LIMIT ADJUSTMENT

With the cursor placed over the **CPA limit** button, the following options are available.

Set TCPA Limit (left click):	Enables the adjustment of the TCPA time.
No function (middle click):	The middle button has no function.
Accept TCPA limit (right click):	Accepts TCPA limit set and closes adjustment slider (the cursor must be over the button text).





CPA limit with adjustment slider enabled.

•	CPA Limit	2.0 NM	AIS C
¢.	TCPA Limit	12 min	Tgt Asso
Set TCP/ Limit	Guard 2 Defete AL	Cone Acc	Limit



TCPA limit with adjustment slider enabled.

To adjust the limit, left click on **Set TCPA Limit**, set the required value then right click on **Accept TCPA limit**.

ALTERNATIVE ADJUSTMENT METHOD

The limits of both the CPA and TCPA can be quickly adjusted by placing the cursor over the numeric limit value, press and hold the left button and roll the tracker ball to adjust to the required limit.

TCP / TCPA ADJUSTMENT NOT AVAILABLE

INS or networked systems can be configured by the operator as INS Resource Master or Slave.

- INS SLAVE: When the MFD is assigned as an INS Resource Slave, a number of settings are locked including the CPA and TCPA settings. The CPA and TCPA settings and limits are supplied from the MFD currently assigned as the INS Resource Master.
- INS MASTER: CPA & TCPA limits can be adjusted and the settings are shared with all networked Multi-Function Displays.

The generation of TCP/ TCPA alerts is unaffected by the INS Resource Master/ Slave status.

See section 6.31 for additional details on Networking.

6.17 Cursor configuration6.17.1 Cursor measurement units

In all navigation modes, the cursor configuration is located in the lower right hand side of the display. Place the cursor over the **Cursor** button and the following options become available:

Cursor position measurements/ range scales are always referenced to the CCRP (Consistent Common Reference Point).

	/	130		LTA at imar	0011	
			Cursor	Video Settir	nas Di	splay Mode
		RNG				opiay mode j
	140	BRG	° (R)	🚺 тсуғ	R: No Hea	ading Line.
	C	LAT	°,' N	Collisic	on risk ass	sessment i
150	PION	LON	°,' E	12:58		More
	OFF	VRM	OFF			Time to ODA
MB	OFF	EBL	OFF	Nautreal Willes	wetric	Time to CPA

Nautical Miles (Left Click):	The Cursor and VRM range and bearing display is set to show Nautical miles.	RNG 1.62 NM BRG 075.4° (T) LAT 51° 30.690' N LON 001° 04.354' E
Metric (Middle Click):	The Cursor and VRM range and bearing display is set show in metric.	RNG 2.61 km BRG 076.0° (T) LAT 51° 30.702' N LON 001° 04.256' E
Time to CPA (Right Click):	Set the Cursor and VRM range and bearing to display time CPA. This can be switched between Nautical Miles and metric:	Time to CPA 00:10:09 LAT 50° 46.531' N LON 001° 15.493' W

6.17.2 Cursor descriptions and tooltips

In all navigation modes, when the cursor is placed over a button, the cursor options are displayed immediately in the bottom right hand corner of the display.

After a configurable delay, a floating tooltip will appear around the cursor showing the available cursor options.

The time before this tooltip appears can be varied (see following page).



After a configurable 1 to 10 second delay, the Floating tool tips appear by the cursor.

6.17.3 Cursor tooltip configuration

The cursor tooltip can be turned ON, OFF or given a 'pop-up' delay of between 0 to 10 seconds.

Place the cursor over the left hand button in the lower right hand



Cursor Cue Configuration

Floating Cursor Cue enabled

Time Delay (secs) 3.0

side of the display. The following option is available.

Configure Floating Tooltip (left click):

When selected, the Cursor Cue Configuration menu appears on screen.

No function (middle & right click):

The middle & right buttons have no function.

CURSOR CUE CONFIGURATION

With the cursor placed over Floating Cursor Cue, the following option is available:

Floating Tooltip ON/ OFF (left click):

Enable (switch ON) **Disable (switch OFF)**

No function (middle & right click):

The middle & right buttons have no function.

When the Floating cursor tooltip is Disabled (OFF), the Time delay (secs) box is not available.

TIME DELAY (SECS)

With the floating cursor cue enabled, the 'pop-up' time delay can be adjusted between 0 and 10 seconds.

Press and hold the left button over the time delay value. The values will have arrows above and below, roll the tracker ball to adjust the time delay.

Press the X to close the Cursor cue configuration menu.

The configuration of the floating tooltip does not affect the cursor option display located below the alert panel.

6.18 Curved heading line			
CURVED HEADING LINE In the Ownship tab, with the cur	rsor placed	Stern Line OFF Curved Heading Line OFF	Ownship Settings OwnShip Past Track Look-Ahee
following option is available.	Julion, the	Toggle Curved HL	Path Predictor Predictor Vessel Outlines
Toggle Curved H/L (left click): E	Standard Predictor Colour		
No function (middle & right Click):	The Middle & rig function.	ht buttons have no	Stern Line OFF Curved Heading Line ON
The curved heading line projects a curved heading line ahead of ownship based on a course, rate of turn, speed and time delay all of which are configured using the following buttons.			- Course : 157.9° + RADIUS 1.00 NM - Speed : 7.6 kn + - Delay : 00:00 +
The curved heading line menu can also be activated from the H/L ON button using the middle cursor option.			Start Countdown True Motion Settings
Suppress graphics (left click):	Removes all gra presentation are	phics from the display a.	
Show curved HL (middle click):	Opens the Curv	ved heading line menu	

When the Curved HL is switched on a new menu is presented where the following parameters can be adjusted and used as follows:

section 6.34.1)

NOTICE ENABLE /DISABLE: LOSS OF DATA

Toggles the stern line ON/ OFF (see also

When Curved Heading Line is toggled between Off and ON, course, speed, Radius/ ROT, and delay settings are lost.

COURSE

Toggle Stern line (right click):

With the cursor placed over the Course - (Decrease) or Course + (Increase) buttons, the following cursor options are available:

Left click: Decrease / Increase 1°

Middle click: Decrease / Increase 5°

Right click: Decrease / Increase 10°

The Course value can also be adjusted and fine-tuned by adjusting the bearing value (degrees) using the trackerball.

NEXT LEG

When a route is loaded, the **Next Leg** button becomes available. When pressed, the **Next Leg** button sets the curved heading line to match the bearing associated with the next waypoint in the route.



RADIUS/ ROT:

With the cursor placed over the Radius /ROT button, the following options are available. Use Radius (left click): The curved heading line uses radius.

No function (middle Click): The middle button has no function.

Use ROT (right click): The curved heading line uses rate of turn.

The Radius/ ROT value can be adjusted and fine-tuned by adjusting the distance value (NM) using the trackerball.

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SPEED

With the cursor placed over the Speed - (Slow Down) or Speed + (Speed up) buttons, the following cursor options are available:

Left click: Decrease / Increase 1 knot

Middle click: Decrease / Increase 5 knots

Right click: Decrease / Increase 10 knots

The speed value can be fine-tuned by adjusting the speed value (knots) using the trackerball.

DELAY

Delay is the time before ownship starts the trial turn shown by the curved heading line. With the cursor placed over the Delay - (Decrease) or Delay + (increase) buttons, the following cursor options are available:

Left click: Decrease / Increase 1 minute

Middle click: Decrease / Increase 5 minutes

Right click: Decrease / Increase 10 minutes

The delay value can be fine-tuned by adjusting the delay value (minutes) using the trackerball.

START COUNTDOWN

When the delay time has been set, the countdown to the time the turn is required can be started. With the cursor over the Start Countdown button, the following options are available: Start Countdown (left click): The delay time set will start to count down.

No function (middle Click): The middle button has no function.

Reset timer (right click): Resets the countdown to the time set in delay.

MANUAL ADJUSTMENT

The curved heading line can be manually adjusted by left clicking the cursor on each of the two dots found on the curved heading line.

NOTE: If no course has been entered in the curved heading line settings, the curved heading line will be the same as the main heading line.

1st dot (Start of turn): Adjusts the delay.

2nd dot (End of turn): Adjusts the radius/ ROT.



Example of curved heading line in Chart Radar mode

TRUE MOTION SETTINGS

True motion can only be displayed when the optional Chart Radar is enabled and switched ON.

With the cursor placed over the True Motion Settings button, the following options are available.

Show/Hide TM limit (left click):	Enable or disable the display of true motion limits.
Set TM limit to defaults (middle Click):	Resets the TM limits to the factory default size.
Edit TM limits (right click):	Resets the timer to 10.0 minutes.

Start Countdown		
True Motion Settings		
Show/Hide TM Limits	Set TM Limit Defaults	Edit TM Limits

When Edit TM Limits has been selected and the cursor is placed over the True Motion limits box on the screen, the following options become available.

Select / Fix TM reset box (left click): Se TI

Selects the edge of the TM limits box for editing, when the TM box is selected, the cursor option changes to Fix TM reset box.

Set TM limit to defaults (middle Click): Resets the TM limits to the factory default size.

Quit TM Reset Edits (right click):

Quits editing of the TM limits box.

The following gives a brief explanation of adjusting the TM limits. This assumes that Show/ Hide TM limits has been set to Show and that the TM limits are displayed on-screen.



Place the cursor on the edge of TM box Left click on **Select TM Reset Box**



The TM limits box becomes **bold**. Use the cursor to re-size TM box



When adjustment is complete, left click on **Fix TM reset box**.

There are two edges of the TM limit that can be adjusted.

When the cursor is used to select the true motion box ahead of ownship, three sides of the box (ahead, port and starboard) become bold.

The size of the box can be adjusted to resize the true motion reset box.

When the cursor is used to select the true motion box aft (behind) ownship, one side of the box (aft) becomes bold.

This edge is the 'reset' distance from the edge of the screen i.e. how close to the edge of the screen ownship will be when it resets to the start of the true motion box. This line will always be behind ownship.



6.19 Depth indication display & UKC alarm



side **DUAL RADAR DISPLAY** Select the Docking tab (shown below) or HAP tab (not shown below) on the upper right hand side of the dual radar display.



DEPTH & UNDER-KEEL CLEARANCE (UKC) ALARM

Where Depth is connected and has been configured during commissioning, Depth and ownship's Under Keel Clearance can be viewed.

The UKC alarm can be switched ON/ OFF and configured so that an alert is generated at a user defined depth.

SENSOR INDICATOR

See section 4.11 for details on the sensor indicator (Green or Amber).

- Depth 6.1 m 0 m 10 m 20 m 30 m 40 m 50 m UKC Alarm 5.0 m Diff. 1.1 m
- **Depth value:** The figure at the top of the depth indication to the right of the Sensor Indicator is the actual depth value being received.
- Depth graph:A grey block will build over time indicating the historic depth figures. The history
(time in minutes) is retained when changing modes or switching to standby but is
lost when the system is shutdown / switched OFF.
The red line within the graphic indicates the UKC alarm depth threshold set by the
operator.
- UKC alarm: Tick/ select the box to Enable the Under-Keel Clearance alarm. Untick/ Deselect the box to Disable the alarm.
- Depth clearance: To set the depth that the UKC Alarm will be triggered, place the cursor over the depth figure shown next to the UKC Alarm ON/ OFF check box, press and hold the left button and arrows will appear above and below the number to be adjusted. Keeping the button pressed, roll the trackerball up and down (north/ south) to adjust the Depth to the desired figure. The Depth clearance value can also be configured in the Alerts Configuration App by adjusting the depth figure in alert number 12314 (3031)
- **Diff:** The **diff** value is the difference between the actual depth and the UKC threshold set by the operator.

NOTES:

- With the exception of the Under-Keep Depth alarm, there are no other user configurable options in the depth display.
- The switch on default depth alert value is configured during system commissioning.
- The Maximum depth alert is 50 m.

6.20 Display Mode

In all navigation modes, the **Display Mode** button is located in the lower right hand side of the display and allows users to carry out the following:

- Change from the current mode to any other enabled display mode without the need to return to standby.
- Return the system to Standby.

With the cursor placed over the Display Mode button, the following options are available.

Change Display Mode (left click):	Change display mode or return to standby.
Show Sync Status (middle Click):	Opens the optional Network Settings status indicator where enabled. See section 6.31.2.
Capture Screen (right click):	Takes and stores a PNG screen grab of the current screen display See section 6 6

CHANGING DISPLAY MODE

When Change Display Mode is selected, the **Select Display Mode** menu is displayed.

Clicking on any of the available modes will change the screen to the mode selected without going to standby.

Modes that are 'greyed out' i.e. the graphic is in grayscale not full colour, the mode is not available and cannot be selected. See Enable Optional Features for details on how to enable content.

EXIT WITHOUT CHANGING

To exit the *Change Display Mode* selection without changing mode, click the \mathbf{X} at the top of the Select Display Mode box.

LOSS OF DATA WHEN DISPLAY MODE IS CHANGED

When changing the Display Mode directly from one display mode to another without returning to the standby screen, all on screen data is retained.

For example, if the following facilities were active in radar mode, they would continue to display if ECDIS was selected.

- Tracked Targets
- Selected AIS targets
- Route loaded
- User generated map loaded

CAUTION LOSS OF DATA

When returning to Standby, data will be lost (see notice below).

NOTICE MAN OVER BOARD/ DEPTH DATA

Data on Active Man Overboard (MOB) symbols and Depth history in the depth display (where enabled) is not lost when switching to standby but data will be lost if the display is switched OFF.





Select display mode with radar options not enabled

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6.21 Drift indication

The drift figures calculated by the current position sensor in use are displayed in the **Drift** tab located in the lower left hand side of the single radar display.

The Drift display is not available in the Dual Radar display app. is not available.

There are no user configurable options in the depth display tab.

6.22 Electronic Bearing Line (EBL)

The Electronic Bearing Line (EBL) controls are located on the lower right hand side of the display.

Two EBLs can be independently controlled and are identified by their colour.

- EBL 1 is Orange.
- EBL 2 is Green.

With the cursor placed over the EBL button, the following cursor options are available.

EBL 1 ON/ OFF (left click):

Switches EBL 1 ON/ OFF When Own Ship is selected, the EBL will be placed on ownship.

When Fixed Chart is selected, the EBL origin will be placed at the cursor position.

TRUE/ RELATIVE (middle Click): Sets the EBL to True or Relative.

EBL 2 ON/ OFF (right click):

Switches EBL 2 ON/ OFF. When Own Ship is selected, the EBL will be placed on ownship. When Fixed Chart is selected, the EBL origin will be placed at the cursor position.

The indication to the left and right of the EBL button indicates the status of each variable range marker. The status is either OFF or showing the True (T) or Relative (R) bearing of the EBL.

OFF	VRM	OFF
OFF	EBL	115.0° (T)
EBL 1 OFF		EBL 2 set
		at 115.0°

TRUE / RELATIVE SELECTED

Middle clicking on True / Relative toggles both EBLs between True and Relative.

OFF	VRM	OFF	OFF	VRM	OFF
045.0° (T)	EBL	115.0° (T)	17.8° (R)	EBL	52.2° (R)

EBL in **True (T)** mode

EBL in Relative (R) mode

EBL values are retained until returning to standby.



KELVIN HUGHES)

Scale 1:500,000

Own Ship selected

N-UP

UTC +00:00 12:42:05

ECDIS

Fixed Chart

Set Chart

Default

Profile:



ADJUST EBL BEARING

When the cursor is placed over an electronic bearing line, the line becomes bold. The EBL can be adjusted in bearing or centred on the current cursor position by pressing and holding the relevant button shown below and dragging the EBL to the required position.

EBL un-selected	EBL selected (line becomes bold)

With the cursor placed over an EBL, the following options are available.

Adjust value (left click):	Press to select and adjust the EBL below the cursor.
Acquire (middle Click):	Only present when the optional Radar interlay is switched ON. See target
	tracking in section 6.55.
Set origin (right click):	Select a new origin for the selected EBL.

When **Adjust value** has been selected, the bearing of the EBL can be changed and the cursor options change as follows:

Set Value (left click):	Accepts the new bearing of the selected EBL.
Cancel (middle Click):	Resets the EBL to its last position.
No function (right Click):	The right button has no function.

SET NEW EBL ORIGIN

With the cursor placed over an EBL, the following options are available.

Set origin (right click):	Select a new origin for the selected EBL.
	tracking in section 6.55.
Acquire (middle Click):	Only present when the optional Radar interlay is switched ON. See target
Adjust value (left click):	Press to select and adjust the EBL below the cursor.

When **Set Origin** has been selected, the origin of the EBL can be changed and the cursor options change as follows:

No function (left click):	The left button has no function.
Cancel (middle Click):	Returns the EBL to ownship CCRP
Set Origin (right Click):	Accepts the new origin for the selected EBL.

ALTERNATIVE ADJUSTMENT METHOD

The EBL bearing can also be adjusted by left clicking and holding the cursor over the bearing value and rolling the trackerball to set the desired value.



An EBL and a VRM can be associated by placing the cursor on the intersection of the EBL and VRM and left-clicking. The EBL and VRM can then be adjusted together.

The cursor button functions are the same as for adjusting the VRM and EBL.





6.23 Enhanced Target Detection (ETD)6.23.1 ETD mode explained

Enhanced Target Detection uses an advanced processing technique to produce a composite display consisting of three layers. The layers consist of a **base layer**, an overlaid **fixed target layer** and a **moving target layer**.



Base layer: This presents a historical record of approximately the last 30 seconds of radar data. This is processed in such a way as to emphasise the underlying structure of the surrounding sea surface and fixed targets.

Fixed target layer:This presents fixed targets such as land, buoys, slow moving and
stationary targets and is shown in a different colour to the base layer.
The layer is derived from the base layer and has a variable gain level
which is controlled using the Fixed Tgt slider

Moving target layer: This presents fast moving and transient information and is displayed in a different colour to the fixed target layer. This layer is derived from the current scan and is controlled using the **Moving Tgt** slider.

The Benefits of ETD:

- Buoys and other small fluctuating (time-varying) targets are more positively detected.
- Moving targets can be more rapidly identified.
- Improved situational awareness in the presence of sea-ice, rain and sea clutter.







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6.23.2 Switching ETD ON in main PPI

When starting single, dual radar or Navigation & Conning display modes from the Standby screen, the display will always start with the ETD switched OFF.

With the cursor placed over the ETD button, the following option is available:

Enhanced Tgt Detection ON/ OFF (left click): Switches ETD mode ON/ OFF.

No function (middle & right click):

The middle & right buttons have no function.

When ETD is switched ON the following changes occur:

- The Gain control is replaced with Fixed and Moving Targets controls
- Dynamic Clutter Suppression™ is disabled
- Interference rejection, scan to scan rejection is disabled

Sea clutter, rain filter and target enhance functions operate normally.







NOTICE

The optional Enhanced Target Detection (ETD) mode is only available when it has been enabled in optional features.

When ETD is NOT enabled, the button text is Black and ETD mode cannot be selected.



6.23.3 Fixed and moving target adjustment

The control location for ETD in Single Radar Display and Navigation & Coning Display modes.

Fixed Targets

With the cursor placed over the **Fixed Targets** slider, the amount of overall gain shown in the ETD display can be adjusted.

Fixed targets are shown in a different colour to the base layer

Moving Targets

With the cursor placed over the **Moving Targets** slider, the gain threshold for moving targets can be adjusted

Moving targets are shown in a different colour to fixed targets



Dual radar display ETD tab



Dual radar display ETD tab

Fine adjustment (main radar PPI ONLY) With the cursor placed over the numeric value for fixed and/ or moving targets, the values can be fine-tuned.

Place the cursor over the value to be adjusted and arrows will appear above and below the numbers.

Use the trackerball to adjust the value to the desired level.



The fine adjust function is not available in the ETD tab of dual radar display mode.

CAUTION SCREEN SATURATION

In Dual radar display mode, placing the moving and fixed targets to maximum can saturate the secondary PPI in the ETD tab making it difficult to distinguish targets from noise. The main PPI in single and dual radar display contains a feature that limits the overall saturation resulting in less lost targets.

6.23.4 ETD tab in Dual PPI

When **Dual Radar Display** is started and ETD is enabled in optional features, the ETD tab will be available.

IF ETD is NOT enabled, the ETD tab text is black and the tab cannot be selected.



Dual display, PPI tab

Dual Display, ETD tab

See the previous section for adjustment of the fixed and moving target sliders.

CAUTION

When selecting or returning to the ETD tab, Head-up (H-UP) mode is always automatically selected

NOTICE

Dual radar mode always starts with the PPI tab selected

6.23.5 Fixed & moving target colours

The colour of both fixed and moving targets can be adjusted using the **Video Settings** button on the main display.

This is detailed in the video settings section of this handbook (see section 6.61.1)

6.23.6 Switching ETD OFF

ETD can be switched OFF in the main PPI by placing the cursor over the ETD button and pressing **Enhanced Tgt Detection ON/OFF**.

- In dual radar display, the ETD cannot be switched OFF in the ETD Tab.
- When ETD is switched OFF or when changing display modes, the moving and fixed target settings are retained.
- When the display is placed in Standby, the ETD moving and fixed target settings are lost.

6.23.7 ETD cautions and notes

ETD INITIALISATION

It takes approximately 30 seconds for the ETD display to fully initialise after any of the following:

- Initial selection of single or dual radar display mode and/ or ETD tab.
- Change of range.
- Change of pulse length.
- Adjustment of sea or rain filters.

During the initialisation period, the moving target presentation is not available; however real time information from the current scan is available.

FIXED AND MOVING TARGET SETTINGS

If the moving and fixed target sliders are set to zero in dual display mode, the main PPI still displays a trace of targets which can assist in targets being missed.

ETD TRIAL PERIOD

Some systems are delivered with ETD enabled for a trial period. When this trial expires a KHKey will need to be purchased (see optional features).

RACON DETECTION

A triggered RACON will be presented on the PPI in moving target colour. RACON responses will be preserved in the base layer for many seconds after they have ceased to be triggered. This is normal behaviour and provides enhanced detection of a RACON.

HISTORICAL ARTEFACTS/ WAKE

Moving targets may leave trails in the base layer (vessel wake). These should not be confused with normal target trails however they do convey similar information and can aid situational awareness.

After ETD initialisation, large fast moving targets may also leave historical trails such as vessel wake in the base layer which may persist for several scans. These may have the appearance of a stationary target but will disappear once the processing has reached steady state.

This is a normal part of the operation and the false target can be quickly associated with a moving target.



6.24 External APPS

Where enabled, the **External Apps** (application) function allows an operator to display and operate third party applications or programs that are connected to the system.

External apps can include WECDIS, GECDIS, DDU, CCTV, BAM etc.

From the Standby Screen, place the cursor over the **External Apps** button and a list of available external applications will be presented for selection.

OPERATION & CONTROL

When an external App has been selected from the standby screen, the MFD will display the operating screen of the selected software.

- A small line will be present at the middle/ top of the screen. When the cursor is placed on this line, the External App control menu is presented.
- It is not possible to switch/ toggle between an External App screen and any of the apps from in the standby screen. The external application must be closed to return to the standby screen (see Software Still Running below).



Example of the External App icon with external programs enabled and displayed.





Example of an external App selected

CLOSE EXTERNAL APP

- a) To close an External App and return to the standby screen, open the External App Control Menu shown above by placing the cursor over the grey line situated at the top of the screen.
- b) In the External App Control menu, press the 'X.'
- c) A dialog stating 'Are you sure you want to disconnect' is presented.
- d) Press Yes to close the program and return to the Standby Screen (see Software Still Running below) or No to return to the external software.

SOFTWARE STILL RUNNING

The External App feature displays and allows operator control of 3rd party software. When the External App is closed using the method noted above, the software is not closed or shut down. It remains in its last operator configuration, running in the background ready for selection.

CONFIGURATION

- The display of External applications is configured during setting to work of the system and cannot be configured by the user.
- Configuration of the External App software is not detailed in this handbook. Please refer to the manufacturers' documentation for details.

THIRD PARTY SOFTWARE HANDBOOKS

The operation and control of external applications connected to the system is NOT DETAILED in this handbook. Please refer to the manufacturer's handbook for operator information.

6.25 Guardzone

Guardzones are used to alert the user to targets that enter a user defined / enabled area. Any number of inclusion and exclusion sectors can be created and each can be individually configured.

Guardzones are not available in the optional Navigation & Conning display mode.

There are two types of Guardzone that can be generated on screen as follows:

Inclusion Sector:	 Shown on screen as an area bounded by a Green line and can be configured as <i>Heading</i> or <i>North</i> Stabilised. Radar returns (ships, landmasses, etc.) that enter an enabled inclusion zone are automatically acquired as Tracked Target(s). Sleeping AIS targets entering an enabled inclusion zone are automatically activated. 	
Exclusion Sector:	 Shown on screen as an area bounded by a Green line filled with diagonal lines. Guardzone Exclusion sectors can be created in an area where target acquisition is <i>not required</i>, for example, they can be placed over landmasses. Sleeping AIS targets and radar returns entering an exclusion <i>sector inside an inclusion sector will not be automatically activated or acquired.</i> 	

OPEN GUARDZONE SETTINGS

With the cursor placed over the Guardzone button, the following option becomes available:

Guardzone Settings (left click): Opens Guardzone settings.

No function (middle & Right Click): The middle and right buttons have no function.

CPA Limit 2.0 NM AIS ON TCPA Limit 12 min Tgt Assoc. ON Guard Zone Tgt Tote ON Settings Assochation (R)

Within the Guardzone Settings, Inclusion and Exclusion Sectors can be switched ON, configured and enabled. The following descriptions are identical for the creation of both inclusion and exclusion sectors.

CREATE THE GUARDZONE

With the cursor placed over the Create Inclusion Sector or Create Exclusion Sector, the following options are available:

Heading Stabilised (left click): Create a heading stabilised Guardzone.

No function (middle click):	The middle button has no function
-----------------------------	-----------------------------------

North Stabilised (right click): Create a Guardzone that remains stabilised to North.



UNMODIFIED / INACTIVE GUARDZONE ON-SCREEN

When either Heading stabilised or North stabilised is selected, a Guardzone is created on the screen at 3.0 NM ahead of ownship and +/- 30 degrees of the heading line.

When first switched ON, the Guardzone is not active and is displayed on screen bounded by a dashed line.

SELECT AND CONFIGURE THE GUARDZONE

When the cursor is placed anywhere over the dashed Guardzone line on-screen, the cursor shape changes from a cross to a square and the following cursor options become available.

Select Zone (left click):	Selects the edge of the Guardzone to be adjusted.
Acquire (middle clock):	Acquires a radar target.
Enable/ Disable zone (right click):	Enables or disables the selected Guardzone.

When a Guardzone is selected (left click) the line below the current cursor position can be adjusted using the trackerball and cursor position.

Guardzones can be adjusted in both range and azimuth by selecting each of the 4 edges or the corners of the zone.



Selecting a disabled Guardzone

Whilst the Guardzone is selected, the cursor options also change to the following:

Set Zone (left click):	Sets the position of the zone being adjusted.
No function (middle click):	The middle button has no function.
Remove Zone (right click):	Deletes the selected Guardzone.

The Guardzone remains inactive whilst the outline is dashed. Multiple Inclusion and Exclusion Guardzones can be configured and displayed

ENABLE

targets.

Guardzones must be activated to enable automatic acquisition (Inclusion) or rejection (Exclusion) of targets. When the cursor is placed anywhere over the Inclusion or Exclusion dashed Guardzone boundary, the cursor shape changes from a cross to a square and the following cursor options become available.

Enable/ Disable zone (right click):	Enables or disables the selected Guardzone.
Acquire (middle Click):	Acquire a radar target.
Select Zone (left click):	Selects the edge of the Guardzone to be adjusted.

Right click on the Guardzone and the dashed bounding line becomes solid; the Guardzone is now Enabled and is active.

Guardzones must be activated to enable automatic acquisition of



Guardzone enabled/ active

DISABLE A GUARDZONE

To Disable a Guardzone, place the cursor over the required zone boundary and right click on **Disable**. The zone remains on screen but will no longer activate new targets entering the zone (see the Caution notes at the end of this page).

REMOVE A SINGLE GUARDZONE

Left click (Select Zone) the Guardzone to be removed and the cursor options change to the following:

Remove Zone (right click):	Deletes the selected Guardzone; See Guardzone deletion cautions below.
No function (middle click):	The middle button has no function.
Set Zone (left click):	Sets the position of the zone being adjusted.

REMOVE/ DELETE ALL GUARDZONE

All Inclusion and Exclusion Guardzones can be deleted at the same time using the **Remove ALL Guardzones** button located in the Guardzone Settings Menu.

With the cursor placed over the button, the following option is available:

Remove all Guardzones (left click): Deletes all Guardzones.

No function (middle & Right click):

The middle and right buttons have no function.

CAUTION GUARDZONE DELETION

When a Guardzone is disabled, automatic Inclusion/ Exclusion target activation for the deleted zone is stopped.

Targets that were already acquired prior to the zone being disabled or deleted will continue to be tracked.

AIS targets that were activated prior to the zone being disabled or deleted will remain active.



Settings

rt ON

HL

Uard Zones

Guard Zone

Remove ALL Guard Zones

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Tgt Tote ON

6.26 HAP tab (Dual Radar Display Mode)

When **Dual Radar Display** is selected, the **HAP tab** can be used to view conning information on sensors connected to the system.

Depending on the commissioning configuration, this can include the display of the following:

- Propeller RPM and Pitch
- Bow thrusters
- Wind speed (True and Relative)
- Rudder angle
- Depth
- Azipod RPM and direction

With the exception of **True** or **Relative wind**, there are no user configurable functions within the HAP tab.

The HAP tab layout varies depending on the system commissioning. For example, the number of bow thrusters displayed can be set during commissioning:



Single Bow thruster configured



Two Bow thrusters configured

PF	기	HA	Р [Dock	ing
	1	Bow T	hruster	S	%
-100	-50	ę	50	100	0%
-100	-50	ę	50	100	70
-100	-50	0	50	100	70

Three bow thrusters configured





6.27 Heading line

6.27.1 On/ off (suppression)

The HL ON/ OFF button is located to the top right of the Radar PPI. With the cursor placed over the **H/L ON** button, the following cursor options become available:

Suppress graphics (left click): Removes all graphics from the display presentation area.

Show curved HL (middle click):	Opens the Curved heading line menu (see section 6.18 for instructions on the use of the curved heading line).
Toggle Stern line (right click):	Toggles the stern line ON/ OFF (see also section 6.34.1).

When the **Suppress graphics** button is pressed *and held*, the following graphics within the PPI are temporarily removed/ suppressed.

- Heading line (HL)
- Vectors
- Chart data,
- AIS and radar Tracked Targets symbols

When pressed the button name changes from HL ON to HL OFF.

When the HL button is released, all graphics are displayed no graphical data is lost.

Graphics are only suppressed when the button is pressed and held, Graphic suppression cannot be locked into the ON position.

Dual Radar Display:

In dual radar display mode, the HL suppression can be temporarily and independently activated in both PPIs.

6.28 Heading sensor selection and control

The position and graphic for the heading sensor changes depending on the display mode selected however the method of selection is the same for all display type.

Analog Gyro

-30 20

040

050 060 070

ROT 0 °/min

Single Radar Display

10 ⁰ 10 20₃₀

The Heading source CANNOT be selected or controlled from the Docking tab in Dual radar Display mode

HEADING SOURCE SELECTION

With the cursor placed over the heading sensor button, the following cursor option is available:



No function (middle & right click): The middle & right buttons have no function.

Select Gyro Sensor produces a drop down box where the available sensors can be viewed and selected (see section 4.10 for general notes on sensor availability).

The heading sensor name will change to selected source.

SENSOR INDICATOR

See section 4.11 for details on the sensor indicator (Green or Amber).







Dual Radar Display

063.7°



Analog Gyro

Dual Radar Display

061.8°

090

080

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6.28.1 Rate of Turn (ROT)

The ROT (Rate of Turn) is shown in the heading sensor display. If no external source of rate of turn is available, the system calculates the value using the sensors connected (i.e. position sensor, analogue or digital heading sensor).

The rate of turn is shown as a moving solid block of colour below the bearing scale:



Starboard Rate of Turn. Port Rate of Turn.

The ROT value is also indicated by a digital readout

6.28.2 Reversed heading (dual Gyro)

In vessels where two heading sensors (Gyros) are fitted with a 'reverse direction' switch, the **Ownship Settings** logo will change direction when the reverse heading sensor is selected.

When installed and commissioned, this can be used on vessels that sail between ports without turning.



Heading sensor in 'normal' forward direction.

0 130 4	10
	40 m. 150
	160
j ^{10 0} 10 2	0
T 20 %	30
	0 130 1

120 20 1

Simulator1

Alternative 'reverse direction' heading sensor selected.

6.28.3 Loss of heading

In the event of a complete loss of heading sensor information, the system will change modes as follows:

- A loss of heading sensor alert will be triggered.
- Head-up is automatically selected; North-up and Course-up cannot be selected.
- Vector mode will revert to Relative; True vectors cannot be selected.
- Tracked Targets, Man Over Board (MOB) symbols and TTM targets will not be displayed.
- AIS objects will not be displayed.
- Trails and past position indicators revert to relative; True trails cannot be selected.
- The stabilisation mode reverts to Sea; Ground stabilisation cannot be selected.
- The ownship graphic, stern line and CCRP all align to Zero degrees on the bearing scale (relative).
- All bearings revert to relative.
- Course to steer values are not displayed.
- EBLs based on ownship and PI lines are retained but are at a relative angle to the ships heading with relative readout bearings. They may be adjusted and additional EBLs and Parallel index lines added. If the heading sensor is restored, they will automatically revert to Ground stabilisation at the current instantaneous relative bearing.
- The following functions are also disabled:
 - Route display (main and alternative)
 - Steering calculations
 - Map display

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6.29 Man Overboard (MOB)

When the Man Overboard function is activated, a MOB symbol is immediately placed at the vessels current position.

The MOB button is located in the lower right hand side of the display.

ACTIVATION

With the cursor placed over the Man overboard (MOB) button, the following option is available:

Man overboard (left click):

Places an MOB symbol at ownship's current position.

No function (middle & right click):

The middle & right buttons have no function.



Location of MOB button



Detail of MOB button



MOB symbol on-screen

Dual Radar Display:

When Dual Radar Display mode is selected and a MOB is triggered, the MOB symbol automatically appears in the main display and the PPI and ETD tabs.

Conning Display: There is NO MOB function in the conning display.

SELECTION MAN OVERBOARD SYMBOL

With the cursor placed over an **MOB** symbol on screen, the following cursor options are available:

Select Target (left click):	Selects the MOB symbol below the cursor.
Acquire (middle Click):	See Target Tracking.
No function (right click):	The right button has no function.

When an MOB symbol is selected, a blue square is placed around the MOB target and data on the selected MOB is displayed in the target data panel.

MOB target selected in



radar mode

Target data panel for selected MOB

PAST TRACK INDICATION

When past tracks are switched ON, a past track indicator will be placed on the MOB symbol.

See the **Past tracks** section for additional information.



MOB with past track enabled

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DE-SELECTING A MOB

With the cursor placed over a MOB that has already been selected, the following options are available:

Deselect Target (left click):	Deselects the selected MOB.
Acquire (middle Click):	Acquire a radar target.
Delete (right click):	Permanently deletes the selected MOB symbol.

When a MOB target is de-selected the symbol remains on-screen but the blue square around the MOB target is removed. Target data for the deselected MOB symbol is no longer shown in the target data panel.

DELETE A MOB

With the cursor placed over a MOB that has already been selected, the following options are available:

Deselect Target (left click): Deselects the selected MOB.

Acquire (middle Click): Acquire a radar target.

Delete (right click):

Permanently deletes the selected MOB symbol.

NO

When a selected MOB symbol is deleted, the following warnings are displayed:

YES

- YES: Permanently deletes the selected MOB. Confirm Man Overboard Deletion ?
- NO: Cancels the delete action.

EXTERNAL TRIGGER

Where connected, a Man overboard can also be triggered via an external switch. The on-screen control remains the same as described above.

There is no indication as to where the MOB signal was activated (i.e. on the display or via an external switch activation).

NOTICES

Multiple MOB symbols can be generated by repeated presses of the MOB button. MOB symbols and data are retained when changing display modes or when returning to the standby screen.

Maps (user generated maps) 6.30

The Maps feature allows the creation, viewing and management of True or Relative user generated maps.



CTS

sor

Distance to WC Time to WOP

Video Settin

Load / Delete Map

Edit Selected Map

MAP LIMITATIONS

- Each point in a map feature is defined as a point i.e. a single line comprises of a start and end point meaning that a line is two points. The maximum number of points in a map should not exceed 10000.
- User maps cannot be created or viewed in the PPI or ETD tabs of Dual Radar Display.

MAP EDITING NOT AVAILABLE?

INS or networked systems can be configured by the operator as data Resource Master or Slave.

Data Resource SLAVE: When the MFD is assigned as an INS Resource Slave, a number of settings are locked including the editing of Maps. Map generation and data is supplied from the MFD currently assigned as the INS Resource Master.

Data Resource MASTER: Maps can be generated, modified, saved and shared with all networked Multi-Function Displays.

See section 6.31 for additional details on Networking.

SELECTING MAP MODE

With the cursor placed over the Maps button, the following options are available.

Open True Mapping (left click):	Opens the True mapping menu.	Open True Mapping
No function (middle Click):	The middle button has no function.	Cu
Open relative Mapping (right click):	Opens the Relative mapping menu.	

When True or Relative mapping is selected, mapping menu is opened.

6.30.1 Loading / deleting true and relative map (s)

With the cursor placed over the Load/ Delete Map button, the following options are available. The Map type will depend on which mode (True or Relative) has been selected.

Lood True / Polotive Man (14th aliab)	Onone a dialogue hay showing the available	Merge / Save
Load <i>True r Relative</i> Map (left click):	maps to load.	Relative Maps ON
No function (middle Click):	The middle button has no function.	Clear / Clear ALL
Delete True / Relative Map (right click):	Opens a dialogue box showing a list of the available maps to delete.	Map Origin / Rotate Load / Delete Map

LOAD MAP

When **Load Map** is selected, a list of available maps is presented. Individual or groups of maps can be selected and loaded.

HEAD/ NORTH TEXT

In **Relative Mapping** only, the Head/ North text below the Loaded Maps column indicates if a selected User Map is Head or North orientated. With a map selected, the text of the selected map changes to indicate the orientation i.e.:





The selected map is loaded on screen and is shown in the **Loaded Maps** box.



Multiple maps can be loaded on screen at any one time. Head/ North indication shown below the Loaded Maps column (Relative Mapping only)

DELETE MAP

When **Delete Map** is selected, a list of available maps is presented. Individual or groups of maps can be selected and deleted as shown below

When **Delete** is pressed, a notification is presented stating 'Are you sure you want to delete file 'xxxx' (where xxxx is the map name)

OK: The selected Map(s) are permanently deleted. **Cancel:** Cancels the delete action.



deleted and press Delete

6.30.2 Creating a new user map

In an INS/ Networked system, ensure that the MAP Resource is set as Master. See Section 6.31 for additional details on Networking.

To create a new map, ensure that no map(s) are selected by using the Clear/ Clear ALL button from the map menu.

Place the cursor on the Edit Selected Map button and select Edit Map.

New maps are created using the same method described in the following section 'Editing Selected maps' but no map is loaded when starting the process.



6.30.3 Editing Selected Map

In an INS/ Networked system, ensure that the MAP Resource is set as Master. See section 6.31 for additional details on Networking.

Open either True or Relative Mapping and load the map to be edited. With the cursor placed over the **Edit Selected Map** button, the following cursor option is available.

Edit Map (Left Click):	Opens the Map Editing menu.
No function (Middle Click):	The middle button has no function.
No function (Right Click)	The right button has no function.

Map features are created by selecting the desired feature or symbol.

The cursor is then used to position, draw and size the selected feature (see following page).





6.30.4 Creating map objects

With the required map object selected from the **Select Edit Action** list, the cursor options are:

Start Draw or Place Point (Left Click):	Start Draw: Starts drawing the selected map object on screen. Once the first point has been placed/ drawn, the button changes to Place Point. For symbols, Place Point drops the symbol at the current cursor position.
Cancel Draw/ cancel move (Middle Click)	Stops the creation of a line or symbol position at the last placed point on the map object.
No function (Right Click):	The right button has no function

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6.30.5 Editing map objects

Left clicking on an existing map object selects the feature for editing. When selected, the edges and centre point is marked by magenta square(s).

With the cursor over these squares, the cursor cue changes to the following.

The cursor function changes depending on the previous action, the available options are shown below.

Select Item to Edit: Click on any point of a map item and it becomes available for editing.

Drop Item: When any of the editing squares are selected, the item can be moved and dropped at a new position.

Select to move Item: Click on the square in the centre of an item or feature and the entire object can be moved.

Cancel move cancels the last action.

Insert to Edit Item: If the cursor is placed inbetween one of the marker squares, a new position can be inserted.

Use End Edit to finish and save the map.



Examples of map objects

Left Click	Middle Click	Right click
Select to edit item Select an existing map object	No Function	No Function
Drop item or select to move item Select an existing map object	Cancel Move Cancels the last move	No Function
Insert to edit item Select an existing map object	No Function	No Function

6.30.6 Select edit action: Map editing buttons

When a map object is selected, other properties may be altered as below:

- Set Colour: The colour of a map item can be changed at any point during the creation or editing process. To change the colour, select the required object then press the Set Colour button. Use the drop down list to choose the desired colour. The colour panel to the right of the button changes to reflect the selected colour.
- Change text:When pressed, use the keyboard to add/ edit text
entries for the selected map feature.
- Delete: Removes any map item that is currently selected.
- **Rename:** When pressed, use the keyboard to name or rename the current map.
- No Danger/ Dangerous: The safety status of a map item can be changed at any point during the creation or editing process. To change the safety status, select the required object then press the No Danger / Dangerous button and chose the desired colour. The button name changes to reflect the selection.



- Line style: The line style of a map object can be changed at any point during the creation or editing process. To change the line style, select the required object then press the **Solid line/ Dashed Line/ Dotted line** button and chose the desired style. The button description changes to reflect the user's selection.
- Undo:Errors can be corrected by pressing the Undo button.Repeated button presses will undo previous actions.
- End Edit/ Exit: To exit the map-editing menu, select End Edit.
 - New Maps:You will be prompted with a notification requesting if
you wish to rename and save the map.
 - **Existing maps:** The edited map is saved.

6.30.7 Merge / Save maps

In an INS/ Networked system, ensure that the MAP Resource is set as Master. See Section 6.31 for additional details on Networking.

Maps can be saved, copied or multiple maps can be merged into one single map with a new name. With the cursor placed over the Merge/ Save button, the following options are available.

Merge Maps (left click):	Merges all loaded maps.
--------------------------	-------------------------

Save Maps as (middle Click): Saves the selected map with a new name.

Save map (right click):

Relative Mapping Loaded Maps Load / Delete Map Edit Selected Map Merge / Save Save Map As Save Man Ciear / Ciear ALL Change Map Origin Merge / Save maps

MERGE MAPS (left click)

Any number of loaded (displayed) maps can be merged into one map file.

True Mapping		
	Loaded Maps	
Load / Delete Map	Test Map 1 Test map 2	
Edit Selected Map		
Merge / Save		
True Maps ON		
Clear / Clear ALL		
Selected Map None		
Maps lo	aded	

Start by loading the desired maps then select Merge Maps.

Saves the selected map.

Use the keyboard to rename the merged map.

The maps are merged and saved as one new map.

True Ma	pping 🛛 🔀
	Loaded Maps
Load / Delete Map	MergedMap
Edit Selected Map	
Merge / Save	
True Maps ON	
Clear / Clear ALL	
Selected Map MergedMap	

Merged map saved

SAVE MAP AS... (Middle Click)

Save Map As... saves a new copy of a selected map under a different name. When requested, use the keyboard to name/ rename the map.

SAVE MAP (Right Click)

The Save Map function saves any changes made to the map currently selected or being edited.

6.30.8 True or Relative Maps ON/ OFF

This function switches the display of maps ON and OFF. With the cursor placed over the True/ Relative Maps ON / OFF button, the following options are available.

True or Relative maps ON (left click): Switches the display of maps ON.

No function (middle Click):

The middle button has no function.

True or Relative maps OFF (right click): Switches map display OFF Maps are removed from the

Load / Delete Map	Load / Delete Map
Edit Selected Map	Edit Selected Map
Merge / Save	Merge / Save
Relative Maps ON	True Maps ON
Clear / Clear ALL	Clear / Clear ALL
Relative mapping selected	True mapping selected

screen. NOTICE MAPS IN MEMORY When True or Relative maps are switched OFF, the maps are removed from the display but are NOT cleared from the memory or deleted.

When Maps ON is pressed the map is presented on screen again

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6.30.9 Clearing User maps

Clearing maps removes all loaded map from the display but does not delete them from memory.

With the cursor placed over the **Clear / Clear ALL** button, the following options are available.



Clear Sel. Map (left click):

Clears the selected Map from the screen.

No function (middle Click):

The middle button has no function.

Clear ALL True or relative maps (right click): Clears ALL maps from the screen.

6.30.10 Change Map Origin

In **Relative Mapping** only, the origin (centre) of a loaded map can be moved from its current position to that of a radar Tracked Target or an AIS target or reset to ownship's current position.

With the cursor placed over the **Map Origin/ Rotate** button the following options are available:



Change map origin

 Target origin (left click):
 Places the origin of the map at the position of a selected target.

Rotate to EBL (middle Click): Rotate the map to the EBL position (see next section).

Ownship origin (right click): Places the origin of the map at ownship position.

6.30.11 Rotate Map to EBL position

In **Relative Mapping** only, a loaded User Map can be rotated from its original position to be aligned with the current EBL position.

With a User Map loaded, switch on EBL 1 (Orange) and adjust the EBL to the required bearing.

Place the cursor over the **Map Origin/ Rotate** button and middle click on **Rotate to EBL**. The map with then rotate to the current EBL bearing.

6.30.12 Closing Maps menu

When loading or editing of Maps is completed, the Mapping menus can be closed by pressing the X located at the top right of the maps menu.

- When the maps menu is closed, all loaded maps remain on screen.
- To add, edit or remove maps the Maps menu needs to be re-opened.

6.30.13 Network sharing of Maps

When a user map is created or edited, changes are not shared cross the network until the data is manually synchronised using the **Network Settings** function. Please refer to Section 6.31 (Network) for details.

SYNCHRONISING MAPS

At the workstation where a map has been changed or updated, open **Network Settings**.

Ensure that **Selected Resource** is set to **Map Resource**.

Ensure that the **Resource Status** is **Mastered**. Is Slave is enabled, use the **Request Mastership** button to change from Slave to Master.

Select the display(s) to be synchronised or if the updated map is to be shared across all displays, press the **Select All** button.

Press the **Sync Selected** button and the maps are shared across the network to the selected display(s).

NETWORK NODE TEXT COLOUR

The text colour of the Network Node(s) will change depending on the Sync status. See Section 6.31.3 for details.

NOTES

 Where a map is loaded and an updated is received via the network, updated maps will be displayed without warning.

SEE SECTION 6.31 FOR GENERAL INFORMATION ON SYSTEM NETWORKING.

	Network Settings	х
Own SFI:	AM1001	
Selected Resource:	Data Resource 🗸	
Resource Status:	MASTERED Request Mastership	
Network Nodes:	▲ AM1002	
Select All Deselect All Sync Selected		
CMA	P SYNC Not Enabled	
6.31 Data resource Networking

6.31.1 Network settings

When enabled in Optional Features, the **Network Settings** menu allows an operator to select a workstation as a Network Master and synchronise data to other connected workstations running ZM-2300 software. Three synchronisation modes are available:

Data Resource:	The Master controls the generation and sharing of data including user generated maps and routes.
INS Resource:	The Master controls INS data such as CPA/ TCPA settings, profiles, chart safety settings etc.
Target Resource:	The Master display controls Target data which is shared to all networked Multi- Function Displays.

Each resource is detailed in this section.

SOFTWARE VERSION

The Network Settings function was added to ZM-2300 **version 3.x and higher** software replacing the previous Network Status menu. For earlier versions of network control, please refer to HBK-2300-1 issue 5.

ACCESS NETWORK SETTINGS... STANDBY SCREEN



Network Settings from standby

Network Settings can be opened from the standby screen by left clicking on the Network Settings button.

WITHIN AN APP

Video Sett	ings Dis	olay Mode
Change	Show Sync	Capture
OTIGITISO		Captaro

Network Settings within APPS

Network Settings can be opened in all APPS by placing the cursor over the **Display Mode** button. The following cursor options become available:

Change Display Mode (Left click):

Opens the Select Display Mode function.

(where enabled).

Show Sync Status (middle click):

Capture Screen (right click):

Takes a PNG screen grab of the entire display (see section 6.6).

Opens Network Settings

6.31.2 Network Settings menu (Master/ Slave)

MOVE MENU

The Network Settings menu can be moved from its default location. Left clicking and hold on the top blue bar and drag the menu to the desired position. The menu cannot be resized.

OWN SFI

This is the number of the workstation in use. The number is automatically generated and cannot be changed by the user.

SELECTED RESOURCE

Left clicking on **Select Resource** opens a dropdown list where the data/ resource to be shared across the network can be selected.

Each resource is detailed in the following sections.

RESOURCE STATUS (MASTER / SLAVE)

A Resource Status will show as either Master, no master or slave:

MASTERED:	Indicated by a Green square showing that the workstation is the network Master. Slave is displayed when a workstation is not a Master.	CMAP SYNC Not Enabled Example of Network Settings
NO MASTER	Indicated by an Orange/ Amber square showing that selected as a Master.	that NO workstations are
MASTERSHIP DENIED:	This is shown when a resource is requested as a Ma is taking place from another workstation. When the	aster whilst a synchronisation synchronisation

BECOMING MASTER

Pressing **Request Mastership** changes the network status of the selected resource from Slave to Master.

• Synchronisation of information can only be commenced at a Master workstation.

complete, Mastership can be re-requested.

- Request Mastership only Masters the selected resource. Other resources will remain at their current status of Master or Slave.
- A slave cannot be made Master if data synchronisation is in progress from a Mastered workstation.
- Selecting Master in Network Settings does not change the Master/ Slave configuration of sensors/ transceivers connected to the system.

INDEPENDENT RESOURCE MASTERS

Up to four resources can be Mastered independently of each other; for example:

Resource	Display 1 (Navigation display)	Display 2 (Chart display)	Display 3 (Route Planning)
Data Resource	SLAVE	SLAVE	MASTER
INS Resource	SLAVE	MASTER	SLAVE
Target Resource	MASTER	SLAVE	SLAVE
Track Control Resource	SLAVE	MASTER	SLAVE



MASTERSHIP DENIED ...?

A request to become a resource Master may be denied in any of the following scenarios:

ALL RESOURCES i.e. Data Resource INS Resource Target Resource	 IN ALL RESOURCES, A REQUEST TO BECOME A MASTER WILL BE DENIED WHEN: A manually activated sync of the Data Resource, INS Resource and / or Target Resource is in progress, e.g. data is being transferred from a Master to the rest of the network. An automatic transfer of any data is in progress e.g. when CPA / TCPA limits are being changed as they are part of the INS resource which is automatically synchronised. MASTER DENIED ALERT (ALL RESOURCES) When a request to become a Master is denied, a warning is displayed in the alerts section of the screen and the workstation making the request will remain a Slave. The Request Master would have to be attempted again when the required resource becomes available.
DATA RESOURCE ONLY	 THE DATA RESOURCE CANNOT BE SELECTED AS MASTER WHEN: The display is in Standby. A Navigation App must be in use to request Mastership. A Map is being edited on the current Master i.e. the Maps Edit dialog is open. The current Master is in Route Planning mode. The current Master is in ECDIS mode and is in the process of making a temporary edit to a route.
TARGET RESOURCE ONLY	 TARGET RESOURCE CANNOT BE SELECTED AS MASTER WHEN: The display is in Standby. A Navigation App must be in use to request Mastership.
INS RESOURCE ONLY NOTE: TRACK CONTROL SYSTEMS ONLY	 IN A TRACK CONTROL SYSTEM, THE INS RESOURCE CANNOT BE SELECTED AS A MASTER WHEN: The current Master is in ECDIS mode and in the process of making a temporary edit to a route. The current Master is creating or sailing on a Join Route.

6.31.3 Network Nodes

All compatible workstations connected to the network are automatically shown in Network Nodes.

The SFI number(s) shown are automatically generated and cannot be changed by the user.

The colour of the SFI number in the Network Nodes display shows the status of each workstation/ device connected to the network. The following example show the varying colours as applied to a Data Resource sync.

- El0001 (GREEN): The Data Resource has been successfully synchronised.
- EI0001 (RED): The Data Resource is NOT in sync with the Master.
- **EI0001 (GREY)**: The workstation is not communicating via the network or is switched OFF.
- EII0001 (YELLOW): All workstations on the network are set to Slave.

SYNCHRONISING DATA

Before synchronising data, the required resource must be Mastered and the workstations to be updated must be selected.

See section 6.31.6 for limitations and precautions.

Select All:	This button selects all workstations displayed in Network Nodes.
Individual Workstation(S):	Individual workstations can be selected by left clicking on the required SFI number displayed in Network Nodes. Multiple nodes can be selected using the shift and control keys.
Deselect All:	Deselects all workstations displayed in Network Nodes.
Sync Selected:	With a workstation set as Master, pressing Sync Selected synchronises the Selected Resource data across the selected network nodes/ workstations.
	When the synchronisation has been successfully completed, the selected Network Nodes should all be displayed in Green text.
	Sync Selected notes Data synchronisation can only be commenced at a Mastered workstation.

CMAP SYNC NOT ENABLED

Function under development.

CLOSE NETWORK SETTINGS

To close the **Network Settings** menu, press the red X at the top of the menu.

	Network Settings	
Own SFI:	AM1001	
Selected Resource:	Data Resource	
Resource Status:	MASTERED Request Mastership	
Network Nodes:	AM1002	
Select All		
Deselect All		
Deselect All		
Sync Selected		
CMA		
CIVI-		

Example of Network settings

6.31.4 Data Resource

DATA SHARED

In an INS/ networked system, **Data Resource** shares user generated maps and routes across the network.

SYNCHRONISING DATA

At the workstation where data such as User Maps, Routes etc. has been edited or updated, open **Network Settings**.

- Ensure that **Selected Resource** is set to **Data Resource**.
- Ensure that the **Resource Status** is **Mastered**.
- If Slave is enabled, use the **Request Mastership** button to change from Slave to Master.

Select the display(s) to be synchronised or if data is to be updated/ shared across all workstations, press the **Select All** button.

Press the Sync Selected button.

All data will be updated/ shared across the network to the selected display(s).

NETWORK NODE TEXT COLOUR

The text colour of the Network Node(s) will change depending on the Sync status. See section 6.31.3 for details.

	Network Settin	gs	X
Own SFI: Selected Resource: Resource Status: Network Nodes:	AM1001 Data MASTERED	Resource	
Select All Deselect All Sync Selected			
CMA	AP SYNC Not	Enabled	

NOTES

- Where an update is received to data that is already loaded, the map or route will automatically update to the newer version. A caution alert noting the change is raised in the alerts panel.
- Individual maps or routes cannot be selected. When Sync Selected is pressed, all data is synchronised.
- All data is shared across the network i.e. approved and unapproved routes.

USER GENERATED MAPS

Refer to section 6.30 for instructions on creating, editing and loading user generated maps.

ROUTES

Refer to the following sections for instructions on creating, editing and loading routes:

- Section 6.43: Route management.
- Section 6.45: Route monitoring.
- Section: 9: Route planning app.

GENERAL NOTES

Refer to Section 6.31.7 for additional notes.

6.31.5 INS Resource

SYNCHRONISING INS SETTINGS

Refer to the relevant section of this handbook for setting the required CPA, TCPA & Target Association parameters. The workstation must be a Master and Sync Selected must be pressed for INS data to be shared.

At the workstation where a display settings have been configured, open **Network Settings**.

- Ensure that Selected Resource is set to INS Resource.
- Ensure that the Resource Status is Mastered.
- If Slave is enabled, use the **Request Mastership** button to change from Slave to Master.

Select the display(s) to be synchronised or if the settings are to be updated/ shared across all displays, press the **Select All** button.

Press the Sync Selected button.

	Network Settings	X
Own SFI:	AM1234	
Selected Resource:	INS Resource	
Resource Status:	MASTERED Request Mastership	
Network Nodes:	CS0001	
Select All Deselect All		
Sync Selected		

All the settings configured will be continuously shared across the network to the selected display(s).

LOSS OF MASTER

During commissioning of the system, each workstation is assigned a node number and priority. If the workstation assigned as an INS Resource Master becomes disconnected from the network (i.e. is switched off), the next node in the priority list automatically becomes the INS Resource Master.

MASTER/ SLAVE FUNCTIONALITY

When a workstation is configured as a **slave INS Resource**, some functions are locked to the INS Resource Master settings and cannot be accessed or adjusted as detailed below:

FUNCTION	RESOURCE STATUS: MASTER	RESOURCE STATUS: SLAVE	EXAMPLE OF MENU/ FUNCTION
CPA AND TCPA LIMIT ADJUSTMENT	Adjustment available.	Adjustment/ settings locked to Master.	CPA Limit 2.0 NM AIS OFF TCPA Limit 12 min Tgl Assoc. OFF Guard Zone Tgt Tote OFF
TARGET ASSOC. BUTTON	Full button functionality is available.	Adjustment/ settings locked to Master.	Vector Length 3 min (T) Past Positions 6.0 min (T)
PROFILES	Full functionality is available.	All adjustment/ settings locked to Master. The Import/ Export function is still available.	User Profile Management X Load: Default v Save: New v Remove: v Starting: Default v Import / Export

FUNCTION	RESOURCE STATUS: MASTER	RESOURCE STATUS: SLAVE	EXAMPLE OF MENU/ FUNCTION
CHART SAFETY SETTINGS <u>AND</u> SOUNDING SAFETY DEPTH	Full safety depth adjustment is available.	Adjustment/ settings locked to Master.	Chart Features General Advanced Query Display Level Custom Selection Depth Shades Symbol Style St52 Traditional Current Palette ChartRadar Data Source Auto Shallow Contour: 0 metres Deep Contour: 17 metres Carear
LOOK AHEAD <u>AND</u> CONFIGURE CHECK	Full adjustment of Look Ahead and safety checking is available.	Adjustment/ settings locked to Master. Configure Check cannot be used.	Ownship Settlings Configure Check OwnShip Past Track Look-Ahead Look-Ahead Zone Display OFFF Check Ahead Zone Display OFFF Look-Ahead Zone Display OFFF Check Ahead Zone Display OFFF Check-Ahead Zone Display OFFF Check Ahead Zone Display OFFF Check-Ahead Zone Display OFFF Check Ahead Zone Display OFFF Check Ahead Zone Display OFFF Check Ahead Check Ahead C
DEPTH UNDER-KEEL CLEARANCE (UKC)	Full adjustment is available	Adjustment/ settings locked to Master.	Depth 6.1 m 10m 20m 30m 40m 12 9 6 3 0min UKC Alarm 5.0 m Diff. 1.1 m

6.31.6 Target Resource

In an INS/ networked system, **Target Resource** shares Tracked Target information and Target Association settings across the network. The workstation must be a Master and Sync Selected must be pressed for target data to be shared.

Please refer to the following sections for additional details of Target Association and tracking:

- Section 6.52 Target Association.
- Sections 6.53 through to 6.56 for information relating to Target Tracking and Target Settings.

At the designated workstation, open Network Settings.

- Ensure that Selected Resource is set to Target Resource.
- Ensure that the **Resource Status** is **Mastered**.
- If Slave is enabled, use the **Request Mastership** button to change from Slave to Master.

Select the display(s) to be synchronised or if target data is to be shared across all displays, press the **Select All** button.

Press the Sync Selected button.

Target data will be continuously shared across the network to the selected display(s).

NETWORK NODE TEXT COLOUR

The text colour of the Network Node(s) will change depending on the Sync status. See section 6.31.3 for details.

LOSS OF MASTER

During commissioning of the system, each workstation is assigned a node number and priority. If the workstation assigned as a Target Resource Master becomes disconnected from the network (i.e. is switched off), the next node in the priority list automatically becomes the Target Resource Master.

	Network Settings	X
Own SFI:	AM1001	
Selected Resource:	Target Resource	7
Resource Status:	MASTERED Request Mastership	
Network Nodes:	¥ AM1002	
Select All Deselect All Sync Selected		
CMA	AP SYNC Not Enabled	

6.31.7 Network notes

NETWORK CONTROL

Network control is limited to selecting a resource, making a workstation a Master or Slave and activating a data sync.

No other networking functions are available to the operator.

WORKSTATION OFFLINE

The following precautions should be noted when synchronising data across a networked system.

- WORKSTATION ONLINE: If a route or user generated map is deleted on a Master Network workstation, the route/ map will be removed from all connected systems when the relevant resource data is synchronised.
- WORKSTATION OFFLINE: With a workstation set as a Slave, if a route or user generated map is edited or deleted when the system is not connected to the network, the change will be overwritten with the latest available when the system is reconnected and the data is synchronised from a Mastered workstation. An offline system is NOT automatically synchronised when it is reconnected to the network. The operator will need to manually synchronise the data.
- RESTORED SYSTEMS: If a new system is connected to the network OR a system is reloaded it should not be synchronised as a Master. A new/ reloaded system will contain no data so could potentially delete all data across the network.

INTERNET / EXTERNAL NETWORK SERVICES

In line with current IEC 61162-460 regulations, HENSOLDT UK does not permit network connection of any internet or web based services to the HENSOLDT UK multi-function display/ workstation or its associated network.

Connection of any third party network services to the system must be pre-approved by HENSOLDT UK prior to connection and use. This includes but is not limited to printers or remote servers etc.

6.32 Orientation				
6.32.1 North-UP, Head-UP & Course-UP				
In all navigation modes, the located in the top right hand	e display orientation control is d corner of the PPI. The button	030	N-UP	RM(R) G
will display the mode current UP.	ntly in use i.e. N-UP, H-UP or C-	North-UP	Head-UP	Course-UP
With the cursor placed ove following options become a	r the orientation button, the vailable:	N-UP s	elected in rada	ır display
North-UP (left click):	Displayed as N-UP on the orienInformation is shown in the displayed as N-UP on the displayed as N-UP on the oriented states and the oriented states are shown in the displayed as N-UP on the oriented states are shown in the oriented states are shown in the displayed as N-UP on the oriented states are shown in the	itation button	North direc	tion upward.
STAB H-UP (1 st middle Click): When the middle button is firs is selected.	t clicked, Stal	bilised (ST	AB) head-up
	• This modes uses the selected	d gyro data.		
Head-UP (2 nd middle Click):	 On a second Middle click, Disp Information is shown on the d upward. Head-up corresponds to the w direction of ownship's heading This orientation may require fit contents. Changing the ship's render this non stabilised orie Pressing the middle button to p 	played as H-U isplay with own risual view from g. requent rotatio s course or yaw ntation mode u ggles the funct	P is select nship's head n the bridge ns of the dis wing of the w unreadable. ion back to	ed. ding pointing in the splay vessel may STAB H-UP.
Course-UP (right click):	 Displayed as C-UP on the orien Information is shown on the d course upward. 	tation button isplay with the	direction of	the vessel's

• The alignment of the chart does not change as the heading changes.

6.32.2 True and Relative motion

In all navigation modes, the Relative and True motion control is located in the top left hand corner of the PPI. The button will display the mode currently in use i.e. RM(T), TM(T) etc.



With the cursor placed over the orientation button, the following options become available:

N-UP selected in radar display

True / Relative Motion (left click): Switches between true and Relative motion.

The button name will change to reflect the mode selected (see trails orientation below).

	RELATIVE MOTION:	Ownship is in a fixed position on the display and the chart scrolls underneath	
	TRUE MOTION:	The chart is fixed and ownship moves across the display. The chart resets once the ship approaches the edge of the display to give a maximum look ahead. The True motion reset box can be configured in the Ownship Settings tab	
Centre Reset (middle Click):	Resets ownship to th Depending on the mo ownship will reset as	ne centre of the screen. ode selected when centre Reset is pressed a follows:	
	With RELATIVE MOT position on the displ	ION (RM) Selected, ownship is in a fixed ay and the chart scrolls underneath.	
	With TRUE MOTION (TM) selected, the chart is fixed and ownship moves across the display. The chart resets once the ship approaches the edge of the display to give a maximum look ahead. The True motion reset box is configured in Ownship Settings.		
Max Lookahead (right click):	Pease refer to the ow	nship position section for details.	

TRUE OR RELATIVE TRAILS

The orientation of trails is indicated in brackets after the **RM** or **TM** indication.

- **RM(T):** Relative Motion and True trails. •
- **RM(R):** Relative motion and Relative trails.
- TM(T): True Motion and True trails.
- TM(R): True motion and Relative trails.

6.33 Ownship position6.33.1 Ownship position

In ALL Radar and Navigation & Conning display modes, with the cursor placed over the current ownship position, ownship can be offset on the display.

With the cursor placed over Ownship, the following options are available:

No Function (left click):	Left click has no function.
Centre Reset (middle Click):	Reset Ownship to the centre of the screen.
Offset Centre (right click):	Changes the cursor options to ownship offset options (see below).

When **OFFSET CENTRE** is selected, the cursor options change to the following:

Set Max Lookahead (Left Click):	See below.
Centre Reset (Middle Click):	Reset Ownship to the centre of the screen.
Set Ownship position (Right Click):	See below.

SET MAX LOOKAHEAD

When Set Max Lookahead is selected, ownship position is placed near the edge of the display giving the largest display in the direction of the ownship's vector.



Display set to Max Lookahead

SET OWNSHIP POSITION

Ownship position can be moved with the cursor. Pressing Set Ownship position drops ownship at the current cursor position.



Display with user defined offset

6.33.2 Ownship offset CCRP bearing indication

On vessels with large antenna position offsets (bow or aft radar antennas for example); it is possible that the CCRP will be outside of the radar presentation area at low ranges.

The following examples show a simulated vessel with the CCRP forward and radar transceiver positioned aft of the vessel.



In this example, the CCRP is displayed within radar presentation area but slightly offset from centre.

The bearing scale changes with the bearing markers pointing towards the CCRP.



The CCRP is nearing the limits of the radar presentation area.

The bearing scale continues to change with the bearing markers pointing towards the CCRP.



The CCRP is outside of the radar presentation area.

All forward bearing scales are blank, bearings markers aft of the vessel point towards the CCRP.



Detailed example of bearing markers 'pointing' towards CCRP.

6.34 Ownship setting



The Ownship Settings button provides access to the tabs for Ownship Settings, Past Track, look-ahead, Anchor Watch and MAX ROTs



The button is located in the top right hand side of the PPI

With the cursor placed over the ownship settings button, the following cursor options are available:

Ownship Settings (left click):	Opens the Ownship Settings tabs	(see following pages)
--------------------------------	---------------------------------	-----------------------

Anchor Watch (middle Click):	Activates the Anchor Watch function (see section 6.2)
Max ROTs (right click):	Allows the configuration of the Maximum Rates of Turn.

OWNSHIP SETTINGS TABS

When Ownship's setting is selected, the following three tabs become available.

- Ownship tab
- Past track tab
- Look-Ahead tab

Each tab is detailed in the following pages.

CAUTION

When the Ownship Setting tabs are selected, the target data panel and some of the system menus are obscured.

Press the red cross X in the top right hand corner of the tabs to return to the normal menu display. A 2nd set of menus can be opened allowing continued monitoring of target data.

See dual Curved heading line menus in the following pages.

6.34.1 Ownship tab

This section details the Ownship tab selected using the Ownship's setting button



VECTOR LENGTH & TIME MARKS Please refer to Sections 6.63 (Vector Length) and 6.65.2 (Tick Marks).

VESSEL PREDICTOR

Please refer to Section 6.65.

OWNSHIP OUTLINE

With the cursor placed over the **Ownship outline ON/ OFF** the following cursor option is available:

Toggle Ownship's Outline (Left Click): Enables or Disables a graphical representation of ownship outline.

No function (Middle & Right Click):

The Middle & right buttons have no function.



NOTICE OWNSHIP DISPLAY RANGE & SCALE

The size of the ship's scaled outline or the simplified symbol in the graphical presentation is a representation of scale of the ship size set during commissioning or 6.0 mm at a nominal viewing distance of 1.0 m, whichever is greater.

WARNING OWNSHIP GRAPHIC DIMENSIONS

The dimensions of the ownship outline are for reference only and must not be used as a definitive measure of the vessels size. Ownship outline parameters are set during commissioning of the system and cannot be adjusted by the user.

STERN LINE ON/ OFF

With the cursor placed over the Stern Line ON/ OFF the following cursor option is available:

Toggle Stern Line (Left Click): Switches the display of the stem line ON/ OFF.

No function (Middle & Right Click): The Middle & right buttons have no function.

The stern line can also be switched ON/ OFF by right-clicking on the H/L ON button.



CURVED HEADING LINE / TRUE MOTION SETTINGS Please refer to section 6.18 for details.

6.34.2 Past Track Tab

This section details the Ownship Setting Past Track tab which is selected using the Ownship's setting button.



The **Past track tab** offers management of the historic trail of ownship position. Archived tracks can also be viewed using the replay functions.

TRACK LENGTH

The length of the past track displayed on screen can be varied. This may be useful for vessels that carry out regular journeys or follow short routes.

With the cursor placed over the **Track Length** button, the following option is available.

Set max length of vessel track (left click): Opens a drop down box showing a range of track length intervals.

No function (middle & right Click):

The Middle & right buttons have no function.

When **Set max length of vessel track** is selected, a drop down list is presented where the desired track length can be selected.

The button name will change to reflect the length selected.

Changing the length of the track does not delete data.

For example; the system stores 3 months of past track information, if the track length is set to 30 minutes, the system still holds all three months' worth of data.

TICK/ TIME INTERVALS

Please refer to section 6.65.2 for details on configuring the Tick / Time marks that are placed on the Past Track.

CLEAR PAST TRACKS/ LOGGED GROUND & WATER TRIP DISTANCES

The whole vessel track can be permanently deleted by placing the cursor over the **Clear Past Track** button and clicking on left clicking on **Clear Track**. This action also reset the cumulative logged water and ground trip distances.

CAUTION

DELETED TRACKS

Once deleted, past tracks are permanently deleted and cannot be replayed using the voyage replay function.

Tracks can be saved to an external memory device (see replay archived data and backup and restore).





CLEAR PAST TRACK PASSWORD

The *default* Captain's password for clearing the past track is: **PASSWORD** The password can be changed by the user in the Alert Configuration page (see section 5.10.7).

CAUTION PASSWORD CAUTION

Passwords cannot be remotely reset. If a password is changed and forgotten, an engineer will need to attend to reset the password. Attendance to reset a lost or forgotten password is not covered under warranty.

LOGGED WATER DISTANCE

Cumulative:The total logged water distance recorded whilst the system has been operational.Trip:The logged water distance since Past Tracks were last cleared (see previous page).

LOGGED GROUND DISTANCE

Cumulative:The total logged ground distance recorded whilst the system has been operational.Trip:The logged ground distance since Past Tracks were last cleared (see previous page).

REPLAY ARCHIVE DATA

Please refer to the following page for details on replaying data.

Ownship tracks can be backed-up to a virus free USB flash drive using the Backup and Restore function which is accessed from the Standby screen. Archived data saved on a USB memory device is loaded as follows:

- a) Left Click on Replay Archive Data.
- **b)** Select the drive containing the data.
- c) From the drive contents select the required replay file (see below for file format).
- d) Select the folder called **12-hour log** (this will appear to be empty) and left click on **Load**.

Pressing../ takes the folders back-up one level. Repeated presses will return the display to the drive listing.

BACKUP FILE FORMAT

A backup-up file on a memory stick will have the following name/ format and will be stored in a folder called 12-hour log

MD BACKUP	MV Ship name	IE1234	20210127	14:30
File identifier	Vessel's name	System	Backup date	Backup time
		Function ID	(YYYY/MM/DD)	(UTC)

REPLAY VOYAGE DATA

The last 12 hours of ownship track data is automatically stored in the system and can be replayed using the Replay Voyage Data function.

Left click on the **Replay Voyage Data** button and the replay functions are opened. Please refer to the following sections for the replay operator instructions.

The data is replayed from the current UTC time.



REPLAY DATA CONTROL

When **Replay Archive Data** or **Replay Voyage Data** is selected, the relevant data is loaded and the following Voyage Replay control appears on the selected screen.

WARNING LIVE NAVIGATION SUSPENDED DURING REPLAY When Replay Voyage Data or Replay Archive Data is selected, the Voyage Replay Control Dialogue is displayed and LIVE NAVIGATION IS SUSPENDED. To return to 'normal' navigation, close the Voyage Replay Control Dialog.

The data used during all replay functions contains the following data:

- Heading
- Speed
- Position and datum
- Tracked Targets
- Current cell description including issuing authority, cell name, edition and update number (*Chart radar and ECDIS modes only*)
- Selected Antenna offsets (*Radar modes or where the optional radar interlay is enabled and in use*).



CHANGING DISPLAY MODES

During replay, the display mode can be changed and other enabled modes used for replay.

CLOSE REPLAY

To close the replay and return to normal navigation modes, press the red cross X located at the top right of the Voyage Replay Control Dialogue.

6.34.3 Look-Ahead tab

LOOK AHEAD APPLICATION NOTICES

Look-ahead only operates when the optional Chart Radar is enabled.

If Chart Radar is NOT enabled, the look ahead can still be enabled but has no function and will not sound alerts.

When Chart radar and look ahead are both enabled, look-ahead alerts will sound even when the Chart display is switched OFF.

Look ahead is a user definable, three dimensional safety area that is centred on ownship's position.

It takes into account the safety settings for **Safety Contour**, **Air Draught**, **Look-Ahead** and **Clearance**.

The shape of the Look Ahead box will change shape based on COG, SOG and Drift.

Based on the chart data being displayed, **Look Ahead** triggers an alert if any of defined chart features enter the look ahead area.

The Chart Features that cause a look ahead alert are configured using the Configure Check function detailed later in this section.



LOOK-AHEAD 'ON-SCREEN'





Example of look ahead with clearance area swept out based on COG, SOG and drift.

CAUTION SYSTEM PERFORMANCE

Depending on the chart(s) loaded, setting the look ahead range and clearance to maximum could impede the performance of the system due to the high volume of objects being checked.

LOOK AHEAD ENABLE / DISABLE

With the cursor placed over the Look Ahead Enable/Disable button, the following option is available.

Enable/ Disable Look-ahead (left click): Switches the look-ahead ON/ OFF.

No function (middle & right Click):

The Middle & right buttons have no function.

Past Track Look-Ah Look Ahead ENABLED

> 6 mins NM

0.3

Look-Ahead Zone Display ON

Configure Check

Look-Ahead

Clearance

PASSWORD

The default Captain's password for both Enabling AND Disabling the look-ahead is: PASSWORD (case sensitive). The password can be changed by the user in the Alert Configuration page (see Section 5.10 for details).

CAUTION **PASSWORD CAUTION**

Passwords cannot be remotely reset. If a password is changed and forgotten, an engineer will need to attend to reset the password. Attendance to reset a lost or forgotten password is not covered under warranty.

LOOK-AHEAD ZONE DISPLAY CONFIGURATION

When Look-Ahead Zone Display is enabled, look-ahead time and clearance adjustments become available.

The following cursor options are available:

Look-Ahead button Look-Ahead (Left click):	The Look-Ahead time can be adjusted between 1 to 30 minutes.
No function (Middle & right click):	The Middle & right buttons have no function.
Clearance button Clearance (Left click):	The Look-Ahead clearance can be adjusted between 0.01 and 2.00 NM.

No function (Middle & right click): The middle & right buttons have no function.

CAUTION LOOK-AHEAD ADJUSTMENT DELAYS

There can be a delay of up to 10 seconds between adjusting the time or clearance parameters, and the change occurring to the look-ahead box on-screen.

LOOK-AHEAD CONTROL NOT AVAILABLE?

INS or networked systems can be configured by the operator as INS Resource Master or Slave.

INS SLAVE: When the MFD is assigned as an INS Resource Slave, a number of settings are locked including the CPA and TCPA settings. The CPA and TCPA settings and limits are supplied from the MFD currently assigned as the INS Resource Master.

INS MASTER: CPA & TCPA limits can be adjusted and the settings are shared with all networked Multi-Function Displays.

The generation of TCP/ TCPA alerts is unaffected by the INS Resource Master/ Slave status.

See Section 6.31 for additional details on Networking.

CONFIGURE CHECK BUTTON

The **Configure Check** button is used to configure which objects will cause an alert if they enter the look-ahead zone.

Left click on **Configure check** and the Configure Parameters and Initiate Route Checking box opens.

NOTICE SAFETY CHECK & FULL CHECK BUTTONS The Safety Check & Full Check buttons are shown with black text and cannot be accessed in this application. These are used when safety checking a route in Route Planning mode.





SELECTING OBJECTS IN CONFIGURE CHECK

With the cursor placed over an object in the FULL CHECK or SAFETY CHECK columns, the following options are available:

set defaults.

Select/ Deselect (Left Click):	Select/ deselect individual objects.
No function (Middle Click):	The Middle click has no function.
Block select/ Deselect (Right Click):	Selects a block of objects (see following page).

BLOCK SELECT

To block select a group of objects, left-click on one object then place cursor over another and right-click Block Select.

All items from between the first and second selection are selected.

Right clicking again on a block will deselect all.



SAFETY CONTOUR, DEPTH & HEIGHT Safety and Depth Contours

Sets the safety depth and contour for the vessel.

Safety Height

Sets the safety height for the vessel.

Link Safety Depth and Contour

Links the Safety contour and depth values.

All values and adjustments are directly linked to those found in the Chart settings/ General tab menus.

Please refer to section 6.11.3 for additional details.

ON-SCREEN LOOK AHEAD WARNINGS Chart Features

When chart features listed in Objects in Safety Check enter the Look Ahead area, they are presented on screen with a yellow square around the feature.

Depth contours

When a depth contour conflict is detected in the look ahead, the affected area is outlined and shaded in red.





Example of chart features and depth warnings in look ahead area.

6.34.4 Max ROTs



The **Ownship Settings button** provides access to the tabs for Ownship Settings, Past Track, look-ahead and MAX ROTs



The button is located in the top right hand side of the PPI.

With the cursor placed over the ownship settings button, the following cursor options are available:

Ownship Settings (left click): Opens the Ownship Settings tabs (see previous pages).

No function (middle Click): The Middle click has no function.

Max ROTs (right click):

Allows the configuration of the Maximum Rates of Turn.

When Max ROTs is selected, the Maximum Rate of Turn configuration menu is opened.

When accessed for the first time, the default settings of 10 kn and 20°/min will be shown. This value can be edited but not deleted.

Additional rates of turn can be added and edited as follows.

ADD

When the **Add** button is selected, a new menu is presented allowing the configuration of a new maximum rate of turn.

The new value will always be +1 knot and – 1°/min from the previous entry.

Placing the cursor over the numeric value, press and hold the left button and use the trackerball to adjust to the required value.

Press OK to accept the value or CANCEL to return to the previous menu.

EDIT

An incorrect or updated entry can be edited by selecting the desired line and then selecting EDIT.

Once the required changes have been made, press OK to accept the values or CANCEL to return to the previous menu.



Max ROTs showing the default settings



Maximum Rates of Turn	
Speed (kn)	Max ROT (%/min)
10	20
11	19
Add Edit	Delete OK

DELETE

To remove a line or group of lines, select the lines to be removed and select DELETE.

INDIVIDUAL or BLOCK SELECT a line

With the cursor placed over an entry in the menu, the following cursor options are available

/ Deselect (Left Click):	Individual lines can be selected/ deselected
/ Deselect (Left Click):	Individual lines can be selected/ deselect

No function (Middle Click): The Middle click has no function.

Block Select/ Deselect (Right Click): A block of lines can be selected. Left click on a line, then right click on a second line. All lines between the two clicks will be selected.

OK /CLOSE

Press OK in the main menu to close the Max ROT's menu.

6.35 Parallel Index Lines6.35.1 Adding parallel index lines

With the cursor placed over the PI line button, the following options are available:

Add PI line (Left Click):Switches parallel index lines ON.1st press:Green PI line ON.2nd press:Red PI line ON.3rd press:Blue PI line ON.4th press:Purple PI line ON.



Hide all PI lines (Middle Click): Hides all PI lines, click on any button to reveal them. PI Line are removed from the screen but all settings are retained.

Delete PI Line (Right Click): Switches parallel index lines OFF. 1st press: Purple PI line switched OFF. 2nd press: Blue PI line switched OFF. 3rd press: Red PI line switched OFF. 4th press: Green PI line switched OFF.



Example of all four Parallel index lines switched ON

6.35.2 Adjusting PI lines

With the cursor positioned over a PI Line, the line becomes bold, two dots and two arrows appear on the line and the cursor function changes depending on the position on the PI line.



The cursor function changes depending on where the cursor is placed on the PI line:

TRUNCATE

The length of the PI line can be adjusted. With the cursor over the **arrows** (> or <) shown on the PI line, the following cursor options become available:

Truncate PI line (left click):	Select arrow to adjust the length of the PI line.
Acquire (middle Click):	Acquire a radar target.
Delete PI line (right click):	Switches OFF the selected PI line.

With the cursor placed over the arrow on the PI line click and the cursor options change as follows:

Truncate PI line (left click):	Set the new length of the PI line.
Cancel (middle click):	Cancels the PI adjustment.

Fully extend PI line (right click): Returns the PI line to the default full screen length.

BEARING ADJUSTMENT

The bearing of the PI line can be adjusted. With the cursor placed between the **Dot** and the **arrow** on a PI line, the following cursor options become available:

Adjust PI line Bearing (left click): Select to adjust the bearing of the selected PI line.

Acquire (middle Click):	Acquire a radar target.
Delete PI line (right click):	Switches OFF the selected PI line.

With the cursor placed between the **Dot** and the **arrow** on a PI line click and release the left button. The cursor options now change to the following:

Set Bearing (left click):	Fix the bearing when the desired value has been set.
Cancel (middle Click):	Cancels the Set bearing function.
Set to Heading (right click):	Align the Selected PI line to ownship's current heading.

C: RANGE ADJUSTMENT

The range of the PI line can be adjusted. With the cursor placed at any position on the PI line between the two dots, the following cursor options become available:

Adjust PI line Range (left click): Select to adjust the range of the selected PI line.

Acquire (middle Click):	Acquire a radar target.
Delete PI line (right click):	Switches OFF the selected PI line.

With the cursor placed over the PI line between the two dots, click and release the left button. The cursor options now change to the following:

Set Range (left click):	Fix the range when the desired value has been set.	
Cancel (middle Click):	Cancels the Set Range function.	
No function (right click):	The right button has no Function.	

6.35.3 Show/ Hide PI line(s)

Parallel lines can be removed from the display without losing data.

With the cursor placed over the **Pl line** button, the following options are available:

Add PI line (left click):	Switches parallel index lines ON.
Hide all PI lines (middle Click):	Hides all PI lines. With the cursor placed over the PI Button, click on any button to restore the display of PI lines. PI Line are removed from the screen but all settings are retained.
Delete PI Line (right click):	Switches parallel index lines OFF.

6.35.4 Delete PI lines

PI lines are deleted in the reverse order to the switch ON process. When a PI line is switched OFF, the PI line data is lost.

With the cursor placed over the **PI line** button, the following options are available:

Add PI line (left click):	Switches parallel index lines ON.		
Hide all PI lines (middle Click):	Hides all PI lines, click on any button to reveal them.		
Delete PI Line (right click):	Switches parallel index lines OFF. 1 st press: Purple PI line switched OFF. 2 nd press: Blue PI line switched OFF. 3 rd press: Red PI line switched OFF. 4 th press: Green PI line switched OFF.		

6.36 Passwords

6.36.1 Operator passwords

The following operator passwords are required for various functions within ZM-2300 software.

FUNCTION	PASSWORD REQUIRED FOR	PASSWORD	
ALERT CONFIGURATION	Any changes made in the alert configuration page.	The factory default password for all functions is: PASSWORD	
LOOK-AHEAD	Enable or disable the look-ahead function.		
CLEAR PAST TRACKS	Clearing past tracks and resetting the cumulative logged water and ground track TRIP distances.	Passwords are case sensitive.	

The password can be changed by the user in the Alert Configuration page, please refer to section 5.10.8 for details.

NOTICE LOST PASSWORD

Passwords cannot be remotely reset. If a password is changed and forgotten, an engineer will need to attend to reset the password. Attendance to reset a lost or forgotten password is not covered under warranty.

6.36.2 System passwords

Access to the following menus is strictly forbidden for system users:

Set-up mode	Operator access to the Set-up mode <i>is not permitted</i> . The Set-up mode allows for configuration of the system and access is only granted to HENSOLDT UK officially trained and authorised engineers.
Windows desktop	Access to the Windows desktop is strictly prohibited.

CAUTION

Attempting to access the windows desktop will invalidate the warranty status of the system. Access to Set-up or the Windows desktop is monitored and logged by the system.

6.36.3 Password optional features:

Bypass Password:	This optional feature is for strictly for service use only and will not be issued for operator use.
Setup Bypass password:	This optional feature allows temporary access to the system configuration only. It may be issued by HENSOLDT UK in exceptional circumstances.

Targe Name

Source

т соб

T SOG

CPA Limit 0.0 NM

TCPA Limit 0 min

Guard Zone

AIS ON

Tgt Assoc. ON

Tgt Tote OFF

6.37 Past Position indicator

The past positions of tracked radar targets, AIS targets and MOB symbols are generated by dropping a past position marker every minute.

The past position slider bar is used to set the total past position time. Past positions can be either true or relative. Up to 30 minutes of past positions can be displayed.

With the cursor placed over the **Past Position** button, the following options are available.

Past Pos. True/ relative (left click):	Switch between true and relative indication.	Target Settings Trial Manoeuvre Vector Length 6 min (R) Past Positions 6.0 min (Off)	
Reset past position (middle Click):	Clear all past position indicators.	Trails Length 6.0 min (T)	
Past Pos. ON/ OFF (right click):	Switches past positions ON/ OFF. When past positions are switched OFF, the graphics are removed from the screen but the data is not deleted i.e. when Past Positions are switched ON again, previous positions history is still shown.		

CAUTION

CLEAR ALL PAST POSITION INDICATORS

When Rest Past Position is selected, all past position indicators are permanently deleted.



Examples of Past Position Indications

6.37.1 Past Position: True/ Relative Trails

The selection of true and relative past position indicators is directly linked to trails as shown below:

Past position ON	Past Positions	6.0	min (T)
Trails OFF	Trails length	6.0	min (Off)
Past position OFF	Past Positions	6.0	min (Off)
Trails ON		6.0	min (T)
Past position ON	Past Positions	6.0	min (T)
Trails ON	Trails length	6.0	min (T)

Past position indicator can be switched between **True** and **Relative** using the *Past Position* button.

Trails can be switched between **True** and **Relative** using the *Trails* button.

The selection of true or relative past positions and trails is directly linked. i.e. when **True** or **Relative** is selected using the Trails button, the Past position button follows the trails selection.

NOTICES GRAPHICS ON/ OFF

When past positions are switched OFF, the graphics are removed from the screen but the data is not deleted i.e. when Past Positions are switched ON again, previous positions history is still shown.

NAVIGATION & CONNING DISPLAY

The Past position function is not available in the Navigation & Conning display.

6.37.2 Past position in single and dual PPI

In dual radar display mode, the **Past Position** indicator can be independently switched ON/ OFF in both the main display and the PPI tab. It is also possible to independently select True or Relative indicators.



True past positions and trials



The length of past position is adjusted in the main display and can be varied between zero and 30 minutes. This adjusts the length of the indicators in both the main PPI and the second PPI.

6.38 Position Fixing

Position fixes can be made using the **Fix** button located within the GNSS display zone.

Left Clicking on the Fix button opens a new menu where position fixes can be configured and set.

? G	PS1			
LAT	51°30.006'N			
LON	001°01.054'E			
WGS84 V	Fix	Check		
UTC +01:00*		10:08:33		
Auto	(Auto)			

NOTICE CONNING DISPLAY OR NAVIGATION & CONNING DISPLAY

The Position Fix function is not available in Conning Display or Navigation & Conning display.

6.38.1 Add a Position Fix

Firstly select the desired **Type of Fix** from the drop-down list.

With the cursor placed over the button Left click on Source of Fix and make the required selection from the list.

The default fix type is Visual Bearing.

The button name will change to reflect the value selected.

Position Fix Dialog	Add Fix	Visual Bearing	
Add Fix Visual Bearing Visual Bearin	Position	Visual Bearing Radar Range Visual/Radar GNSS	
Time	Time	Loran Astronomical Other	
Comment			
Show Position Fixes			
Update DR Accept Cancel			

Place the cursor over the Add Fix button and the following cursor options are available:

Add Fix (left click):	Add a Position Fix
Add DR (middle Click):	Add a Dead Reckoning (DR) FIX.
Add EP (right click):	Adds an Estimated Position (EP) FIX

CAUTION CURSOR FUNCTIONS

When Add fix has been selected, the cursor cannot be used to select any other function until the fix has been placed on the chart.

Click on Add Fix, Add DR or Add EP as required and move the cursor onto the display. Depending on the fix type selected above, the cursor symbol will change to one of the following symbols:

1708 U	Visual bearing	1709
1708 _R	Radar range	1709 DR
1708 WR	Visual/ radar	1709 EP
1708 GNSS	GNSS	1122 DR
1709 —L	Loran	1122 EP
1709 A	Astronomical	NOTE: represe

1709	Other (no text by symbol)	
1709 DR	Dead reckoning	
1709 EP	Estimated position	
DR GNSS	Dead reckoning based on GNSS	
1122 EP	Estimated position based on a visual fix	

NOTE: In the above examples, the four digit numbers represents the time the fixes were created.

PLACING THE POSITION FIX

With the cursor position at the required fix position on the display, the following options are available.

Place fix on chart (left click):	Adds the position fix.
Acquire (middle Click):	Acquire a radar target.
No function (right Click):	The right click has no function.

Left click on Place Fix on Chart and the position fix is dropped at the current cursor position.

Add Fix Visual Bearing 🔻	The following data will now be displayed in the Position Fix dialogue:		
Position 51° 28.366' N 001° 06.376' E	Position:	The position of the fix.	
Time 03/05/2011 16:34	Time:	The time the position was dropped.	
Comment Kentish flats wind farm	Comments:	Notes/ comments for the fix can be added using the keyboard.	
Update DR Accept Cancel			

CAUTION FIX NOT SET

At this point, the fix is NOT accepted. Pressing 'Cancel' cancels and deletes the current fix.

6.38.2 Use Position Fix to Update Dead Reckoning

The dead Reckoning can be updated using the Position fix. With the system configured as shown in the previous section, left clicking on the **Update DR** button updates the DR to the last position fix.

NOTICE The time, date, position and comments for the fix cannot be changed once it has been accepted.

6.38.3 Accept a Position Fix

Left clicking on the Accept button accepts the fix but does not update the DR position.

CAUTION Accepting a fix does not update the DR position

NOTICE

The time, date, position and comments for the fix cannot be changed once it has been accepted.

6.38.4 Show or Hide Position Fix

When the Show position fixes button is pressed the following drop down list is presented:

SHOW POSITION FIXES

All position fixes are shown.

HIDE POSITION FIXES Position fixes are *NOT* shown.

POSITION FIXES SHOWN WITH PAST TRACK

Position fixes are displayed but are controlled as part of the past track length.

For example: If the **Past Track length** is set to 2-hours, position fixes created in the last 2-hours are shown. All fixes older than 2-hours are not shown.

The show/ hide position fix button name will change to reflect the selection.

6.38.5 Cancel a Position Fix

Fixes can be cancelled before they are accepted as a fix or a dead reckoning update. With the cursor over the Cancel button, the following option is available:

Cancel Fix (left click): Deletes the current position fix.

No function (middle & right Click): The Middle & right buttons have no function.

Position Fix Dialog Add Fix Visual Bearing Position 50° 20.130' N 002° 08.229' W Time 06/08/2011 13:17 Comment Show Position Fixes Update DR Accept Cancel

Show Position Fixes Show Position Fixes Hide Position Fixes Position Fixes shown with Past Track

6.38.6 Reviewing a Position fix

When the optional Chart Radar function is enabled, details of a position fix can be reviewed by placing the cursor over the position fix symbol and left clicking (**Chart Query**).

The detail of the fix and any associated range or bearing LOP(s) are displayed in **Chart features** as **Position fix.**

Use the +/- symbols next to the text entry to expand or collapse the data within the dialogue box.

Charl Features C-Map Professional+ Depth area Navigational system of marks C-Coverage Deptition Fix Type: Standard Source: Visual Bearing Lat: 51° 25.840° N Lon: 001° 13.681' E Time: 04/05/2011 09:08 Lat: 51° 26.073' N Lon: 001° 13.681' E Dearing 2

6.39 Position Sensor6.39.1 Sensor selection and control

Position sensors can be selected as follows:

Place the cursor anywhere on the **Position Sensor** Selection bar and the following option is available:

Select Pos Sensor (left click): A list of available EPFS sources is displayed in a drop down list.

No function (middle & right Click): The Middle & right buttons have no function.

Pressing **Select Pos Sensor** produces a drop down box where the available position sensors can be viewed and selected (see Section 6.47 for general notes on sensor availability).





Position selection in Navigation & Conning mode

The button name will change to show the selected source and the selected position is displayed as **Lat** and **Lon**.

The select position sensor function allows the user to select the position source and to separately select the source for Course Over Ground (COG) and Speed Over Ground (SOG).

SENSOR INDICATOR

See section 4.11 for details on the sensor indicator (Green or Amber).

COG & SOG

See section 6.15 for full details on COG & SOG

The COG and SOG defaults to the current navigation system, but this can be overridden manually.

NOTICE

If the currently selected navigation system fails, the COG and SOG will search for a working sensor and Drift can be entered using the DR.

position sensor selection bar.

DIFFERENTIAL POSITION (DGPS) INDICATOR



Where there is **no symbol**, the selected position sensor is not a

Where a DGPS signal is being received, a 'D' will appear in the



DGPS system.

If the DGPS signal is of questionable accuracy, the indicator will change to '?'

DIFFERENTIAL TO AUTONOMOUS ALERT

If the position sensor in use changes from Differential to Autonomous, an alert will be triggered indicating "Position: Lost Differential."

6.39.2 Position Offset

An offset can be applied to an EPFS position. As required, place the cursor over **LAT** (latitude) *or* **LON** (longitude) and the following cursor options become available.

 Apply Offset (left click):
 Apply an offset in LAT or LON to the current position.

 No Function (middle Click):

Reset Offset (right click):

Removes the offset and switches the offset display OFF.

APPLY OFFSET

Left click on Apply Offset to open a slider bar below the LAT or LON box as required.

OFFSET MAXIMUM

A maximum 500 m offset can be applied

With the cursor placed over the slider bar, press and hold the left button and use the tracker ball to adjust the Latitude or Longitude offset as required.

The offset value and direction is displayed to the right of the LAT or LON button.

RESET OFFSET

Pressing Reset Offset removes all offset values from the current position and switches the offset display OFF.

CHANGE POSITION OFFSET CARDINAL DIRECTION

With the cursor placed over the Latitude or Longitude Position offset value, the offset dialogue background will change from black to light blue and the following cursor options become available:

Offset North (LAT) or Offset East (LON) (left click):	Button displays: North is when cursor is over LAT offset or East when cursor is over LON offset
No Function (middle Click):	The middle click has no function.
Offset South (LAT) or Offset West (LON) (right click):	Button displays: South when cursor is over LAT offset or West when cursor is over LON offset

POSITION OFFSET NORTH/ EAST

LAT: With the cursor placed over the LAT offset, applies a North offset when adjusting Latitude. LON: With the cursor placed over the LON offset, applies an East offset when adjusting Longitude.

POSITION OFFSET SOUTH/ WEST

LAT: With the cursor placed over the LAT offset, applies a South offset when adjusting Latitude. LON: With the cursor placed over LON offset, applies a West offset when adjusting Longitude.

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6.39.3 Position Datum

The datum of the position can be changed as follows. With the cursor over the Datum Button, the following cursor option becomes available:

Change Datum (left click):

Opens a drop down list where the required datum can be selected.

No function (middle & right Click): The Middle & right b

k): The Middle & right buttons have no function.

The button name will change to reflect the selected datum.

? G	PS1 •	LAT 51°30	121'N	LON	001°01 3	90'E	WGS84 v	WGS84	I V
LAT	51°30.006'N	R) -				N-UP	RM(R)	WGS84 ARC50 ADG84	ł
UTC +01:00*	001°01.054'E Fix Check 10:08:33	Na	ivigation	& Cor	nning dis	splay mo	ode	ED50 NAD27 OSGB36	
Auto	(Auto)							S.AM69 TOKYO WGS72	
Rada	r modes							Datum dropo	down

WGS84	World geodetic system 1984	
ARC50	ARC 1950 (Africa)	
ADG84	Australian Geodetic 1984	
ED50	European 1950 (European Datum)	
NAD27	North American 1927	
OSGB36	Ordnance Survey of Great Britain 1936	
S.AM69	South American 1969	
Tokyo	Tokyo	
WGS72	World Geodetic System 1972	

The CCRP, cursor, target data position, chart features, route planning table and DR position values are converted to the selected datum.

Position values shown are converted to the datum selected for display but are stored internally as WGS84 datum.

CAUTION

Users should be aware that chart transformation based on IHO S60 parameters (as used for non-WGS84 datums) may result in significant positional errors.
6.39.4 Position Check

Check Position shows the difference between the position sensor currently selected and other available position sensors.

With the cursor on the **Check** button the following cursor option is available:

Check position (left click):

Opens the position check display.

No function (middle & right Click):

The Middle & right buttons have no function.

When Check is selected, the values of position sensors are shown and the differences (including dead reckoning) are shown in the Position Check box.

The other position locations are also displayed in the chart presentation area.

In the example opposite, the differences between GPS1 and a DR position are shown.

CLOSE POSITION CHECK

Press X to close the Check function.

? G	PS1	
LAT	51°30.006'N	
LON	001°01.054'E	
WGS84 V	Fix Check	
UTC +01:00*		10:08:33
Auto	(Auto)	



6.40 Profile

The screen configuration of single radar display, dual radar display and navigation & conning display modes can be saved and managed using the Profile function.

The following user configurable parameters are saved in profiles:

- AIS settings including Class A Targets, Class B Targets, ATON, Sleeping Targets and Target Association
- Chart Display settings
- Correlation Mode and settings
- CPA and TCPA Limits
- Cursor Cue settings
- Display Offset
- Gain, Sea and Rain settings
- Motion Mode (North Up, Course Up, Head Up)
- Past Position Mode (True, Relative) and Length
- Predictor Vector settings
- Range Rings On/Off

PROFILE MANAGEMENT

With the cursor placed over the profile button, the following cursor options are available;

Manage user profile (left click):	Selection, configuration	050 Profile: Default
	and management of profiles.	Manage User KH Default Full Default Profile Profile
KH default profile (middle click):	Loads the system default settings.	HL ON Import /
Full default profile (right click):	Loads default settings.	CPA Limit 2.0 NM

PROFILE MANAGEMENT NOT AVAILABLE?

INS or networked systems can be configured by the operator as **INS Resource Master** or **Slave** (See section 6.31 for additional details on Networking).

- INS SLAVE: When the MFD is assigned as an INS Resource Slave, a number of settings are locked including Profiles. The Profile settings and management are configured by the MFD currently assigned as the INS Resource Master.
- INS MASTER: Profiles can be created, edited and loaded. When a profile is loaded, it is also loaded on all displays configured as INS resource Slave.

LOAD

Left clicking on Load opens a drop down box where default and user created/ saved profiles can be selected.

The button name will change to reflect the selected profile.



Load

Profile: Default Profile: Default Profile: Default Profile: Default Profile: Default Profile: Default Chart OFF T SOG -----CPA ----TCPA ----BCR ----CPA Limit 0.0 NM AIS ON

12 NM

TM(T) GND STAB

Range

- Range Scale
- Route settings
- Stabilisation Mode (Sea, Manual, Ground)
- Stern Line On/Off

N-UP

- Trails Mode (True, Relative) and Trails Length
- Transceiver tuning (manual or auto)
- Vector Mode (True, Relative), Length and Timer Marks
- Video Settings (Data, Graphics, Chart/Map, Nav Tools, Targets, Radar, Trails, Radar and Trails colours)

Range

Rings

3 NM

OFF

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SAVE / NEW PROFILE.

Left clicking on Save opens a drop down box where default and user profiles can be saved.

Prior to creating a new profile, the screen must be configured to the desired settings.

Selecting 'New' saves the current screen set-up as a new profile. When **New** is selected, use the keyboard to assign a name to the profile and click **Accept** to save it. The newly named profile will now be available for selection in the Load menu.

Once saved, It is not possible to edit a profile.

REMOVE (DELETE)

Left clicking on Remove opens a drop down box where user profiles can be deleted. The profile to be deleted can be selected.

NOTICE NO DELETION WARNING

As soon as Delete is selected, the profile is deleted without warning.

A profile cannot be deleted if:

- It is a factory default profile.
- The profile is set as a Starting profile. The required profile must be de-selected from starting profiles prior to deletion.

STARTING

The profile set as a Starting profile is automatically selected for use when the display is switched ON or the system is restarted.

Left clicking on Starting opens a drop down box where user profiles can be selected for use as a start-up profile.

CLOSE

To close the User Profile settings menu, click on the X at the top-right of the menu.

6.40.1 Last settings

Last Settings appears as a selectable profile when a change has been made to the profile that is currently loaded.

This will also from appear if another display mode is selected. For example, if you change from ECDIS mode to the optional Dual Radar Display, the profile will show as Last Settings, this being the original profile loaded plus any changes made to the display settings.

Us	er Profile Management	X
Load:	TEST PROFILE 1	▼
Save:	New	V
Remove:	Last Settings TEST PROFILE 1 New	
Starting:	Default	▼
	Import / Export	





6.40.2 Import / Export profiles

Profiles can be imported and exported to a virus free USB memory stick and shared between HENSOLDT UK Navigation Displays running ZM-230x software (where 'x' is the software variant number).

With User Profile Setting menu open and the cursor placed over the import / Export button, the following cursor options are available:

Import Profiles (left click):	Import previously saved profiles from a USB memory device.	S
No function (middle Click):	The middle button has no function.	
Export Profiles (right click):	Export all profiles to a USB memory devi	ce.

EXPORT PROFILES

When **Export Profile** is selected, all profiles are immediately saved to the USB memory device in a file called **UserProfiles.ini** (approximately 100 Kb). Individual Profiles cannot be exported.

If a profile file already exists on the USB device, the following warning is displayed:



Press OK to overwrite the previous file or Cancel to abandon the export.

IMPORT PROFILES

When **Import Profiles** is selected, all user profiles found on the USB memory device are imported to the display and merged with the existing user profiles.

There are no confirmation messages that the import has been completed.

CAUTION FILE OVERWRITE

When importing user profiles from another display or from an old copy of the UserProfile.ini file, the contents of the USB memory device will overwrite any profiles on the system with the same name.

If no memory device can be found or there is no 'UserProfile.ini' file on the USB memory device, the following warning will be displayed:



Load:	Default	1
Save:	New	
Remove:		
Starting:	KH test profile	
	Import / Export	

User Profile Settings

6.41 Racons, SARTs and Radar Enhancers6.41.1 Racons

A RACON is a radar beacon (**RA**dar bea**CON**) which emits receivable signals in the radar frequency spectrum (X and S-Band).

The RACON signal is represented on screen as a Morse code character (dots and dashes) originating at a point just beyond the position of the radar beacon.

The Morse code symbol on the screen may not be completely accurate but is sufficiently close to the beacon radar image.

6.41.2 Beacon Button (X-Band Only)

SART DETECTION

Some versions of ZM-2300 Navigation Display software will have a **Beacon** button on the top left of the screen situated below the Mute button.

The button shows the current status of Beacon Mode and is used to toggle the mode ON and OFF.

When Beacon Mode is ON, the transceiver will switch to a mode to improve detection of the transmissions of Racons, Radar Enhancers and SARTs. In this mode, the Manta NEO X-Band is limited to 8 NM range.

BUTTON AVAILABILITY

This Beacon button is only present when the system is a **Master** of a **MK11 X Band transceiver** or **Manta NEO X-Band.**

CAUTION

BEACON MODE IN NORMAL USE

It is strongly recommended that the Beacon button is left set to OFF during normal navigation.

6.41.3 Operation of Marine Radar for Beacon Detection

RADAR RANGE SCALE

To observe a Racon, SART or Radar Enhancer signal, select a range scale of 6 or 12 nautical miles. The spacing between the Beacon responses is about 0.6 nautical miles (1125 metres) and a number of returns are required to distinguish between the different types of signals.

BEACON RANGE ERRORS

Inherent delays occur in the Beacon responses due to the in-built trigger delay. Also Beacons may have to sweep through the whole radar band before reaching the frequency of the search radar. At medium ranges of about 6 nautical miles the range delay may be between about 150 metres and 0.6 nautical miles beyond the Beacon position.

As a Beacon is approached, the radar detects the initial fast sweep of the Beacon and double dots are shown. The range delay of the first dot is no more than 150 meters beyond the Beacon position.

RADAR BANDWIDTH

Any radar bandwidth of less than 5 MHz attenuates the Beacon signal slightly, so a medium bandwidth is normally selected to ensure optimum detection of the beacon. Operating Instructions are to be consulted about the particular radar parameters and bandwidth selections.

RADAR SIDE LOBES

As the Beacon is approached side lobes from the radar antenna may show the Beacon responses as a series of arcs or concentric rings. These can be removed by the use of the sea anti-clutter control. Operationally, observation of the side lobes can be used to confirm that the beacon is near to the ship.

DETUNING THE RADAR

To increase the visibility of the beacon in clutter conditions, the radar can be detuned to reduce the clutter without reducing the beacon response. The radar AFC system permits sufficient manual control to detune the receiver. Care is to be taken when operating the radar while detuned, as other wanted navigational and collision avoidance information may not be detected.

The radar tuning must be returned to normal operation as soon as possible.

When a SharpEye[™] transceiver is selected and the Beacon button is available, retuning is not necessary.

GAIN

For maximum range beacon detection the normal operational gain level is to be used. For optimum range beacon detection, set the Sea Anti-clutter Control to minimum. Care must be exercised as targets in sea clutter may be obscured when the radar system is retuned for normal operation. Automatic/manual anti-clutter sea control facilities are to be switched to manual.

RAIN ANTI-CLUTTER CONTROL

Rain control should not be used when trying to detect beacons, as the beacon responses may be reduced or suppressed.



Beacon mode ON: Example of a SART located > 6.0 nm away



Beacon mode ON: Example of a SART located between 2 nm and 0.2 nm



Beacon mode ON: Example of a Beacon located within 0.2 nm

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6.42 Radar control

6.42.1 Dynamic Clutter Suppression™

Dynamic Clutter Suppression™ (DCS) automatically suppresses clutter, adjusting to the prevailing conditions over time.



When DCS is enabled, the Sea and Rain filters are replaced with a single adjuster for Dynamic Clutter SuppressionTM.

BUTTON NOT AVAILABLE?

The Dynamic Clutter Suppression function cannot be selected when a Doppler SharpEye[™] system is selected.

With the cursor placed over the Dynamic Clutter Suppression[™] check box, the following cursor option becomes available:

Enable/ Disable DCS (left click): Switches the dynamic clutter suppression ON/ OFF.



No function (middle & right Click): The middle & right buttons have no function.

When Dynamic Clutter Suppression[™] is enabled (ticked) the Sea and Rain filter controls are replaced by a Dynamic Clutter Suppression[™] control which allows the adjustment of the clutter suppression to be adjusted.

Example of Dynamic Clutter Control (DCS) with radar returns in heavy rain with 8 to 12 m waves



DCS OFF

DCS set to zero



DCS set to 5 (maximum)

6.42.2 Enhance

The video enhance feature enlarges targets in range and bearing to increase visibility.

Clutter should be reduced to a minimum before switching on Video Enhance.

In excessive sea clutter or precipitation, the use of enhanced video may reduce target visibility. A combination of optimum pulse length, adjusting Sea/Rain anti-clutter and Scan-Scan Correlator produces better target visibility.



The video enhance function stretches the targets in both range and azimuth, two different levels being applied independently on user selection.

With the cursor placed over the **Enhance** button, the following cursor options are available.

Normal Video (Left Click):	Switches the video enhance OFF.
Enhance 1 (Middle Click):	Applies 1st stage of video enhance (target stretch in both range and azimuth).
Enhance 2 (Right Click):	Applies 2nd stage of video enhance (further target stretch in range and azimuth).

WARNING

ENHANCE APPLICATION NOTES

The video enhance enlarges not only small targets but also clutter returns from the sea surface, rain and radar interference.

For this reason, ensure these types of interference have been sufficiently suppressed before activating the video enhance.

In excessive sea clutter or precipitation, the use of enhanced video may reduce target visibility. Adjust the correlator and sea/rain anti-clutter controls to reduce the amount of clutter before enabling the enhance functions.

6.42.3 Gain Control

The Gain control sets the threshold of the radar signals shown on the screen.

With the cursor placed over the Gain slider, the following cursor option is available.

Adjust Gain (Left Click):

Adjusts the Gain as required.

No function (Middle & Right Click):

The middle & right buttons have no function.



Keeping the Adjust Gain button pressed, use the cursor to adjust to the desired gain level.

NOTES ON GAIN CONTROL:

- For a correct Gain setting with the correlator switched OFF, the control should be adjusted until an even 'speckled' background is just visible on the screen, i.e. the gain is set to the threshold of receiver noise.
- In conditions of high precipitation (rain, hail or snow) a reduction of the Gain level reduces clutter and produces a clearer picture.

WARNING GAIN APPLICATION NOTES

If the gain is set too low, weak targets will not be visible.

Equally, if the level is set too high there will be too much background noise and strong targets may not be clear due to the poor contrast between the targets and the background noise.

6.42.4 **Sea Clutter Control**

MAGNETRON AND NON-DOPPLER SHARPEYE™ TRANSCEIVER SYSTEMS

The Sea anti-clutter control reduces returns from sea clutter.

The control has the maximum effect at zero range diminishing over time (range) until no reduction of signals occur at the edge of the Radar Operational Area.

> 5.0 0.0 0.0

Auto

With the cursor placed over the **Sea clutter** slider, the following cursor options are available.

Manual Sea (left click):	Adjusts the sea filter as required.	Gain	5.
Reset sea (middle Click):	Resets the sea clutter to zero	Sea	0.
reset sea (made chek).		Rain	0.
Automatic sea (right click):	Selects automatic sea allowing the system		
	to automatically apply the anti-clutter	Sea 🦲	- Au
	level.	Sea filter set to A	Auto

MANUAL ADJUSTMENT

With the Adjust Sea button pressed, use Adjust Sea (left click and hold) to manually adjust the sea clutter to the desired level.

The optimum manual setting of the Sea clutter control is that some clutter is seen but is sufficiently suppressed so that small targets are easily identified.

RESET SEA

Selecting reset switches the AUTO Sea OFF and resets the clutter control value to zero.

AUTO SEA

When Automatic Sea is selected, the system automatically applies the anti-clutter level. When automatic Sea is selected the slider graphic is automatically positioned and fixed in the middle of the adjustment range but does not represent that actual level of filtering applied.

ADJUSTMENT NOT AVAILABLE?

If the Sea filer is greyed out and cannot be adjusted, the display is set as Tx Slave. See section 6.42.8 for additional details.

DOPPLER SHARPEYE™ TRANSCEIVER SYSTEMS

See section 6.42.6

WARNING

SEA CLUTTER LEVELS

If the Sea anti-clutter is set too low, targets may be obscured. Equally, if the Sea anti-clutter is set too high, both targets and sea clutter may be obscured.

NOTES ON SEA ANTI-CLUTTER CONTROL

- In most cases adjust the Sea clutter control until clutter has disappeared to leeward, with a little still visible windward. Increasing the Sea anti-clutter progressively reduces the clutter whilst retaining targets. Smaller targets may have a similar or lower signal than clutter signals; the visibility of these targets can be enhanced using the Scan to Scan correlation function.
- When the radar is operating in conditions of simultaneous precipitation and sea clutter there will be a further degradation in performance, and the gain, sea and rain anti-clutter controls may need to be set manually to optimise the radar picture.
- When switching from Automatic back to Manual Sea, the control reverts to the last manual setting used prior to switching to auto.

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6.42.5 Rain Clutter control

MAGNETRON AND NON-DOPPLER SHARPEYE™ TRANSCEIVER SYSTEMS

The Rain anti-clutter control reduces clutter from rain, snow and hail. The rain anti-clutter control setting should be adjusted to preserve small targets.

With the cursor placed over the **Rain clutter** slider, the following option is available.

Adjust rain (left click):	Selects manual control of rain filter.	Gain 5.0
Reset rain (middle Click):	Resets the rain clutter to zero	Sea 0.0
Reset rain (initude circk).		Rain 🗍 0.0
Automatic Rain (right click):	Selects automatic rain allowing the	
	system to automatically apply the anti-	Rain Auto
	ciutter level.	Rain filter set to Auto

MANUAL ADJUSTMENT

With the Adjust Rain button pressed, use the cursor to adjust the rain filter to the desired level.

The Rain control should be adjusted so that clutter from precipitation is reduced, thus improving radar image discrimination. Note that land masses will be thinned as the rain anti-clutter control is increased.

RESET RAIN

Selecting reset switches the AUTO Rain control OFF and resets the clutter control value to zero.

AUTO RAIN

When Automatic Rain is selected, the system automatically applies the anti-clutter level. When automatic Rain is selected the slider graphic is automatically positioned and fixed in the middle of the adjustment range but does not represent that actual level of filtering applied.

ADJUSTMENT NOT AVAILABLE?

If the Rain filer is greyed out and cannot be adjusted, the display is set as Tx Slave. See section 6.42.8 for additional details.

DOPPLER SHARPEYE™ TRANSCEIVER SYSTEMS

See section 6.42.6

WARNING

RAIN CLUTTER LEVELS

If the Rain anti-clutter is set too low, targets may be obscured. Equally, if the anti-clutter is set too high, both targets and sea clutter may be obscured.

NOTES ON RAIN FILTER

- Useful techniques that can be used in conjunction with the rain clutter to help target detection are the Reduction of gain, use of S-Band frequency radar sensor or, in magnetron systems, under pulsing the radar (short pulse is effective at reducing rain signals).
- When the radar is operating in conditions of simultaneous precipitation and sea clutter there will be a further degradation in performance, and the gain, sea anti-clutter and rain anti-clutter controls may need to be set manually to optimise the radar picture.
- When switching from automatic to manual rain, the control reverts to the last manual setting used prior to switching to auto.

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6.42.6 Sea & Rain control in Doppler SharpEye[™] systems

SEA AND RAIN SET TO AUTO

In systems that are Mastering a SharpEye[™] Doppler transceiver, the Sea and Rain filters should be left set to Auto as the processing within the SharpEye[™] is very effective.

MANUAL ADJUSTMENT

In normal conditions, the manual Sea and Rain sliders have very little visible effect.

DOPPLER OR NON-DOPPLER?

Non-Doppler Systems

When a Non-Doppler SharpEye[™] or Magnetron transceiver is selected, the Dynamic Clutter Suppression[™] controls are available.

The Sea and Rain controls will behave in the same manner as a magnetron system.



controls in a Doppler system

ADJUSTMENT NOT AVAILABLE?

Doppler Systems

When a Doppler SharpEye[™] transceiver is selected, the Dynamic Clutter Suppression™ controls are NOT displayed.



Sea & Rain filters in a non-Doppler system

If the Sea and Rain filer is greyed out and cannot be adjusted, the display is set as Tx Slave. See section 6.42.8 for additional details.

NOTICE **EXTREME CONDITIONS**

In extreme clutter conditions (very high sea states or very heavy rain) the manual Sea or Rain sliders may be used to give increased attenuation of the visible clutter.

CAUTION

The use of the manual sliders to reduce clutter can be at the expense of small target detection. Note: The attenuation rules applied are consistent with the clutter reduction characteristics of the slider.

Auto

6.42.7 Interference Rejection and Correlation

Video correlation is used to reduce radar interference and to reduce clutter.

It is recommended that the anti-clutter controls are set first to reduce clutter as far as possible whilst maintaining target detection.

Left clicking on the **Correlator** button produces a drop down box where various levels of correlation can be selected.



Use the drop down list to select the required level of correlation; the button name will change to reflect the level selected.

CORRELATION MODES

No Correlation

The radar image is not processed by the correlator and the presented radar image intensity depends on the signal strength. Small targets are likely to be presented at a similar level to clutter

INT. REJECTION ON

Mutual radar interference may occur in the vicinity of another shipborne radar operating in the same frequency band. It is seen on the screen as irregular patterns or in the form of usually curved spoke-like dotted lines extending from the centre to the edge of the picture. Interference rejection can reduce this type of interference.

In interference rejection, consecutive transmissions are compared and only signals present on both transmissions are correlated and shown on the screen. Interference from other radars is suppressed and receiver noise reduced. Int. Rejection ON is the switch on default correlation mode.

SCAN/SCAN

Two levels of Scan to Scan correlation can be selected

- SCAN/SCAN 2: Correlates the last 2 scans of radar data.
- SCAN/SCAN 3: Correlates the last 3 scans of radar data.

Scan to scan correlation may be applied to reduce sea and precipitation clutter. Most sea clutter spikes will be suppressed, however, any spikes that correlate over several scans may still be shown. Correlation will have the following effects:

- Stable targets will correlate over several scans and after averaging will be retained and displayed at a high intensity.
- Clutter is of a random nature and will not correlate to the same level. Thus when displayed it will be shown at a lower intensity.
- As correlation is ground stabilised and averaged, zero speed targets will be visible at a higher intensity, assuming they are detected on the majority of scans.
- Scan-scan correlation requires a ground stabilisation input.

WARNING

SCAN to SCAN PRECAUTIONS

Fast moving targets may not fully correlate, particularly on the lower range scales. Correlation should therefore be applied on longer range scales, typically on or above 3 nm range scale.
A radar sensor using a faster rotating antenna can assist in target detection under these conditions.
If correlation is used on short pulse and/or a low range scale, small targets with a fast relative speed may not correlate.

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ENHANCED CORRELATOR

The Correlation Enhance function uses long time constant correlation techniques to detect fixed or moving targets in addition to scan to scan 3 mode.

FIXED TARGET

Fixed targets such as land, buoys, slow moving and stationary targets are shown in a different colour to the moving targets. Fixed Targets have a variable gain level which is controlled using the 'Fixed Tgt' slider.

MOVING TARGET

This presents fast moving and transient information which is displayed in a different colour to fixed targets. The gain level of this layer is controlled using the 'Moving Tgt' slider.

TARGET COLOURS

The colours of fixed and moving targets can be adjusted; see Video Settings (section 6.61) for additional information.

This function is useful for showing small, fixed targets, e.g. buoys that are obscured by waves, atmospheric conditions on some scans and for identifying targets that do not correlate using scan-to-scan correlation.

CAUTION CORRELATION TIME DELAY

The Correlation Enhance function requires a ground stabilisation input or a stationary platform. It may take up to 2 minutes after changing range for the full effect of the technique to be visible to the user.

6.42.8 Master / Slave & Run time

Transceivers connected to the system can be set as **Master** or **Slave** from the standby screen or whilst an APP is running.

MASTER / SLAVE FROM STANDBY

From the standby screen or when a transceiver is being selected, with the cursor over the required transceiver the following cursor options are available:

Master (Left Click):	Selects the transceiver as Master.
View (Middle Click):	The middle button has no function in commercial applications.
Slave (Right Click):	Selects the transceiver as Slave.



When the transceiver status has been selected, the system can be placed into RUN using any of the available APPS.

MASTER / SLAVE DURING TRANSMISSION

To Master a transceiver that is currently assigned as a Slave, Place the cursor over the **Master/ Slave** button and the following option is available:

Master (Left Click):	Masters the current transceiver that is selected.
No function (Middle Click):	The middle & right buttons have no function.
Run time (Right Click):	Displays the Power ON and Run Time of the selected transceiver.

SEA & RAIN FILTERS

When **Slave** is selected, the **Sea** and **Rain** filters displayed in the lower left hand side of the display are shown in black text and cannot be operated.

When **Master** is selected, the Sea and Rain filters operate normally.









TRANSCEIVER POWER ON & RUN TIME

With the cursor over the Master/ Slave button in a run more, the right hand click (Run-Time) opens a dialog that displays the Power On and Run Time for the selected transceiver.

Transcei∨er Run Time Information			
Power On Time	19472 Hours	47 Mins	
Run Time	8646 Hours	57 Mins	
	ок		

Example of Run Time information

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MASTER/ SLAVE NOTES

- In Slave mode, the tune control, pulse length selection, performance monitor and Mute controls are NOT available.
- In single transceiver systems the Slave button does not appear.
- When a system is set as Slave, the radar image is limited to the range set on the Master Display. No radar data is shown outside the limit, although AIS data will be shown.
- In the scenario where displays 1 and 2 are set as Master, if display 2 Masters Transceiver 1, display 1 automatically becomes a Slave of Transceiver 1 and Transceiver 2 switches to standby. (See below).



Slave display at higher range with radar image limited

Display 1	Display 1	Display 2
MASTER	SLAVE	MASTER
Transceiver 1 Display 2 Display 2 Selects Transceiver 2 MASTER MASTER	Transceiver 1	Transceiver 1

6.42.9 Mute

Mute sectors are configured during system commissioning and can only be turned ON and OFF by the operator.

With the cursor placed over the Mute button, the following cursor options are available:

Mute Sector ON/ OFF (left click): Switches the mute sector ON/ OFF.

No function (middle & right Click):

The Middle & right buttons have no function.

When the mute sector is switched ON, the mute sector shows as a shaded wedge on screen.

NOTES

- Only one mute sector is permitted per transceiver.
- Mute sectors must be individually configured for each transceiver in use.

MUTE BUTTON NOT AVAILABLE?

The Mute button is only available when the radar sensor is selected as Master.





Mute sector ON

PM

6.42.10 Performance Monitor (PM)

The efficiency of the magnetron in a transceiver can be checked using the performance monitor (**PM**) function.

PM BUTTON NOT AVAILABLE?

The Performance monitor button is not available when:

- A SharpEye[™] transceiver is selected (see SharpEye[™] Systems below).
- The selected transceiver is a Slave not a Master.

SHARPEYE[™] SYSTEMS

SharpEye[™] transceivers do not use conventional magnetron technology. The transceiver continuously runs background performance checks on forward power, reverse power, receiver sensitivity and temperature. If any of these parameters falls outside predetermined levels, an alert is generated at the display indicating the nature of the fault. See alerts 18019 to 18042 in section 5.12 for details.

X-BAND 12 kW

The parameters of the magnetron in the HENSOLDT UK 12 kW X-Band transceiver unit are tested and stored during commissioning or after a magnetron has been replaced.

When the **PM** function is initiated by the user, the radar is

Automatically placed in 24 nm mode and Long Pulse. The transceiver is then auto-tuned for 15 seconds (approximately 10 rotations of the antenna) and the minimum, maximum and average magnetron currents and the Maximum Main Bang Suppression levels are all checked and compared against the commissioning values.

If the new values are outside of allowable range, an alert is generated in the operator screen. A description of the applicable alerts (18044 to 18066) can be found in section 5.12.

TEST SCHEDULE

Performance monitor checks should be carried out in line with IMO regulations or ship specific requirements/ instructions.

PERFORMANCE MONITOR ON/ OFF

With the cursor placed over the PM Button (when available), the following option is available.

Performance Monitor (left click): Starts the performance monitor test.

No function (middle & right Click): The Middle & right buttons have no function.

WARNING

SYSTEM PERFORMANCE DURING TESTS The performance monitor test changes the range, pulse length and tuning of the transceiver. The performance monitor test should only be carried out when the system is not required for safe navigation.

- **PM OFF:** In normal operation, the PM function is OFF and the button is a light blue background with white text.
- **PM ON:** When PM mode is enabled and is running, the button colour changes to a Dark blue background with Red text. When the test has been completed, the button automatically changes back to light blue/ white text and an alert is displayed confirming the performance monitor test results.

The PM tests can be cancelled by left clicking on the PM Button.





Example 12 kW magnetron transceiver.

6.42.11 Range selection/ Range Rings

The range button allows changing of the current range and control of range rings.

With the cursor placed over the **Range** button, the following cursor options are available:

Range Down (left click):	Selects the next available lower range.
Rings ON/ OFF (middle Click):	Switches range rings ON/ OFF.
Range Up (right click):	Selects the next available higher range.





RANGE

Use range up and Range down to change the current range.

On systems fitted with an optional keyboard, the **Page up** or + (increase) and **Page down** or - (decrease) buttons can also be used to change range.

RANGE RINGS

The following ranges and range ring spacing can be selected:

Short pulse

Range (NM)	0.125	0.25	0.5	0.75	1.5	3.0
Range rings (NM)	0.05	0.1	0.1	0.25	0.25	0.5

Medium pulse

Range (NM)	6.0	12	24
Range rings (NM)	1.0	2.0	4.0

Long pulse

Range (NM)	48	96
Range rings (NM)	8.0	12

RANGE RINGS NOT AVAILABLE?

Range rings are not available in the ETD tab of Dual Radar Display.

6.42.12 Transceiver Ready/ Not ready

The status of each transmitter is shown on the Standby screen and Radar Sensor Selection.



Indicato	r Status	Transceiver State	Description
	Red square	Not Ready	Tx Not Ready.
			The transmitter is warming up, the warmup period should last a maximum of:63 seconds for the 12 kW X-Band transceiver.
			SharpEye [™] sensors do not require a warm-up period. After a short initialisation period the transceiver will show as READY at switch on
59	Red Square with a number	Not Ready Countdown timer.	Some transmitters give a countdown to when the transceiver will be ready. When the countdown reaches zero, the symbol will change from Not ready to Ready.
	Green Square	Ready	The transceiver is ready to transmit.
10	Green square with a number	Ready Mastered	The transceiver is Ready, mastered by a display and is not transmitting.
10	Green square flashing with a number	Run Mastered & Transmitting	The transceiver is READY but is currently Mastered by another display.
· · · · · ·			The flashing green number indicates the number of the display that is controlling the transmitter.
	Green square flashing with no number	Run Ready transmitting mastered by this display.	The display in use is the Master of the transceiver

6.42.13 Transceiver selection

STANDBY SCREEN

The process for selecting a transceiver from the standby screen is the same regardless of the navigation mode required.

STANDALONE SYSTEM (no interswitch)

When the transmitter is directly connected to the display i.e. no interswitch is fitted, there is no need to select a transmitter.

The display will always be Master, Slave cannot be selected as there is only one transceiver connected to the system.

INTERSWITCHED SYSTEMS

With the cursor over the required transceiver, the transceiver can be selected as either a Master or Slave (see section 6.42.8).

GO TO RUN

The selected Transceiver can now be placed in Run by selecting any of the enabled operational modes in the Go to Run menu.

CHANGE TRANSCEIVER WITHOUT RETURNING TO STANDBY

It is not necessary to return to the standby screen to select a different transceiver.

In all radar display modes, a different transceiver can be selected without returning to the standby screen.

Place the cursor over the currently selected transceiver which is shown at the top left side of the PPI (shown as TX 1 in the image shown)

With the cursor over the transmitter control button the following options are available:

Select Radar Sensor (left Click): Opens the Radar Sensor Selection menu where the required transceiver can be selected.

Go to Standby (middle click):	Returns the system to the Standby Screen. The selected
	transceiver stops transmitting but remains switched ON.

No function (right click): The right hand button has no function.

BLUE TX SELECTION LINE

When a transceiver is in use, a blue line may be shown between the display and the selected transceiver.

This line and the associated View button has no function in commercial systems and can safely be ignored. It is recommended that the blue line is left at the default position so that it tracks the Master or Slave condition of the system.







TRANSCEIVER INFO PANEL

The information panel just below the transceiver selection button gives details on the transceiver currently selected.

- **Mode:** Shows the 'Range Mode' of the transceiver (when selected).
- **Frequency:** Shows the frequency currently in use by the transceiver. Frequencies are set during setting to work of the system and cannot be changed by the operator.
- **Power:** Displays High or Low power.

Sweep: Up or Down.

TX Standby:



Note: The information available will vary depending upon the transceiver being used.

6.42.14 SART detection using manual tune

The Manual Tune feature is very useful for distinguishing between radar returns and Search and Rescue Transceiver (SART) transmissions. A de-tuned receiver system will still receive SART transmissions even though its own transceiver's radar returns are reduced, thereby making SART responses more visible.

Shows the current status of the selected transceiver (Not ready, Standby, Run).

To detect SART signals, select Manual Tune and detune the receiver system to show the minimum number of target returns from the radar. Retune the receiver system once SART detection has been completed, either manually, or by selecting Automatic Tune.

6.42.15 Tune indicator

The tune function allows the manual or automatic tuning of the transceiver. With the cursor placed over the **Tune** button, the following cursor options are available.

Manual Tune (left click): Manually adjusts the tune.

No function (middle Click):

Automatic tune (right click): The system automatically tunes the transceiver.

MANUAL TUNE

Place the cursor over the TUNE slider and, keeping the **Adjust Tune** button pressed, use the cursor to adjust the tune to the desired level.

The tune bar indicator is located below the slider and shows the tune level.

AUTO TUNE

Selecting Automatic tune uses the AFC function and is recommended for normal operation. The tune bar is automatically set for the strongest signal.

Left clicking on 'Manual tune' releases the auto tune function and returns the control to manual control.

TUNE INDICATOR MISSING?

The tune indicator is not displayed when a SharpEye[™] transceiver is selected or the transceiver is set as Slave. In either of these states Pulse length selection is also not displayed.







6.42.16 Trails

PA Limit 1.0 NM	AIS ON								
A Limit 30 min	Tgt Assoc. ON	PPI	HAP	Docking	Route	CCTV	ETD	Camera	ľ
Guard Zone	Tgt Tote OFF			050 060	070	090		H-UP	F
elete ALL Tgts	Trial Manoeuvre		030	40 Januar Marine Marine		alenalised and	400	Range	1
ector length	6 min (T)		020 Juliusha	3 - 12 - 12 - 12 - 12 - 12 - 12 - 12 - 1		1	110	Rings	
Past Positions	6.0 min (Off)	010	1 .			· · ·	121	o Trails	6.
rails length	6.0 min (T)		Trail	s in dual P	PI tab of	Dual Rac	dar displa	y mode	

Trails in single screen display modes

Trails allow the configuration and display of target trails. With the cursor placed over the Trails graphic, the following cursor options are available.

Trails 1	True/relative (left click):	Toggles trails between true/ relative.
Reset 1	Frails (middle Click):	Clears both the screen and the memory of trails.
Trails (On/ Off (right click):	Toggles the trails ON and OFF.

TRAILS TRUE/RELATIVE

Trails can be switched between True trails or Relative trails. The True motion button will change to reflect the trails status as detailed below:

- Relative Motion and True trails: RM(T)
- Relative Motion and Relative trails: RM(R)
- Relative Motion and Trails OFF: RM
- True Motion and True trails:
- True Motion and Relative trails:
- True Motion and Trails OFF: TM



Trails Length

ХТ<mark>D -0.251 NM</mark> То WPT

True/Relative

Reset Trails

6.0 min (Off)

WP2

Example of Relative motion true trails indication

Trails length

6.0 min (T)

Trails adjustment slider

RESET TRAILS

When Reset Trails is pressed (middle click), all trails are permanently cleared from the display and memory.

TM(T)

TM(R)

TRAILS ON / OFF

Switches the display of trails ON or OFF. When switched OFF trails continue to be processed and will be displayed when the trails function is switched back on

TRAIL LENGTH ADJUSTMENT

With the cursor placed over the Trails adjustment slider, the following cursor option is available.

Adjust trail length (left click): Adjust trails from zero to 30 minutes.

No function (middle & right Click): The middle & right buttons have no function.

To adjust the trails length, place the cursor on the trails length slider and keeping the button pressed, use the cursor to adjust to the desired length.

TRAILS AND PAST POSITION INDICATOR:

The selection of true or relative trails is directly linked to the Past Position Indicator; see section 6.37.1 for additional details.

NOTES ON TRAILS

 To allow dynamic adjustment of the trails time, the full 30 minutes of trails data is stored in memory. Meaning that full trails data is not available until the radar is running for at least 30 minutes to fill the trails memory. Having a full 30 minutes of trails memory allows trail times to be increased to obtain full situation awareness and reduced to lower screen clutter without the data being lost. However, trails data is only built from entering radar mode from standby, so a full trails history will not be available initially.

If the radar mode is changed via the Standby screen the trails history is lost, but if the mode is changed directly via the on-screen Display Mode button without going via the Standby screen the data is retained.

Newly detected targets will initially begin to form a trail, the trail period will not have established for the time indicated. Radar echoes outside the memory range (for example if the range scale is incremented more than one range scale) will need to build up to the indicated trail period.

- When trails are switched OFF, data is removed from the screen but it is retained in memory. When trails are switched back on, any available historical trails data is displayed.
- When trails are turned OFF, the trails length slider is not displayed

Trails length 6.0 min (T) Trails length 6.0 min (Off)

- Trails history is lost when:
 - Changing between Radar or ECDIS modes.
 - The radar interlay is switched OFF/ ON.
 - The display is placed in standby or is switched OFF.
- RELATIVE TRAILS: All radar echoes produce relative trails; own ship does not have a relative trail.
- TRUE TRAILS: Stationary radar targets do not produce true trails when ground stabilisation is applied. An Electronic Position Fixing System (EPFS) stabilisation source is free of drift and should provide a stable ground stabilisation. If ground stabilisation is not applied there may be a true trail on a stationary target. To remove the true trail, apply the correct amount of Drift.
- Stationary radar targets do not produce true trails when ground stabilisation is applied i.e. land would not have trails when ground stabilisation is selected.
- If Sea stabilisation is selected, stationary targets may have a true trail due to the difference between ground and water velocity i.e. drift.
- Reported AIS targets do not form trails and past position indicators must be used to indicate the
 past track of an AIS target.

6.43 RangeGuard



RangeGuard TAB/ function within the Conning Display App

OVERVIEW

RangeGuard is a system of sensors externally positioned around a vessel or installation that give proximity detection to nearby objects for assistance during manoeuvring or security applications. Multiple sensors can be fitted and the graphic within the Conning Display App provides approximate information on distance, closing speed and time to impact.

AVAILABILITY

This feature is only available when the RangeGuard system has been configured during setting to work of a system. When configured, the **RangeGuard** tab becomes available for selection in the **Conning Display** app. If RangeGuard is NOT configured, the Tab text is black and the tab cannot be selected.

ACCURACY

The accuracy of the figures shown are for guidance only and should not be relied upon as a definitive measurement of distance or time to an object. Please refer to the manufactures sensor information for full details.

OPERATOR FUNCTIONS

There are no operator selectable controls or configurations available within the RangeGuard tab.

GRAPHIC COLOURS

The background colour of the graphic (blue, amber or red) change depending on the proximity to the detected object.

The tolerances are configured in the RangeGuard equipment and cannot be adjusted from the workstation. Please refer to the suppliers equipment manuals for details.



NON-IMO PRESENTATION

An alert is permanently displayed to advise the operator that the Conning Display APP and RangeGuard function are displayed as a non-IMO approved presentation mode.

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6.44 Route Management 6.44.1 Select Main Route

Routes can be displayed and managed using the Routes functions. The location and layout of the menus varies depending on the navigation mode in use however the functional operation of the menus is identical regardless of the mode selected.

With no route loaded, the control button will display **Route: Not loaded**.

Route: Not Loaded Route control button (no route)

Route: Thames sim route

Route control button (route loaded)

When a route has been loaded, the button name will change to reflect the name of the route.



/ideo Settings Display Mode

Time to WOP

Route TAB in Dual Radar Display mode.

	Route: Tham	nes sim route	
0.100 /	4M 0.100 NM	Next Ord	lers
XTD 0.904 NM		Turn Radius	-2.00 NM
	WP3:WP3	Leg Bearing	068.4°
	068.4°	Leg Length	0.000 NM
Planned Track	068.4°	Leg Duration	00:00:00
Planned Speed	15.0 kn	Distance to WOP	0.000 NM
Turn Radius	0.500 NM	Time to WOP	00:00:00
Turn Rate (planned)	30.0 °/min		
Turn Rate (current)	0.0 °/min	Arrival Wa	ypoint
Channel Width	0.100 NM	WPT	WP3
Distance to WOP	1.46 NM	Speed Required	
Time to WOP	00:00:00	Distance to WP	1.46 NM
Bearing to WOP	030.1°	ETA at WP	15:07 26/03

With the cursor placed over the Route button the following cursor options are available.

Select Main Route (left click):	Select and load a route.
Route Settings (middle Click):	Opens the route settings where the display can be configured.
Deselect Route (right click):	De-selects the route that is currently loaded.

SELECT MAIN ROUTE

To load a route, left click on **Select Main Route** and a list of available routes stored in memory will be presented. Select the required route, the route name will appear in the **Route Name** box at the bottom of the Select Route to Load dialog.

ONLY CHECKED ROUTES LOAD

Routes that have not been safety checked cannot be loaded. If a route is loaded that exceeds the maximum latitude, **Route <route name> exceeds 85° latitude** is displayed.

Clock Load to display/ load the route or Cancel to abort the load process.

KH Dover to Calais	
KH Harwich To Dover	
KH Micklefirth1	
KH SIM Kentish flate route	
KH Tilbury - Gothenburg	
Route Name	
Route Name KH SIM Kentish flats route	

ROUTE COLOURS

The main and alternative routes as shown in different colours:Primary (main) routes:Displayed in Red.Alternative routes:Displayed in Orange.

When a route is loaded, the route name is displayed and route monitoring information is shown.

CONNECTED EQUIPMENT

Where configured during commissioning, when a route is loaded it is automatically sent via LAN to other connected equipment.

The route is sent when it is loaded or when changing legs during the route.

Select Route menu

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6.44.2 Notes on pilotage tools

For details on adding pilotage tools, see section 9 (Route Planning).

VISIBILITY

When a route is loaded in radar or navigation and conning display mode, pilotage tools may not immediately be visible. Pilotage tools only become visible when ownship is in the leg preceding and/ or the leg containing the pilotage tool.

REFERENCE

When a route is loaded in a navigation mode, pilotage tools are referenced to the CCRP of the vessel and not the centre line of the route.

6.44.3 Network sharing of routes

When a route is created or edited in route planning, changes are not shared cross the network until the data is manually synchronised using the **Network Settings**/ Sync **Data Resource** function. Please refer to section 6.31 for details.

6.44.4 Route compatibility

Routes from other manufactures systems that conform to IEC 61174 edition 4 (common route format 'RTZ') can be imported, edited and saved into Route Planning.

SOFTWARE COMPATIBILITY

Routes generated in software version **ZM-2300 V3.x** and higher cannot be loaded onto systems running **ZM-2300 V2.x** or lower or any system running **ZM-2144** software.

6.44.5 Route Settings

Route Settings allows the configuration of the display of the route on-screen. With the cursor placed over the Route button the following cursor options are available.

Route: Not Loaded Route control button (no route loaded)

Select Main Route (left click):Select and load a route.Route Settings (middle Click):Opens the route settings where the display can be configured.Deselect Route (right click):De-selects the route that is currently loaded.

When Route Settings is selected, DISPLAY, GENERAL and ALARMS tabs become available.

Note: The Route settings menu is not available in Conning display mode.

DISPLAY TAB

The Display tab is used to set the level of route features shown on screen.

Route Features

Selecting (Ticked = ON) or Deselecting (Not ticked = OFF) any features in route settings removes the selected item from the screen. Deselecting a feature does not suspend the activity, for example: If you deselect Route the route is no longer shown on the screen but all other route monitoring functions continue.

Route Select/ deselect

When **Route** is deselected in the Route Settings/ General tab, the route is removed from the display, route monitoring continues however, the route name will change as detailed opposite.

This enables operators to see that a route is loaded but not displayed.

Distance to Run

When selected, *Distance to run* places markers on the route that count down the distance (in nautical miles) to the next waypoint in a route.

The distance to run marks are only shown on the leg of the route being navigated.

The markers can be adjusted to display every 0.1 to 50 nautical miles.

When the cursor is placed over the numeric values, they can be adjusted by rolling the trackerball up or down as required.



Route selected Route Name remains as Test Route 1



Route NOT selected The route name changes to >-Test Route 1-<.



GENERAL TAB

The **General tab** is used to Enable or Disable the auto-loading of routes from other systems.

When **Auto Load NMEA Routes** is selected (ticked), routes from other equipment connected to the system will be automatically loaded on screen.

Compatible routes can be accepted from an external device such as a GNSS or an ECDIS system.

When a route is received, the system will prompt with 'New Route received from *device name*' where device name is the identification of the equipment sending the route.



General tab of Route Settings

When received, the route is automatically saved in a folder called 'Externally Sourced' where it can be loaded or edited and safety checked in route planning.

If a route is already loaded when a new route is received, the system still saves the route but will also prompt with 'Replace Current Route? Yes/ No.'

- Yes: Replaces the current route with the received route.
- No: Leaves the existing route loaded.

CAUTION EXTERNAL ROUTES SAFETY CHECK Externally received routes must be fully safety checked prior to use.

ALARMS TAB

The Alarms tab within Route Settings is used to add, edit or delete Critical Points (CP) on a loaded route.

A route must be loaded for the Edit Critical Points button to be active.

ADD AND EDIT CRITICAL POINTS

Critical points cannot be added to a protected route.

With the cursor over **Edit Critical Points**, the following cursor option becomes available:



Edit Critical Points NOT available Route loaded Edit Critical Points available

Edit/ Add CPs (left click): Opens the Edit or Add CP control which is displayed at the bottom of the screen.

No function (middle & right Click): The Middle & right buttons have no function.

Critical Points on Route: KH Tilbury - Gothenburg	Add Critical Point	X
Pressing Add Critical Point opens the following menu:		
Edit Critical Point		

0.000 /	M before waypoint:	WP1:Tilbury Port	
	Tere before Online		_
Alarm:	Time before Critical F	Point v 15 min	
	Alarm enabled		

Note: The creation and editing of Critical points is fully detailed in the 'How do I...' section of Route Planning.

CLOSE ROUTE SETTINGS TABS

To close Route Settings, press the red cross \mathbf{X} at the top right of the tab.

6.44.6 De-Select a route

The route currently in use can be deselected as shown below Selecting De-Select Route switches OFF the main route.

With the cursor placed over the **Route** button the following cursor options are available.

Route: Thames sim route Route control button (route loaded)

Select Main Route (Left Click): Select and load a route.

Route Settings (Middle Click): Opens the route settings where the display can be configured.

Deselect Route (Right Click): De-selects the route that is currently loaded.

When a route has been deselected, the button changes name to show 'Route: Not Loaded' and all route monitoring functions stop.

6.44.7 Route Approved/ Not Approved

The approval status of a route is shown when the route is selected or loaded.

In Chart Radar/ ECDIS mode, a tick appears in the Routes Icon when an approved route is loaded. This is an indication that the route being loaded has been approved for use in route planning by the Navigator, Captain or responsible person.

UNAPPROVED ROUTES CANNOT BE LOADED.



Extended Route Data icon not ticked. (Chart Radar/ ECDIS mode only).

ROUTE APPROVED Route Name Test route 2 O days since approval Cancel Load ECDIS route icon with route approval tick.

ECDIS route icon with route approval tick. (Chart Radar/ ECDIS mode only).

6.45 Route Monitoring

		Route: KH SIM k	Centish flats route
	100	XTD -0.002 NM	0.100 NM 0.100 NM
		Next WPT	WP3 : WP 3
	110	CTS 058.7°	STG kn
*	f.	Distance to WOI	P 1.52 NM
	120 Mans	Time to WOP	00:01:29
<u> </u>	PILine	ETA at final WP	T 23:29 05/01
130 RNG	Cursor	Video Settings	Display Mode
BRG LAT LON	(T) ^' N ' E	Route: Cross tr	ack limit exceeded
/RM EBL	OFF OFF	Change Display Mode	Capture Screen

PPI	HAP [Docking	Route	CCTV	ETD	Camera	ESS	
	Route: Thames sim route							
-0.100 NM 0.100 NM				Next Orders				
XTD 0.904 NM			Turn R	Radius -2.00 N				
Next V	VPT	WP	3 : WP3	Leg Be	aring		068.4°	
CTS			068.4°	Leg Le	ngth	0.	000 NM	
Planned Track 068.4°			Leg Duration			00:00:00		
Planned Speed 15.0 kn			Distance to WOP			0.000 NM		
Turn Radius 0.500		500 NM	Time to WOP 00:00:0			00:00:00		
Turn F	Rate (planned	d) 30	0°/min					
Turn F	Rate (current)	0	.0 °/min		Arrival	Waypoir	ıt	
Chann	el Width	0.1	100 NM	WPT			WP3	
Distan	ice to WO	P 1	.46 NM	Speed	Requir	ed	kn	
Time t	o WOP	0	0:00:00	Distant	ce to W	P	1.46 NM	
Bearin	ig to WOP		030.1°	ETA at	WP	15:0	7 26/03	

Route monitoring in Single Radar Display

Route Monitoring Tab in Dual Radar Display

- Route monitoring can be used to monitor the vessels progress on a preloaded route.
- There are no user configurable options in the route monitoring dialogues.
- Depending on the mode selected, route monitoring will display details about the route including the following:

XTD	Cross track Distance in nautical miles (NM).
Next WPT	The name or identifier (e.g. WP6) of the <i>next</i> waypoint in the planned route.
CTS	Current Course to Steer to follow the route.
STO	Speed To Go is the speed that has been calculated in order to achieve the planned time
316	of arrival at a waypoint (if set).
Distance to WOP The distance to the next wheel over point in the planned route.	
Time to WOP	The time to the next wheel over point in the planned route.
ETA at final WPT	Estimated time and date of arrival at the last waypoint in the planned route

When a monitored route falls within a region beyond the maximum latitude, **Route <route name>** exceeds 85° latitude is displayed.

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6.46 Rudder Angle

Depending on the system configuration, rudder angle(s) may be displayed in various screens as detailed below.

NOTICE

The Rudder angle is only displayed when the rudder signal has been connected and configured during system commissioning.

OPERATOR FUNCTIONS

There are no user configurable functions for the display of rudder angle.

Operators cannot change or modify the graphic or rudder indicator scaling.

RUDDER ANGLE DISPLAY

Single Radar Display In Single Radar Display only, if no rudder is configured, the vessel name and Call sign is shown in place of the rudder indicator.



Rudder configured

No Rudder Configured

Docking Tab in Dual Radar Display mode



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6.47 Sensor Selection & Failure

6.47.1 Sensor Selection

A number of functions use drop down lists to allow selection of a source of inputs to the system; for example speed or position sensor inputs.



Examples of drop down lists in single radar display

display

When a drop down list is selected, a list of sensors configured during commissioning is shown.

SENSOR AVAILABILITY

Each sensor will be shown in either White or Black text depending on the status of the sensor.

White text: Sensor Available:	Sensors that are shown in WHITE text are c configured and are available for selection.	orrectly
Black text: Sensor not available:	Sensors shown in BLACK TEXT are correct the signal is not available and the sensor ca Likely causes may be that the source equipr	ly configured but nnot be selected. ment is switched
	Analog Gyro	



Example of a Heading drop down list where:

- Analogue Gyro: Sensor available (White text).
- Simulator1 (HDT) & Simulator 1 (VHW): NOT available (Black text).

SENSOR INDICATOR

See Section 4.11 for details on the sensor indicator (Green or Amber).

6.47.2 Sensor failure

In the event of the loss of a primary sensor an alert is raised and the system reacts as follows:

Loss of position (EPFS)	 An Alert is raised and the system switches to an alternative sensor. If no alternative sensor is available the system switches to Position Fix or DR Position (also known as Failure DR and shadow DR). DR Position should be selected and fixes made at regular intervals (see position fixing in Section 6.38).
Loss of Heading	An alert is raised and the heading display will show as INVALID.
Loss of Speed	 An Alert is raised and the system switches to an alternative sensor of the same type (i.e. ground/sea) if available. If no sensor is available the system will switch to an alternative sensor of the other type (i.e. ground/sea) if available. If no alternative sensors are available the system switches to Manual speed.
Loss of COG/ SOG	 An Alert is raised and the system switches to an alternative sensor. If no alternative sensor is available the COG/SOG will display as INVALID

6.48 Speed sensor display, selection and control

Pressing on the Speed Sensor button produces a drop down box where the available speed log sensors can be viewed and selected.

With the cursor placed anywhere on the **Speed sensor Selection** bar, the following option becomes available:





Speed Sensor in Single Radar Display

Select speed source (left click): Opens a drop down list of available sensors.

No function (middle & right Click): The Middle & right buttons have no function.

A left click on 'Select Speed Source' produces a drop down box where the available speed log sensors can be viewed and selected. The heading sensor name will change to selected source.

SPEED SENSOR NOTES

- When manual speed is selected the speed shown is Speed Through Water (STW).
- Single axis water logs cannot detect the effect of leeway, this can be because of bubbles in the stream of water passing the sensor.
- When the speed sensor is changed the stabilisation mode (Sea or Ground) is automatically selected for the type of sensor.

SENSOR INDICATOR

See section 4.11 for details on the sensor indicator (Green or Amber).

6.48.1 Speed source identifier

The speed sensor type is automatically detected and shown in brackets at the end of the display as **W**, **B**, **M** or **P**.

Manual Speed 7.3 kn (M) 🔻	(W/WAT)	Indicates the sensor is WATER SPEED
5 0 5 10 15 20 25 30 35	(B)	Indicates the sensor is BOTTOM TRACK
	(M)	MANUAL SPEED is selected
	(P/EPFS)	Indicates the sensor is POSITION i.e. GPS

6.48.2 Speed source button changing colour

If a speed source is selected that changes the stabilisation mode e.g. sea stabilisation changes to ground *or* ground to sea, the Speed Sensor Selection button will temporarily change colour to warn that the stabilisation mode has changed.

GPS2				15.0 kn			(P) V	
		111-0						
-5	0	5	10	15	20	25	30	35

Speed source Selection highlighted in Magenta to indicate a change in stabilisation mode.

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6.48.3 Manual Log adjustment

When **Manual Log** is selected as a speed source, the manual speed can be adjusted by placing the cursor over the Slider Bar, left click and hold and use the cursor to drag the speed slider to the desired speed.





Single Screen radar display

6.48.4 Ground or sea stabilised?

When an appropriate speed sensor is connected, the system automatically detects if the input is Sea or Ground stabilised and assigns a label to the source.

i.e. –Sea or –Gnd.



6.48.5 Display Dual axis speed log

The speed indicator graphic changes when a dual axis speed source is selected as shown below:


6.49 Spyscope

NOTICE

Spyscope is only available in Single radar display mode

The Spyscope gives a zoomed image of the area below the current cursor position.

The Spyscope can be configured to show images from inside the operational area only or to operate across the entire screen area.

With the cursor placed anywhere inside the Spyscope viewing area, the following cursor option becomes available:



Spyscope in Single Radar Display mode

Toggle Spyscope outside PPI (left click): View Spyscope data across the entire screen or just inside the PPI.

No function (middle & right Click):



Spyscope restricted to showing inside radar PPI

SPYSCOPE ZOOM

The Spyscope can be zoomed from X1 to X8 magnification using the zoom control slider to the left of the Spyscope screen.

The default setting is X2 magnification. The current magnification level is shown at the bottom of the zoom control slider.

The zoom level resets to X2 when the system is placed into Standby.

The Middle & right buttons have no function.



Spyscope outside PPI (placed over speed indication)



6.50 Stabilisation

The stabilisation button allows the selection of Sea or Ground stabilisation. With the cursor over the stabilisation button, the following options are available:

SEA stabilised (left click):	The course and speed through the water is used for stabilisation.
No Function (middle Click):	The middle button has no function.
Ground stabilised (right click):	Selects the course over ground for stabilisation.



When the stabilisation mode is changed, the speed source sensor automatically changes to the best appropriate sensor. If the sensor required for a stabilisation mode is not available, the mode cannot be selected.

SEA STABILISED

This stability mode uses the course and speed through the water; set and drift are not used.

Speed and Distance Measuring Equipment, manual log and gyro inputs provide the sensor input for sea stabilisation.

Note that a single axis log cannot detect the effect of leeway. Sea stabilisation is affected by tide and wind, the effect of own ship's structure, and will vary in different locations. A water speed sensor is automatically selected.

Sea stabilised vector arrows:	When sea stabilisation is selected, a single arrow is displayed at the end of ownship's vector.	
Speed indication:	Is from a water speed sensor.	;
Target Data:	When Sea stabilisation is selected, the course and speed of a target is shown as CTW (Course through water) and STW (speed Through Water) in True or relative (see target data).	n Ri



Sea stabilised vector



Target Data display

GROUND STABILISED

Ground stabilisation uses the course over ground.

An Electronic Position Fixing System (EPFS) is normally used to provide ground stabilisation; a VTG input from a GPS will also provide COG and SOG.

Without this ground-reference speed and course, stationary targets would appear to drift at a rate and direction opposite to the tide. Own ship Course over Ground (COG) and Speed over Ground (SOG) may also be calculated from a dual axis log input.

The ground stabilised true motion presentation can be very useful for Pilotage, when it is important to know own ship and other ship's course and speed over ground in relation to land, buoys and beacons. A ground speed sensor is automatically selected.

Ground stabilised vector arrows:	When ground stabilisation is selected, a double arrow is displayed at the end of ownship's vector.	HX X X
Speed indication:	Is from a Ground speed sensor.	Ground stabilised
Target Data:	When Ground stabilisation is selected, the course and speed of a target is shown as COG & SOG	Ground Stab nge 6 NM Rings OFF

STABILISATION MODE BUTTON CHANGES COLOUR

If there is a change in speed source that causes a change in stability mode, the stabilisation button will temporarily change colour to warn that the speed stabilisation source has been changed.



Charl

Target Data display

T SOC

CPA TCPA

Ground Stab Sea Stab Stabilisation button changed to Magenta indication a change of mode.

The button does not change colour when changing from VBW ground speed to VTG ground.

STABILISATION PRECAUTIONS AND NOTES

- When a different speed sensor is selected, the stabilisation mode appropriate to the sensor is automatically selected. If the mode changes, the stabilisation button will temporarily change colour (see above).
- If the stabilisation mode is changed, the selected speed sensor automatically changes to the best one available.
- The stabilisation mode cannot be changed if the required sensor is not available.
- A known stationary target (Navigational Mark) should not show any movement providing there is no error in the ground stabilisation.
- Referenced targets can be used for stabilisation but may not be as accurate as an EPFS source.
- Course over Ground (COG) and Speed Over Ground (SOG) boxes are for information only. When Ground stabilisation is selected and the COG & SOG source cannot be selected, the values are the same as the selected speed source.
- If the GPS no longer sends information or sends an error message, then the radar operational area will revert automatically to sea-stabilisation.

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6.51 Tape measure tool

The range and bearing between two points can be measured using the Tape Measure tool. With the cursor placed at any point in the display area, press and HOLD the left button and the left hand button function changes as follows:

Select (left click): Select target or chart object.

Changes to

Drag Extend (left click): Enables tape measure tool.

Keeping the left button pressed, move the cursor to the required position. The current cursor range and bearing from the origin of the tape measure can be observed in the cursor position box.

Whilst the Drag extend button is pressed, the cursor position panel is outlined in magenta.

To stop Drag extend measurements, release the left hand button and the cursor cue buttons and cursor position box will revert to their default settings.



6.52 Target Association

Radar Tracked Target (TT) and AIS data for the same vessel may appear to have slightly different positions and / or vectors.

Target Association allows the operator to associate (link) radar Tracked Targets and AIS targets that *appear* to represent the same vessel into one target vector.

Targets are associated when the radar and AIS targets bearing, speed, COG and SOG are within an operator adjustable tolerance level of each other.

When Tracked Target and AIS Targets meet the Target Association criteria, they become associated.

See **Target Association Settings** in this section for additional information on Vectors.

Target Name		
ID		
Source		
RNG		
BRG		
T COG		
T SOG		_
CPA		
TCPA		
BCR		
CPA L	imit <mark>0.0</mark> NM	AIS ON
TCPA L	imit 0 min	Tgt Assoc. ON
Gua	rd Zone	Tgt Tote OFF
Targe	t Settings	Trial Manoeuvre
Vecto	or Length	6 min (R)
Past	Positions	6.0 min (Off)
Trails	Length	6.0 min (T)

NOTICE

The Target Association control and menu is not available in Navigation and Conning display mode.

TARGET SYMBOLS



DDEGAUTIONIC AND NOTES





Separate Tracked Target and AIS Target Associated ta



Associated target (AIS + TT)

Key

TT + AIS:Vector information derived from Tracked Target data from the ARPA.AIS +TT:Vector information is derived from AIS data.

FRECAUTIONS AND NOTES	
AIS target symbol updates:	AIS targets are updated depending on target characteristics. To align the AIS target symbols with a Tracked Target, the AIS symbol is moved on each scan assuming that the previous course and speed is unchanged.
Button not available:	If an AIS input or signal is not detected, the AIS ON and Tgt Assoc ON buttons are greyed out indicating that the AIS is not available. The AIS and Target Association cannot be selected.
All targets are associated:	When Target Association criteria are met, ALL radar Tracked Targets that meet the association criteria are associated with the presumed corresponding AIS target. Individual targets cannot be linked on their own.
Loss of association:	Associated Tracked Target and AIS targets continue to be associated as long as they continue to meet the association criteria. When a target fails to meet the association criteria, it will be disassociated and shown as a separate Tracked Target and AIS target.
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6.52.1 Enable/ Disable Target Association

With the cursor placed over the **Tgt Assoc.** button the following options are available.

Association ON (Left Click):	Activates/ switches ON Target Association.
Association settings (Middle Click):	Opens Target Association settings menu.
Association OFF (Right Click):	De-activates/ switches OFF Target Association.

The Tgt Assoc. button will change to reflect the association status (ON or OFF)

6.52.2 Target Association Settings

The **Target Association Settings** menu allows the balance between a radar Tracked Target and AIS targets to be configured. The settings are detailed on the following pages.

To adjust a Target Association setting to a different value, place the cursor over the Slider Bar and adjust as required.

NOTE: The Delta range, bearing, COG and SOG values cannot be set individually; these values are set using the Target Association slider bar.



0 NM

Frails Length

fat Tate OFF

6.0 min (Off)

6.0 min (T)

A radar Tracked Target and an AIS targets will be associated (linked) if the Delta values are *less than* those shown below.

The following figures are for when Target Association is set to the default 100% setting.

Delta Range:	The differences between Tracked Targets range and the AIS target range must be within 90 meters of each other
Delta bearing:	The differences between Tracked Targets bearing and the AIS target bearing must be within 0.8 degrees of each other.
Delta COG:	The differences between Tracked Targets COG and the AIS target COG must be within 10 degrees of each other.
Delta SOG:	The differences between Tracked Targets SOG and the AIS target SOG must be within 2.5 knots of each other.
Default:	Pressing default sets the Target Association settings to the default value of 100%.

As the Target Association is adjusted, the tolerances of the above figures are increased (higher percentage) or reduced (lower percentages).

EXAMPLES OF TARGET ASSOCIATION SETTINGS:

Slider set to 100% (DEFAULT) Target Association Settings X Delta Range : 90 m Delta Bearing : 0.8° Delta COG : 10.0° Delta SOG : 2.5 kn Default 100 % Display AIS as Default

The delta figures are set as explained in the previous page.



The allowed differences between radar Tracked Targets and AIS targets are much greater. As the tolerances are larger, Target Association is easier but there is an increased risk in busy shipping lanes of associating with the wrong target.

Slider set to 50% (MINIMUM)



The allowed differences between radar Tracked Targets and AIS targets are reduced. It is harder to associate the target but potential association with the incorrect target is reduced.

6.52.3 AIS or Radar source

The source of data used to calculate association target vectors can be switched between Radar (TT) and AIS. With the cursor placed over the **Display AIS as Default** or **Display RADAR as Default** button, the following cursor options are available.

Set AIS as default (left click):	Associated target vectors are derived from AIS target data.
No Function (middle Click):	The middle button has no function.
Set Radar as default (right click):	Associated target vectors are derived from Tracked Target (ARPA) data.

 Target Association Settings
 X

 Delta Range : 90 m
 90 m

 Delta Bearing : 0.8°
 0.8°

 Delta COG : 10.0°
 100 °

 Delta SOG : 2.5 kn
 100 %

 Target Association Priority
 100 %

 Display RADAR as Default
 Display AIS or Radar as Default

button

The button name will change to reflect the AIS or Radar selection.

CHANGE RADAR/ AIS DEFAULTS ON INDIVIDUAL TARGETS

When targets are associated, the Vector information for individual targets can be changed between Tracked Target data (displayed as **TT**) or AIS Target data.

With the cursor placed over the **SOURCE** row for the target of interest, the following options are available.

Show AIS data (left click): The source of target data is from the AIS.

No Function (middle Click): The middle button has no function.

Show radar data (right click): The source of target data is from the radar Tracked Target (TT).

Regardless of the default setting, the Tracked Target number (ID) and AIS vessel name (Target Name) are both shown in the target data panel.





Tracked Target (TT) + AIS

AIS + Tracked Target (TT) target.

Vector information for the associated target is derived from AIS data. The target label will display as AIS name then the Tracked Target ID.

Radar as default/ TT + AIS: Vector information for the associated target is derived from Tracked Target data from the ARPA. The target label will display as the Tracked Target ID then the AIS name.

RADAR/ AIS DEFAULT FOR INDIVIDUAL TARGETS

It is possible to override the AIS/ Radar default setting for individual associated targets. This is done from the target data dialogue box (see following page).

VECTOR NOTES

AIS as default/ AIS +TT:

The change in RADAR or AIS source only affects associated targets. Data and vectors for Tracked Targets/ AIS that are NOT associated remain fully independent.

CAUTION VECTOR/ SPEED DIFFERENCES

The calculations for Target Association are carried out at each individual workstation. Because of the tolerance ranges in the Target Association limits, the calculations may lead to differences between vector and speed calculations displayed on each workstation.

6.52.4 Target Association Priority

In a networked INS system, the source of data used to calculate the Target Association parameters can be selected using the **Target Association Priority** function.

Each display can use data from a specific processor *or* use its own local target data. This may be useful in a system with multiple sensors where antenna locations/ offsets may lead to minor inconsistencies in target tracking data.

SETTING TARGET ASSOCIATION PRIORITY

The **Target Association Priority** can be individually configured on each display.

In **Target Association Settings**, left click on the **Target Association Priority** button and a dialogue is presented showing all displays connected to the network.

The display shown at the top of the list (shown as **Radar Target from AM1001** in the example opposite) is the source of the target data that will be used for Target Association.





Target Association Priority menu

The display with (local) at the end of the name (shown as Radar Target from AM1002 (local) in the above example is the workstation being used.

LOCAL

Where **local** is selected as the first priority i.e. **Radar Target from AM1002 (local)**, Target Association data is only taken from the workstation in use and not from other displays via the network.

CHANGE A PRIORITY

Left click to select one of the display names (e.g. Radar Target from AM1001) then use the **Move Up** or **Move Down** buttons to change the priority.

If the display set as top priority goes off-line or is switched OFF, the Target Association Priority switches to the next sequential display in the list.

EXAMPLE OF TARGET ASSOCIATION PRIORITY

The example on the following page shows a system with four sensors and four network connected processors/ multi-function displays.

The example shows that Display AM1001 is sharing the Target Association data with displays AM1002 and AM1003. This means that the Tracked Target data being used across the three displays is from the transceiver selected by display AM1001 even if displays AM1002 and AM1003 are displaying radar returns from different transceivers.

Display AM1004 is set to Local priority so will only use Tracked Target data from the transceiver selected by AM1004.



NOTES

- With Target Association Priority selected, data for ALL targets from the selected processor is used. Individual target data cannot be selected.
- The display names i.e. AM1001 etc. are set during system configuration and cannot be changed by the operator. Please refer to the installation data for processor identification.
- The calculations for Target Association are carried out at each individual workstation. Because of the tolerance ranges in the Target Association limits, the calculations may lead to differences between vector and speed calculations displayed on each workstation.

6.53 Target Data

NOTICE

Target data is not available in Conning Display modes

Information on selected AIS, radar tacked targets or a man over board symbols is displayed in the *Target Data* box.

When a target is selected, a Blue or White square is placed around the target and the data is displayed.

To assist in identification, the text in the target data is the same colour as the square around the target.

Target Name	VESSEL NAME	VESSEL NAME
ID		
Source	AIS	AIS
RNG	9.40 NM	10.77 NM
BRG	131.4°	117.8°
T COG	000.0°	035.8°
T SOG	0.0 kn	11.1 kn
CPA	9.40 NM	10.66 NM
TCPA	23:59:59	-00:08:07
BCR	999.00 NM	13.74 NM

TARGET DATA COLUMN 1	TARGET DATA COLUMN 2
Displays the latest selected target.	Displays the most dangerous of the remaining targets or if no dangerous targets exist, displays
The square around target and the target data is BLUE.	the previously selected target.
	The square around target and the target data is WHITE.
Ker - Are Lessel Name	English - +>

FLIR CAMERA NOTE

When **Locked to target** is selected in the optional FLIR camera mode, the camera will track Target 1 unless the operator selects a dangerous target. A small camera symbol will also appear beside the selected target.

6.53.1 Target data display

Data from the selected target(s) is shown as below. All target ranges and bearings are shown referenced to ownship CCRP.

Target Name		ROCKWELL
ID	001	
Source	TT	AIS
RNG	1.32 NM	2.14 NM
BRG	090.2°	172.6°
T COG	089.7°	043.0°
T SOG	11.7 kn	12.0 kn
CPA	0.01 NM	1.65 NM
ТСРА	-00:06:46	00:06:49
BCR	0.00 NM	1.68 NM
вст	-00:08:06	00:07:19
Status	Tracked	Class A
MMSI		232000004
Callsign		KH00001
IMO		9454332
LAT	51°07.257'N	51°05.078'N
LON	001°23.991'E	001°21.017'E
Quality		High(<= 10m)
RAIM		Not in use
Heading		222.0°
ROT		0°/min Port
Length		146 m
Beam		33 m
Draught		3.8 m
NAV Status		Underway Engine
Туре		Passenger ship
DEST		FREEPORT
ETA		04:48:06 21-05-2024
Nation		United Kingd
SRM		View

Target Name: AIS target name.

ID: The Tracked Target number i.e. 021 and any target label that has been applied.

Source: Source of target data (see Target Source below) and Target Association).

Selectable between

See below & following page for details.

True and Relative.

RNG: Target range from Ownship CCRP.

BRG: Target bearing from Ownship CCRP.

T CTW: True course through water.

T STW: True speed through water.

- T COG: True course over ground.
- **T SOG**: True speed over ground.

R CRS: Relative course.

I

L

I

R SPD: Relative speed.

CPA: Closest point of approach.

TCPA: Time to closest point of approach.

BCR: Bow crossing range.

BCT: Bow crossing time.

Status: AIS class or radar Tracked Target.

MMSI: Vessel MMSI number (AIS targets only).

Callsign: Vessel radio call sign (AIS targets only).

IMO: Vessel IMO number (AIS targets only).

LAT/ LON: Current latitude and longitude of target.

Quality: Accuracy of position (AIS targets only).

RAIM: Whether Receiver Autonomous Integrity Monitoring is in use.

Heading: Target heading.

ROT: Target rate of turn (AIS targets only).

Length, Beam & Draught: Vessels dimensions (AIS targets only).

NAV Status: Current navigation status of the target (AIS targets only).

Type: Vessel type (AIS targets only).

DEST: Vessel destination (AIS targets only).

ETA: Vessel estimated time of arrival at destination (AIS targets only).

Nation: Nation of the vessel based on the MMSI number (AIS targets only).

SRM: Indication of whether Safety Related Messages have been received from this target (see SRM below) (*AIS targets only*).

SOURCE

The **Source** row in target data refers to the source of the target Data used to calculate vectors. For Associated targets, this can be switched between Radar source (Tracked Target) or AIS source by placing the cursor on the Source data column and left or right clicking. Please refer to Target Association for additional details.

SOURCE DEFINITIONS

TT	Tracked Target (ARPA)
TT+AIS	Associated target with the Tracked Target data set to priority.
AIS+TT	Associated target with the AIS data set to priority.
TT+TT	Associated target with the Tracked Target data set to priority.
rTT+TT	Associated target with the Tracked Target data from a remote source set to priority.

SAFETY RELATED MESSAGES

If any Safety Related Messages have been received from a target, the **SRM** row in the target data shows a View button. A left click on this button will display the list of Safety Related Messages from this target. See 6.1.10 Safety Related Messages for additional information.

TRUE/ RELATIVE DISPLAY OF COURSE AND SPEED

The display of course and speed for ALL targets can be switched between True and Relative.

Place the cursor placed over **T CTW / STW** or **R CRS / SPD** (sea stabilisation) or **T COG**, **T SOG** or **R CRS/ SPD** (ground stabilisation) data and the following cursor option becomes available:

T COG	230.7°	228.8°	
T SOG	7.9 kn	8.7 kn	
or			
R CRS	236.4°	228.7°	

8.7 kn

Toggle Crs & Spd True/Rel (left click):

Switches the target display of course and speed between True and Relative.

R SPD 7.9 kn

6.53.2 Target Tote

The target data display can be switched to **Target Tote** where targets can be sorted by varying priorities with reference to ownship's CCRP.

With the cursor placed over the **Tgt Tote ON/ OFF** button the following options are available.

Tote ON (left click):

Switches ON Target Tote.

No Function (middle Click):

Tote OFF (right click):

Revert to target data display.

The middle button has no function.

Target Name		
ID		
Source		
RNG		
BRG		
T COG		
T SOG		
CPA		
TCPA		
BCR		
CPA L	imit 0.0 NM	AIS ON
TCPA L	imit 0 min	Tgt Assoc. ON
Gua	rd Zone	Tgt Tote OFF
Targe	t Settings	Trial Manoeuvre
Vect	or Length	6 min (R)
Past	Positions	6.0 min (Off)
Trails	Length	6.0 min (T)

TARGET TOTE DISPLAY

-			000	DOT	2010	222			Callsian	Course
larget	СРА	ТСРА	BCR	BCI	RNG	BRG	R.CRS	R.SPD	Calisign	Source
002	0.69 NM	00:10:48	4.90 NM	00:03:00	4.57 NM	060.1°	232.6°	19.6 kn		Radar
				l s mi t i	5.40 NM	047.3°	225.9°	18.2 kn		-
						المنت		19994		
				-						
						-				
				Correct I						
	\square				C C	3		\bigcirc		
	- -									

TARGET TOTE DEFINITIONS

Target	AIS vessel name, Tracked Target or MOB reference number.
CPA & TCPA	Closest point of approach and Time to closest point of approach.
BCR & BCT	Bow crossing range and Bow crossing time.
RNG & BRG	Range and bearing.
R CRS & R SPD	Relative course and Relative Speed.
T CRS & T SPD	True course and True Speed.
Call sign	Vessels radio call sign (AIS targets only).
Source	Radar Tracked Target (Radar) or AIS signal (AIS).

6.53.3 Target Tote priorities

When Target Tote is enabled, targets are sorted according to one of the following selectable priorities:

- Closest Range.
- Shortest +ve TCPA.
- Shortest +ve TCPA within CPA limit.
- Closest CPA with +ve TCPA.

With the cursor placed over the current filter (*the switch-on default is Shortest* +*ve TCPA*), the following cursor options is available:

Select Tote mode (left click):

No Function (middle & right Click):

Select from four different target priorities.

The middle & right buttons have no function.

The button name will change to reflect the selected mode.

AIS and Tracked Targets are displayed using the filter selected.

Closest Range 🔹		
Target	СРА	ТСРА
		
1923 1923		
<u>14</u> 82		
		ATTEN.
503		a nna
	\Box	

Shortest +ve TCPA within CPA limit
Closest Range
Shortest +ve TCPA
Shortest +ve TCPA
Shortest +ve TCPA within CPA limit
Closest CPA with +ve TCPA
Tote Mode options

Tote Mode selection

NOTICE AIS TARGET DATA

AIS target data is displayed in Target Tote even when AIS targets are switched OFF in the AIS control panel. AIS targets do not need to be selected for the data to be shown In Target Tote.

6.54 Reference Targets

6.54.1 Reference (Fix) a Tracked Target

A Tracked Target can be set as a **Reference target** or set as an **Anchor watch target**.

- For accurate COG/ SOG calculations, the Tracked Target to be used *must be stationary*.
- A target must be fully acquired and be showing a vector (See Target Tracking – ARPA).

With the cursor over a **target name** in the **target display**, the following options are available.



Radar Tracked Target and target display

 Fix/ Unfix target (left click):
 Fix (set as a reference) or Un-fix the selected Tracked

 Target.

No Function (middle Click):

The middle button has no function.

Set/ Reset Anchor watch (right click): Set and Reset a Tracked Target as Anchor watch.

Left clicking selects the target as a fixed target. The target name and number will change and be preceded with 'Rx' where x is the sequential number of the referenced targets i.e. the first reference target will be R1-xxx, the 2nd reference target will be R2-xxx etc.



Left click on the Target Name 002





Target R1-002 as displayed on-screen

When a Tracked Target is referenced, the COG & SOG calculations are automatically calculated from the reference target and are shown as **Radar Reference (Auto)** in the list of available COG/ SOG sources.



TARGET REFERENCING PRECAUTIONS & NOTES

Target Loss:	Loss of a reference target may have a major impact on the accuracy of the results for true speed and true course of targets and own speed will be degraded. Lost reference targets that are of interest will generate a "Lost reference target' alert.
AIS Restrictions:	Due to conflicts between common consistent references (CCRP), Tracked Targets cannot be set as reference targets when AIS targets are switched ON.
Relative Velocity:	Reference Targets are only used for the calculation of True Speed, calculation of Relative Speed may be inaccurate and should not be used to calculate Relative velocity.

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6.54.2 Deselect (Un-fix) a referenced Tracked Target

To Un-fix a referenced target, select the referenced Target Name and left click on Fix / Unfix.

The R will be removed from the target name, e.g. the target name will change from R-001 to 001.

If no further reference targets exist, **Radar Reference (Auto)** will not be available in COG / SOG drop down list and the COG and SOG will search for a working sensor in the following sequence:

- 1^{st:} Position Sensors (GPS etc.)
- 2nd: Any Doppler Log(s)
- 3rd: Radar reference (if reference targets are available)
- 4th: Manual

6.54.3 ARPA Anchor watch

The anchor watch will reference a stationary Tracked Target and sound an alert when the target has drifted by a pre-determined distance.

In the target display, select an existing, fully acquired stationary Tracked Target. Then, with the cursor placed over the target name in the target display, the following options become available:

Fix/ Unfix target (left click):

Fix (set as a reference) or Un-fix the selected Tracked Target.

No Function (middle Click):

Set/ Reset Anchor watch (right click): Set and Reset a Tracked Target as Anchor watch.

Right clicking selects the target as an Anchor Watch.

The target name and number will change and be preceded with **A**.

The anchor watch limits are set in Alert Configuration which is accessed from the standby screen.





Target A-002 as displayed on-screen

The alert is listed as alert number **17027: ARPA Anchor Watch limit exceeded** and has a default setting of 150 meters (see Section 5.10: Alert Configuration for details on how to change this parameter).



When the distance between ownship and the anchor watch referenced target is more than the figure set in the alert configuration, an Anchor watch alert is displayed and an audible alarm will sound.

CAUTION After an anchor watch alert has been acknowledged, the target reverts to a reference target. If Anchor Watch is still required, it must be reactivated.

RESET (REMOVE) ANCHOR WATCH

To remove the anchor watch, select the target Name and press the **Set / Reset Anchor Watch** button.

The **A** will be removed from the target name; for example target name will revert from target **A-002** to target 002.

6.54.4 Reference target set as an anchor watch

SET REFERENCE TARGET ANCHOR WATCH

A target can also be made a reference target and then selected as an Anchor watch.

In the target tote box, select the Tracked Target that is of interest.

Name	
ID	R1A-002
Source	TT
RNG	3.46 NM
BRG	116.3°
T COG	011.4°
T SOG	0.3 kn
CPA	3.34 NM
ТСРА	03:10:52
BCR	7.50 NM



Fix/ Unfix target button to assign the selected reference target then press Set / Reset Anchor assign the selected target as an anchor

The target name and number will change and be preceded with **RA**; for example; target **001** becomes target **RxA-001** where **x** is the sequential number of the referenced targets i.e. if reference target R1-xxx is used, the number will become **R1A**-xxx, if the 2^{nd} reference target is used, **R2A**-xxx etc.

REMOVE REFERENCE TARGET ANCHOR WATCH

To remove the anchor watch, select the referenced target name and press the Set / Reset Anchor Watch button.

6.55 Target tracking (ARPA)

GENERAL NOTES ON TARGET TRACKING

Up to 450 surface targets with relative speeds of up to 150 knots can be tracked across all displays connected to a network. i.e. a standalone displays can track 450 targets whereas three INS/ network connected displays can track a maximum of 450 targets across all three displays.

Radar tracking facilities are available within 0.1 to 24 nautical miles on all range scales.

Target tracking plots manually selected or automatically acquired radar targets and calculates their course and speed. Target data is indicated by target vectors on screen and additional information (position, range, CPA etc.) which is displayed in the target data panel. The radar system must always be optimally adjusted and tuned to ensure required targets will not be lost or unwanted targets such as sea returns and noise will not be acquired and tracked.

A target does not always mean a ship or another surface vessel, but can imply returns from landmasses, reefs, sea surfaces and/ or clutter. As the level of clutter changes with environment, the operator should adjust the SEA anti-clutter, RAIN anti-clutter and GAIN controls to ensure target echoes are not eliminated from the radar screen.

During slow turns there is no effect on Tracked Targets however, for very high turning rates of greater than 150°/minute (depending on gyro), there is some influence on *all* Tracked Targets which last for a minute or two and then all Tracked Targets revert to full accuracy. The course of a Tracked Target lags 15 to 30 seconds at high relative speed, or 3 to 6 seconds at near zero (near 0) relative speed.

For target tracking when manual speed is being used, the User MUST adjust the speed input every time that the Ownship changes speed.

ADDITIONAL READING

Please refer to the following section for additional details.

- Section 6.14: Collision Avoidance
- Section 14: Interpreting the radar display

NOTICE

CONNING DISPLAY MODES

In Conning & Navigation Display mode, targets can be Acquired, Selected, De-selected and Deleted but no target information can be viewed.

6.55.1 Acquire, select & delete radar targets

NOTICE CONNING DISPLAY MODES

In Conning & Navigation Display mode, targets can be Acquired, Selected, De-selected and Deleted but no target information can be viewed.

In single and dual radar modes, with the cursor on screen the following options are available:

Select or Chart Query (left click):	Select an object or Chart query only appears when the optional chart feature is enabled.	
Acquire (middle Click):	Acquires a radar target.	
No Function (right click):	The right button has no function	

With the cursor placed over a radar target of interest, middle click on Acquire.

A dotted circle is placed around the target and a sequential number is assigned (e.g. 001).

When the target has been acquired, a vector will be shown.

The target can now be selected and data will be displayed in the target data display.

If the Tracked Target violates ownship CPA, TCPA settings or is deemed as a potential collision threat, an alert will sound.



Target acquired

SELECTING A TRACKED TARGET

With the cursor placed over a Tracked Target, the left click cursor option changes to the following:

Select Target (left click):

Selects the target at the current cursor position.

No function (middle & right Click):

Target Name	VESSEL NAME	VESSEL NAME
ID		
Source	AIS	AIS
RNG	9.40 NM	10.77 NM
BRG	131.4°	117.8°
T COG	000.0°	035.8°
T SOG	0.0 kn	11.1 kn
CPA	9.40 NM	10.66 NM
ТСРА	23:59:59	-00:08:07
BCR	999.00 NM	13.74 NM

Target data panel. Use the scroll bar to view all data The Middle & right buttons have no function.



When a target has been selected, the **target data panel** automatically opens and target data is displayed.

The target is outlined with a BLUE or WHITE square where the colour corresponds with the colour of data in the target data panel.

See **Target Data** (section 6.53) for additional details on the target data panel.

TARGET TRACKING OVERLOAD

Up to 450 targets with relative speeds of up to 150 knots can be tracked.

When the number of Tracked Targets reaches 95% of the 450 target processing capacity, an alert is triggered stating that **ARPA: Tracking targets nearing processing capacity**.

When the 451st target is attempted to be acquired, the alert is replaced by an **ARPA Tracked Target processing capacity exceeded.** No further targets can be acquired or tracked unless a currently Tracked Target is deleted.

ARPA: Tracked targets nearing processing cap..



To track another target requires the deletion of one or more currently Tracked Targets.

DESELECT OR DELETE A TRACKED TARGET

With the cursor placed over a radar Tracked Target, the following options are available:

Deselect Target (left click):	De-Selects a target
Acquire (middle Click):	Only present when the optional Radar interlay is switched ON. See Target Settings if the Acquire button is not available.
Delete (right click):	Deletes the target at the current cursor position

DESELECT TARGET

Place the cursor over the selected target and left click on Deselect Target.

The target continues to be tracked. The square around the target is removed and data for the target is no longer shown in the target data panel.



DELETE TARGET

Place the cursor over the selected target and right click on Delete.

- The selected target is deleted and is no longer being tracked.
- No warning alerts will be triggered for the deleted target.
- Data for the target is no longer shown in the target data panel.

DELETION IN A NETWORKED SYSTEM

If a target is deleted from any display in a networked system, the target will be deleted on ALL connected displays regardless of where the target was first acquired.

DELETION OF REFERENCE / ANCHOR WATCH TARGETS

When a deleted Tracked Target was set as a reference and the speed source is set to use radar reference, the speed source will change from Radar Reference to the best speed source available.

If more than one target is being used as a reference, the COG and SOG is calculated/ based on all reference targets. If a reference target is deleted the calculations are based on the remaining targets.

CAUTION DELETION OF AN ANCHOR WATCH TARGET

If a target is deleted that has been assigned as an Anchor watch, all anchor watch monitoring for the deleted target is suspended.

DELETE ALL TARGETS

See section 6.56.1 for details on deleting all targets & putting all AIS signals to sleep.



D Source RNG BRG T COG T SOG CPA TCPA BCR	Name	
Source RNG BRG T COG T SOG T SOG T CPA BCR	ID	
RNG BRG T COG T SOG CPA TCPA BCR	Source	
BRG T COG T SOG CPA TCPA BCR	RNG	
T COG	BRG	
T SOG CPA TCPA BCR	T COG	[]
CPA TCPA BCR	T SOG	
TCPA BCR	СРА	
BCR	ТСРА	
	BCR	

Target data panel with no data.

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6.55.2 Lost and found targets

LOST TARGET DETECTION ON/ OFF

Lost Target Detection alerts can be switched ON and OFF or set to trigger inside a user defined range. The factory default setting is **Lost Target Detection OFF**. Section 6.56.2 provides further details on Lost Target Detection.

ASSUMPTIONS & DEFINITIONS

The following descriptions assume that Lost Target Detection is switch ON, is set to an example range of 24 NM and the target is within this range.

NOTICE

LOST TARGET ALERT STATUS

Lost Target Detection **OFF**: NO alerts are generated when a target is lost. Lost Target Detection **ON**: Lost target alerts are generated as detailed below.

CAUTION

TARGET RE-ACQUISITION

There is always a probability that a reacquired target is NOT the original target but may be another radar return in the vicinity of the original lost Tracked Target.

WEAK TARGET VECTORS

Vectors shown on weak targets may be unstable and should not be relied upon for collision avoidance.

TRACKED	ARPA
Weak target	If a tracked or AIS target is not seen for 8 consecutive scans, a Weak Target alert is triggered and a Weak Target symbol (see symbols on following page) is drawn at the last known position of the target.
Lost target	 If a target is not seen for 20 consecutive scans, a Lost Target alert is triggered and a lost target symbol is drawn at the last known predicted position of the target. If the target <i>is not of interest</i>, it is deleted. If the target <i>is of interest</i>, it is NOT deleted and will require operator confirmation by acknowledging the alert. A target is deemed to be <i>of interest</i> when it is within the limits (referenced to ownship) set in Lost Target Detection configuration.
	If a target reappears in the period between a <i>weak</i> target and <i>lost target</i> alert then a <i>Target Found</i> alert is generated and the target is reacquired. This could occur if the target is temporarily obscured by clutter, poor radar returns or incorrectly set transceiver tune.
Found target	When a <i>weak</i> target alert is triggered, the radar tracking program starts to search for the lost target and will reacquire any target in the vicinity of the predicted position of the original lost target.
	If no target is found 20 sweeps after the original loss of target then the search is suspended and a <i>lost Tracked Target</i> alert is generated.
	The symbol will continue to flash until the alert is acknowledged. The warning is automatically acknowledged when/ if the target has been excluded by a pre- determined Lost Target Range (when enabled; see section 6.56.2).
Audio alarm	In the alert panel, cancel the Lost Target warning to delete the symbol and silence the audible alert.

TRACKED AIS		
Lost AIS Scenario	Intermittent AIS target inside the lost target detection range.	A non-intermittent target sailing outside of AIS reception.
Lost target	The AIS messages times out after 420 seconds a lost target alert is raised and the target symbol flashes.	The AIS messages times out after 420 seconds a lost target alert is raised and the target symbol flashes.
Found target	If a new VDM message appears at 500 seconds and the lost target warning has not been cancelled, the AIS symbol will move to the updated location but will still flash and show as a lost target. With each new AIS message received the target will update to the location received in the message. The symbol will continue to flash until the alert is acknowledged. The warning is automatically acknowledged when/ if the target has been excluded by a pre- determined Lost Target Range (when enabled; see section 6.56.2).	No VDM message is received giving a new location for the target, it will continue to flash until the operator acknowledges the alert. Where enabled, this will automatically stop once the target has been excluded by a pre-determined range.
Audio	In the alert panel, cancel the Lost Target warning to delete the symbol and silence the	
alarm	audible alert.	

6.55.3 Symbols and alerts

Target Status	Number of antenna sweeps	Tracked Target	Tracked Target in Collision warning
Target being acquired	New target	Dashed green circle on target	Dashed green circle on target
Target acquired	Maximum 12 sweeps to acquire target	Green circle and vector on target	Red circle and vector on target
Guard Zone Target Detected	"Guard Zone ⁻ Refer to sect	Target Detected" is displayed an Inclusion Sector ion 6.24 for details on Guard use.	when new targets enter Zone configuration and
Weak target alert Image: Weak target alert Image: ARPA: Weak Target 07:27	Alert sounds 9 sweeps after loss of target	Green cross and vector at the predicted position of the target	Green cross and a red vector the predicted position of the target
Found target alert ARPA: Target Found 07:27	Alert sounds if target is redetected	If a weak target reappears weak target and <i>lost targ</i> <i>Found</i> alert is generat reacqu (See previou	in the period between a get alert then a <i>Target</i> ed and the target is ired. is section).
<i>Lost target</i> alert	Alert sounds 21 sweeps after loss of a target	Red cross at the last known position of the target. No vector is shown	Red cross at the last known position of the target. No vector is shown
Collision alert	Alert sounds when a Tracked Target (TT) violates CPA/ TCPA limits	The audio alert associated can be silenced but the vis cleare When the Tracked Target does not violate the CP collision warn	d with the collision alert ual indication cannot be ed. is no longer a threat or A/TCPA settings, the ing clears.

6.55.4 Networked target tracking

SHARING TARGET DATA

In a networked enabled system/ INS, Tracked Target numbering, data and labelling is shared across the network.

ENABLE/ DISABLE DISPLAY OF EXTERNAL TARGETS

The display of external targets can be enabled/ disabled in **Target Settings** / **Show External Tracked Targets** (see section 6.56.4 for details).



NETWORK

EXAMPLE TRACKING/ NUMBERING SCENARIOS

- **TARGET 01** is acquired and tracked on **DISPLAY 1**. This is automatically shown on DISPLAYS 2 & 3 as **Target 01**.
- TARGET 02 is acquired and tracked on DISPLAY 3. This is automatically shown on DISPLAYS 1 & 2 as Target 02.
- TARGET 03 is acquired and tracked on DISPLAY 2. This is automatically shown on DISPLAYS 1 & 3 as Target 03.

NOTES

- Target numbering starts at 001 and continues to 1000. At 1001 targets, the system resets to 001.
- A total of 450 targets can be tracked across an INS/ networked system.

6.55.5 Multiple Tracked Target Inputs

EXTERNAL TARGET SOURCE

In INS/ Networked systems, Tracked Target input messages (TTM) can be received from multiple displays or target tracking systems. Tracked Targets may have a suffix letter at the end of the target number.

- Target data can originate from additional Navigation Displays via the network or other external target tracking systems.
- The letter associated with an external target is assigned during setting to work/ commissioning of the system and cannot be changed by the operator.



Example of Tracked Targets received from two separate sources of Tracked Target data

ENABLE/ DISABLE EXTERNAL TARGETS

External targets can be enabled (displayed) or disabled (not displayed) in **Target Settings / Target Label Settings menu**.

TARGET ICONS

The target icon will change to reflect the tracking source as follows:

Target acquired on user display:

Target from external source:



6.56 Target Settings

Target Settings is located in the right hand side of the display in the menus below the target data and just above the Vector Length adjustment slider.

With the cursor placed over the Target Settings button, the following cursor option is available:

Target Setting (Left Click):

Opens the Target Settings menu.

No function (Middle & Right Click): The Middle & right buttons have no function.

TARGET SETTINGS

When Target Settings is opened, the following features can be managed:

- Delete ALL Targets.
- Lost Target Detection.
- Tracked Targets ON/ OFF.

6.56.1 Delete ALL Targets

Delete ALL Targets button deletes ALL Tracked Targets and sends ALL AIS targets to sleep.

With the cursor over the **Delete ALL Targets** button, the following options are available:

Delete all targets (left click): Deletes all Tracked Targets & sends all AIS targets to sleep.

No function (middle & right Click): The Middle & right buttons have no function.

 Target Settings
 X

 Delete ALL Targets

 Lost Target Detection OFF

 Lost AIS ATON Detection OFF

 Lost AIS Locating Dev Detection OFF

 Lost Target Range Limit 3.00 NM

 Show External Tracked Targets

 Target Label Settings

Targe

ID Source RNG

BRG

T COG T SOG CPA

TCPA BCR

CPA Limit 0.0 NM

TCPA Limit 0 min

Guard Zone

Target Settings

Vector Length

Trails Length

Past Positions 6.0 min (Off)

AIS ON

Tgt Assoc. ON

Tgt Tote OFF

Trial Manoeuvre

6 min (R)

6.0 min (T)

When **Delete all Targets** is selected, the following on-screen dialogue is displayed:



YES: ALL radar Tracked Targets are deleted, all AIS targets are sent to sleep.

NO: Cancels the target deletion.

NOTICE NETWORK TARGET DELETION

When a target is deleted from any display in a networked system, the target will be deleted on ALL connected displays regardless of where the target was first acquired.

NOTICE

AUTO ACTIVATION/ RE-ACQUISITION OF AIS/ TARGETS

When enabled in AIS Settings, Auto activation of sleeping targets will automatically activate/ reactivate dangerous targets.

Where target are within a Guardzone, the system will automatically redetect radar targets and activate sleeping AIS targets.

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6.56.2 Lost Object Detection

Lost Target Detection allows the operator to enable or disable the detection of lost tracked targets and lost AIS targets.

Lost AIS ATON Detection allows the operator to enable or disable the detection of lost AIS ATONs.

Lost AIS Locating Dev Detection allows the operator to enable or disable the detection of lost AIS locating devices (AIS SARTs, AIS EPIRBs and AIS MOBs).

The range above which lost objects are ignored can also be set.

Each of the Lost item detection controls operator in a similar way. Lost Target Detection is described below.

With the cursor placed over the Lost Target Detection button, the following option becomes available:

Lost Target Detection (left click): Toggles between ON and OFF.

No function (middle & right Click):

The Middle & right buttons have no function.

Lost Target Detection OFF:

- Lost target detection is DISABLED.
- No alerts will be raised if a target is lost.



Lost Target Detection ON:

- Lost Target Range Limit slider is available where the range limits for the lost target can be configured.
- A range of between 0.400 to 24.0 NM can be selected using the slider.



EXAMPLE

The Lost Target Range Limit is set to 12.0 NM.

BELOW 12 NM:AIS and Tracked Targets within 12 NM will trigger a Lost Target Alert.BEYOND 12 NM:AIS and Tracked Targets beyond 12 NM will NOT trigger a Lost Target Alert.

6.56.3 Show external Tracked Targets

With the cursor placed over the **Show External Tracked Targets** button, the following cursor option is available:

Show/ Hide external targets (left click):	Toggles the display of external Tracked Targets ON (button text changes to Hide External Tracked Targets) or OFF (button text changes to Show External Tracked Targets).
No function (middle & right Click):	The Middle & right buttons have no function.

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ADDITIONAL DETAILS

See section 6.55.5 for further details on the display of external Tracked Targets.

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6.56.4 Target Label Settings

Target Label Settings allows the operator to add text labels to a Tracked Target and control the display of on-screen data.

Left clicking on the Target Label Settings button opens the menu.

LABEL TARGET

With the cursor placed over the **Label Target** button, the following cursor options are available:

Set Label (left click):	Allows the operator to assign a text label to a Tracked Target (see below).

No function (middle Click): The Middle button has no function.

Cancel Labelling (right click): Cancels the labelling operation change.

To add a label, left click on **Label Target/ Set Label** then place the cursor over the Tracked Target of interest and left click (**Label Target**). In the text entry box that opens, enter the desired target name and click on **accept** or **enter** on a physical keyboard.

EDIT TARGET LABEL

To edit a label, left click on **Label Target/ Set Label**, place the cursor over the Tracked Target to be changed and left click (**Label Target**). Edit the target label/ name in the text box that opens and click on **accept** or **enter** on a physical keyboard to accept the change.

APPLICATION NOTES

- Target labels/ names are limited to a maximum of 10 characters. If more than 10 characters are entered, a warning is displayed stating "The label has been modified to remove illegal characters and has been limited to 10 characters".
- When Target Association is enabled, Tracked Target labels will be displayed when the Association priority is set to TT+AIS. When the association priority is set to AIS+TT, the AIS name is displayed and the target label is not shown.

TARGET LABELS ON/ OFF

Target labels controls the display of the sequential number allocated by the system to a Tracked Target i.e. 010. This label can be switched ON and OFF but the target number cannot be changed.

With the cursor placed over the **Target Labels ON/ OFF** button, the following cursor options are available:

Target labels ON (left click):	Switched the display of the Tracked Target number ON.
No function (middle Click):	The Middle button has no function.
Target labels OFF (right click):	Switched the display of the Tracked Target number OFF.



TARGET IDs ON/ OFF

The target ID is the text label set by the operator using the Label Target function detailed above.

With the cursor placed over the **Target IDs ON/ OFF** button, the following cursor options are available:

Target IDs ON (left click):	Switched the display of the Tracked Target number ON.
No function (middle Click):	The Middle button has no function.
Target IDs OFF (right click):	Switched the display of the Tracked Target number OFF.

SOURCE IDs ON/ OFF

The source ID identifies which of the displays connected to the network initiated the Tracked Target.

With the cursor placed over the **Source IDs ON/ OFF** button, the following cursor options are available:

Source IDs ON (left click):Switched the display of the display source identification
number ON.No function (middle Click):The Middle button has no function.

Source IDs OFF (right click):

Switched the display of the display source identification number OFF.

EXAMPLES



All labels OFF



Target ID ON



Target ID and Label ON



Target ID, Label and Source ON

6.57 TCVR Control

Optional additional transceiver control is available using the TCVR Control button on the bottom right corner of the radar display. This button will only appear when the appropriate dongle is connected to the display.

When the button is left clicked the Radar Control menu appears with 'Frequency' and Power Buttons



6.57.1 Frequency

Left clicking the Frequency button opens the Frequency menu which allows the frequency to be changed.

For S-Band SharpEye[™] transceivers this will allow frequencies 1-8 to be selected.

For X-Band SharpEye[™] transceivers this will allow frequencies 12-25 to be selected.

	2 3	4
5	s 7	8

6.57.2 Power

When the cursor is placed over the Power Button the Power level can be switched between High and Low power.

Low Power High Power

Low Power (left click):	Sets Power Output to Low
No function (middle Click):	The Middle button has no function.
High Power (right click):	Sets Power Output to High.

When TCVR is used to switch to Low Power mode, a Caution alert will be displayed in the alert box bottom right of the Master display.

TCVR: Non-IMO Low Power 10:47 TCVR Mode selected

6.58 Track control

Track control is detailed in a separate handbook reference HBK-2300-TCS.

Please contact HENSOLDT UK for details.

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6.59 Trial Manoeuvre

NOTICE CONNING DISPLAY MODES

Trial manoeuvre is not available in Conning Display and Conning & Navigation Display modes.

The Trial Manoeuvre function simulates an intended change of course and/ or speed. This allows the user to assess the effect of a change of course, speed, time to manoeuvre, and rate of turn (ROT) in order to plan any avoiding action in a potential collision situation.

The Trial Manoeuvre function is applied to both Tracked Targets and AIS targets and shows predicted positions of tracked, reported targets and ownship.

Ownship's intended speed, course and a 'delay time' are entered. Assuming that all tracked and reported targets maintain their present speeds and courses, the targets' and ownship's future movements are simulated.

Better trial manoeuvring information is obtained when relative motion & sea stabilisation is selected.

NOTICE RELATIVE VECTORS When trial manoeuvre is enabled, vectors are set to relative and a red 'T' is displayed at the bottom of the display. When selected in Simulation mode 'ST' is displayed. With the cursor over the Trial Manoeuvre button, the following cursor option is available. Enable trail manoeuvre (left click): Enables trail manoeuvre and opens the trail manoeuvre menu.

No function (middle & right click): The Middle & right buttons have no function.



NOTICE

As the trial Manoeuvre parameters are configured, the vectors change to show the relative change of direction caused by the Manoeuvre. Vectors will turn red if a collision course is detected.

When trial manoeuvre is enabled, vectors are set to relative.



Trial manoeuvre OFF



Trial manoeuvre ON

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COURSE ADJUSTMENT

With the cursor placed over the **Course** - (Decrease) or **Course** + (Increase) buttons, the following cursor options are available:

Left click: Decrease / Increase 1°

Middle click: Decrease / Increase 5°

Right click: Decrease / Increase 10°

The Course value can also be adjusted and fine-tuned by adjusting the bearing value (degrees) using the trackerball.

The Trial Course is shown in the Trial Manoeuvre dialogue box and the effect of the proposed change in course is shown on screen as a new vector.

PLANNED ROT ADJUSTMENT

A default ROT value is set on installation and is automatically selected. Other rates of turn can be selected using the drop down list.

The button name will change to reflect the selected ROT.

SPEED ADJUSTMENT

With the cursor placed over the **Speed -** (Slow Down) or **Speed +** (Speed up) buttons, the following cursor options are available:

Left click: Decrease / Increase 1 knot

Middle click: Decrease / Increase 5 knots

Right click: Decrease / Increase 10 knots

The speed value can be fine-tuned by adjusting the speed value (knots) using the trackerball.

The Trial speed is shown in the Trial Manoeuvre dialogue box and the effect of the proposed change in speed is shown on screen.

ACCELERATION & DECELERATION ADJUSTMENT

A default Acc/Dec (acceleration/ deceleration) value is set on installation and is automatically selected. Other rates can be selected using the drop down list.

The button name will change to reflect the selected value.

DELAY ADJUSTMENT

The delay represents the time lag from the present time to the time when ownship will start to change speed and/or course.

Manoeuvring characteristics such as rudder, turning and acceleration delay must be considered when using trial manoeuvre, this is particularly important on large vessels.

When a trial is activated, the delay time defaults to 0 (zero) minutes.











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DELAY ADJUSTMENT

The delay represents the time lag from the present time to the time when ownship will start to change speed and/or course.

Manoeuvring characteristics such as rudder, turning and acceleration delay must be considered when using trial manoeuvre, this is particularly important on large vessels.

When a trial is activated, the delay time defaults to 0 (zero) minutes.

With the cursor placed over the **Delay -** (Decrease) or **Delay +** (increase) buttons, the following cursor options are available:

Left click: Decrease / Increase 1 minute

Middle click: Decrease / Increase 5 minutes

Right click: Decrease / Increase 10 minutes

The delay value can be fine-tuned by adjusting the delay value (between 1 and 30 minutes) using the trackerball.

START COUNTDOWN

Once configured, the trail manoeuvre can be started.

With the cursor over the **Start Countdown** button, the following cursor options are available:

Start countdown (left click):	Commences the trial manoeuvre countdown
No function (middle Click):	The middle button has no function.
Reset timer (right click):	Reset the countdown timer to 0 (zero) minutes.



CAUTION

CPA/ TCPA & Vectors

If CPA / TCPA limits are set to zero, trial manoeuvre vectors are not shown.



6.60 UTC Time

With the cursor placed over the **UTC time** button, the following options are available:

UTC (left click):	Selects time to be shown in UTC
Local (middle Click):	Selects time to be shown in local time
Set Local (right click):	Opens a dialogue for setting the local time offset

UTC BUTTON WITH ASTERIX *

If UTC time is NOT from an IEC 61162 ZDA time source an asterisk appears in the UTC button.



UTC*

GPS1

AIS data is inaccurate if UTC time is not available and AIS symbols will be shown with broken lines.

SET UTC LOCAL TIME

When Set Local is selected, the Set Offset for Local Time panel opens where a time source and UTC offset can be selected and configured.



Current Time Source: A selectable list of active and available sources of time. The button shows the current time source selected.

Internal clock uses the time set during commissioning in the panel PC display operating system.

Local offset: When selected a list of UTC offsets between -12 to +13 hours is shown and the required offset can be selected.

Cancel: Exits Select active devices, no changes are saved.

OK: Exits Select active devices and accepts all changes.

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6.61 Video settings

In all navigation modes Video Settings is located in the lower right hand side of the display. The Video Settings button allows you to change the colour palette, intensity and backlight levels for specific layers.

With the cursor placed over the Video Settings button, the following cursor option is available:

Adjust Video Settings (left click): Opens the Video Settings menu.

No function (middle & right click):

The middle & right buttons have no function.

ADJUSTING VIDEO LEVELS

In video settings, with the cursor placed on any of the video settings sliders the following option is available:

Adjust Data Levels (left click):

Adjusts the video level for the selected slider.

No function (middle & right click):

The Middle & right buttons have no function.





Video Settings Display Mode

djust Video Settings

Video Settings menu

Left clicking and holding on the slider, use the tracker ball to set the desired video level; each slider setting is detailed below

Data	Data outside the radar/ chart operational area.		
Graphics	Graphics within the radar/ chart operational area such as <i>heading line, ship's outline, stern line, range rings etc.</i>		
	Brightness of Charts and the User Maps		
	WARNING		
Chart/ Map	ECDIS CHART/ MAP ADJUSTMENT To maintain the required chart colour and luminance settings, the chart/ map video settings MUST NOT be adjusted when ECDIS is set to display S52 palette. In S52 palette, Char/Map MUST BE left at the maximum setting (slider fully to the right).		
Nav Tools	Navigation tools such as VRMs, EBLs and PI lines.		
Targets	All graphics associated with tracked and AIS targets.		
Radar	Colour and brightness for radar data. Please refer to the following page for full operation description.		
Trails	Colour and brightness for target trails. Please refer to the following page for full operation description.		
Fixed Tgt Colour	Colour for Fixed Targets in ETD mode/ Enhanced correlator. Please refer to the following page for full operation description.		
Moving Tgt Colour	Colour for the Moving Targets in ETD mode/ Enhanced correlator. Please refer to the following page for full operation description.		

6.61.1 Changing colours in video settings

The colours of radar returns, radar trails, fixed target and moving target (ETD and enhanced correlator modes) can be changed from the default colours to yellow, green, red, orange, light blue or white.

Some adjustments are available for Radar 1 and Radar 2 as defined below:



EXAMPLE

The following example shows changing the colour of the radar returns. The adjustment procedure is common to radar, trails fixed Tgt and moving Tgt colours.

Top slider adjusts Brilliance of Radar PPI 1



Place the cursor over Radar ► in Video Settings and the available colours will be presented.

With the cursor placed over one of the colours, a colour description is shown and the following cursor options become available:

Adjust Radar 1 (left click):

Change the colour of the main PPI.

No function (middle Click):

The middle button has no function.

Adjust Radar 2 (right click): Change the colour of the 2nd PPI.

Placing the cursor on the top or bottom sliders allows users to independent change the colours for radar 1 or Radar 2.

Example of colours changed:

Top slider: Display 1 set to orange (Radar Colour 4) Radar

Bottom slider: Display 2 set as white (Radar Colour 6)



Video Settings Menu

Radar 🕠			 (
Trails 🕠			()
Fixed Tgt C	Radar Cir 4	e as Idar	PPI 1 PPI 2
Moving Tgt (∋ as idar	PPI 1 PPI 2

Radar colour options

6.61.2 Fixed and Moving Targets the 'Same as Radar'

When Enhanced Correlator or ETD mode is selected, the colour of moving and fixed targets can be linked to the main radar screen colours. When linked, changing the colour of the radar also changes the linked colours for ETD or Enhanced correlation modes.



When ticked, the Fixed Tgt Colour is linked to the colour of the Main display (PPI 1)

When ticked, the **Fixed Tgt Colour** is linked to **2**nd **display in the PPI tab** (PPI 2) of dual display mode

When ticked, the *Moving Tgt Colour* is linked to the colour of the **Main display** (PPI 1)

When ticked, the *Moving Tgt Colour* is linked to 2nd display in the PPI tab (PPI 2) of dual display mode

When deselected (Not ticked), the colours for Fixed and Moving targets can be independently configured.

WARNING LINKED COLOURS

If Fixed Tgt colours and Moving Tgt colours are BOTH linked to the radar colour, it is difficult to determine moving targets from fixed targets when ETD mode or the Enhanced correlator is enabled.

6.61.3 AIS target colours

The colour of AIS and Tracked Target indicator/ vectors can be changed in Video Settings from the default S52 colours (**Blue**) to KH colours (**Green**).

Targets that violate user defined CPA/TCPA or Guardzone will generate a collision alert and change colour to **Red** for S52 and **Bright Red** for KH colours.

To change the colours, place the cursor over the 'Targets' text in Video Settings and the following cursor options become available.

S52 colours (left click):	AIS targets and vectors are displayed in S52 COLOURS.	Daylight
No function (middle Click):	The middle button has no function.	
KH colours (right click):	AIS targets and vectors are displayed in KH	l Colours (Green).

Video S	Settings 🛛 🔀
Data 🗖	
Graphics	Ĵ
Chart/Map	Ĵ
Nav Tools 💻	Ĵ
Targets	
Radar 🔸 📻	ĵ
Trails 🔸 💼	<u> </u>
Fixed Tgt Colou	r ▶ Same as PPI1 Radar PPI2
Moving Tgt Color	Ur Same as PPI1 Radar PPI2
	Daylight

6.61.4 Display Brilliance (Daylight / Dusk / Night)

Daylight/ Dusk/ Night button in Video settings

The Daylight/ Dusk/ Night button can be accessed from the Video Settings button and/ or the standby screen. This controls the pre-set level of backlight brilliance for each mode:

Video Settings Display Mode
Adjust Video Settings
Open Video Settings
Video Settings
Data 🧊
Graphics
Chart/Map
Nav Tools
Targets
Radar 🔸 📫
Trails •
Fixed Tgt Colour
Moving Tgt Colour Same as Radar PP11 PP12
Daylight

Daylight/ Dusk/ Night button

Daylight/ Dusk/ Night button from standby



Daylight/ Dusk/ Night button

With the cursor placed over the **Daylight/ Dusk/ Night** button, the following pre-defined screen brilliance levels are available.

Daylight (left click):	Switches to Daylight viewing.
	In Chart Radar modes, a 2 nd press of the button toggles between Day
	Bright and Day Night. Note 1
Dusk (middle Click):	Switches to dusk viewing
Night (right click):	Switches to night viewing

The button name will change to show the display level selected.

NETWORK/ INS systems

When the brilliance level is changed in a networked/ INS system, the screen brilliance will change on all Multi-Function Displays connected to the HENSOLDT UK network. Note 2 & 3

DAYLIGHT BRILLIANCE WARNING

BACKLIGHT/ DAYLIGHT

Switching from Night to Daylight instantly changes the backlight brilliance to maximum. This will affect the operator's night vision due to the relative brightness of the daylight colour scheme during night-time conditions.

Note 1: CHART RADAR/ ECDIS: The networked brilliance control also switches Chart Radar/ ECDIS screens between Day Bright and Day Night. If a Multi-Function Display is switched OFF when the networked screen brilliance is changed, its status can become inverted when the system is switched back on i.e. the network/ INS is set to night but the ECDIS is set to Day Bright.

- **Note 2:** Networked screen brilliance control requires configuration during commissioning of the system. Individual screens can be configured during setting to work to disable this function. This is not a user configurable activity.
- Note 3: The MFD must be configured as the INS resource Master in Network Settings (see 6.31.5)

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6.61.5 Backlight brilliance

The display backlight brilliance can be adjusted using the buttons located on the lower right hand side of the display.



The buttons are touch sensitive.



INCREASE BRILLIANCE Pressing the + button increases the screen brilliance.

REDUCE BRILLIANCE

Pressing the – button reduces the screen brilliance.

RESET BACKLIGHT BRILLIANCE

The screen backlight can be reset to the default settings by press the Ctrl (Control) and F1 keys at the same time. The brilliance will reset immediately.



DAYLIGHT / DUSK / NIGHT Changing the screen brilliance does not change the Daylight/ Dusk/ Dark modes, or day bright/ day night video settings.

WARNING BACKLIGHT BRILLIANCE

Exercise caution at night when changing or resetting the screen brilliance. Increasing the backlight to maximum will affect the operator's night vision due to the relative brightness of the daylight colour scheme during night-time conditions.

See Section 4.2.2 for information regarding MDC-A22-1 and MDC-A26-1 brilliance adjustment.

6.61.6 Keyboard backlight

Where an optional keyboard is fitted, the keyboard backlight can be independently adjusted.

The brilliance can be varied from OFF to Maximum in 7 steps (each button press increases the brilliance and then returns to OFF).

The controls are located to the right of the Page Up (Pg Up) and Page Down (Pg Dn) buttons:





Press to increase keyboard backlight brilliance.

Press to decrease keyboard backlight brilliance.

NOTICE The brilliance of the keyboard is not linked to the screen backlight brilliance.

6.62 Variable Range Markers (VRM)

The Variable Range Marker (VRM) controls are located on the lower right hand side of the display. Two VRMs can be independently controlled and are identified by their colour.

VRM 1 is Orange VRM 2 is Green

With the cursor placed over the **VRM** button, the following cursor options are available.

VRM 1 ON/ OFF (left click): Switches VRM 1 ON/ OFF.

No function (middle Click): The middle button has no function.

VRM 2 ON/ OFF (right click): Switches VRM 2 ON/ OFF.

The indication to the left and right of the VRM button indicates the status each variable range marker. The status is either **OFF** or showing the **radius of the VRM**.

VRM values are retained until returning to standby

NAUTICAL MILES to Km

The range of the VRM can be changed from **Nautical miles** to **Km** (metric) or **CPA**. See cursor configuration for details.

ADJUSTING THE VRM

When the cursor is placed over a variable range marker, the line becomes bold.

The VRM can be adjusted in range or centred on the current cursor position by pressing and holding the relevant button and dragging the VRM to the required position.

With the cursor placed over a VRM, the following options are available.

Adjust value (left click):	Press to select and adjust the VRM below the cursor.
No function (middle click):	The middle button has no function.
Set origin (right click):	Places the centre of the VRM at the current cursor position.

When Adjust Value (left clic	ck) has been selected, the following cursor options become available:
Set Value (left click):	Fixes the new range of the selected VRM.
Cancel (middle click):	Returns the VRM to its previous value.
No function (middle click):	The right button has no function.

When Set Origin (right cl	ick) has been selected, the following cursor options become available
No function (left click):	The left button has no function.
Cancel (middle click):	Returns the VRM to its previous value.
Set Origin (right click):	Fixes the position for the selected VRM.

MANUAL ADJUSTMENT

The VRM range can also be adjusted by left clicking and holding the cursor over the range value and rolling the trackerball to set the desired value.

100			Ē
		le la compañía de la compañía	¹²⁰ Maps
		/	PI Line
		2° 130	Cursor
	E.	RNG	
5	140	BRG	° (T)
1		LAT	[°] ,' N
150		LON	*E
160	OFF	VRM	OFF
M	OFF	EBL	OFF

ſ	OFF	VRM	1.50 NM
	OFF	EBL	OFF
VRM1 OFF		VRM 2 set at 1 50 NM	



6.63 Vectors

Vectors are available for Tracked Targets and activated AIS targets.

- Vectors assume a constant target velocity (course and speed) and in the case of relative vectors, assume that ownship maintains its current velocity.
- True (T) and Relative (R) target vectors can be selected.
- Vector properties are common to Tracked Targets and AIS targets.





Vector control in Navigation & Conning Display Select the **Docking** tab

Vector control in Single and Dual radar display

TRUE / RELATIVE VECTORS

With the cursor over the Vector Length text (NOT the adjustment slider), the following cursor options are available. Left clicking on Vector True / Relative toggles all vectors between true or relative display

Vector true/ relative (left click):	Switch between true (T) and relative (R) vectors.
Vessel prediction (middle Click):	Switches the vessel prediction dialogue ON/ OFF.
Tick marks ON/ OFF (right click):	Switches time marks on the vector ON/ OFF.

ADJUSTING VECTOR LENGTH

The vector length can be adjusted by dragging the Vector length slider to the desired value.

Vector length 6 min (T)

With the cursor placed over the vector slider, the following cursor option is available:

Adjust Vector Length (left click):

Adjusts the length of the vector.

No function (middle & right Click):

The Middle & right buttons have no function.

Left click and hold on the slider and drag the vector length to the desired value.

The vector length between Zero and 120 minutes can be selected in the following intervals:



TARGET DATA

True or relative target data information for the course and speed of a selected target does not change with the selected vector type. See section 6.53 for additional details.

VECTOR TIME MARKS

When Time marks are switched ON, markers are placed along the vector at 1 minute intervals. With the cursor over the Vector Length text (NOT the adjustment slider), the following options are available.

Vector true/ relative (left click): Switch between true (T) and relative (R) vectors.

Vessel prediction (middle Click): Switches t

Switches the vessel prediction dialogue ON/ OFF.

Tick marks ON/ OFF (right click): Allows the configuration of tick (time) marks.



Vector time marks OFF



Vector time marks ON

6.64 Vector chart types

IHO S-57	Electronic Navigational Chart (ENC) vector based charts.
IHO S-63	Encrypted ENCs as supplied by other hydrographic offices or chart suppliers.
С-Мар	Vector based charts <i>including</i> Professional, Professional+, C-Map ENC and C-Map Admiralty ENC Service (CAES).

IHO DATA PRESENTATION & PERFORMANCE CHECK

The HENSOLDT UK ECDIS conforms to the IHO ENC/ECDIS data presentation and performance checks as defined by the IHO.

Instructions on running the IHO user data check are supplied by your chart provider and are not included in this handbook.

RASTER / ARCS NAVIGATION CHARTS

Raster, ARCS or BSB charts cannot be loaded or displayed on HENSOLDT UK multi-function displays running ZM-2300 software.

CHART LIMITATIONS

The maximum North and South latitudes at which the ECDIS is qualified for use is 85°

Where >85°N is displayed, Chart presentation North of 85°N should not be used. Refer to paper chart is displayed in bottom of the chart presentation area.

Where >85°S is displayed, Chart presentation South of 85°S should not be used. Refer to paper chart is displayed in bottom of the chart presentation area.

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6.65 **Vessel Predictor**

6.65.1 Predictor

Vessel predictor shows a curved vector and scaled outline of the vessel in its predicted course. Prediction calculations are based on the current position, rate of turn, motion over the ground as reported by the selected sensor, (e.g. GPS or log) and drift based on the currently selected heading and speed sensors.

With the cursor over the Vector Length text (NOT the adjustment slider), the following cursor options are available:

Vector true/ relative (left click):	Switch between true (T) and relative (R) vectors.
Vessel prediction (middle Click):	Switches the vessel prediction dialogue ON/ OFF.
Tick marks (right click):	Time (tick) mark intervals can be set.

VESSEL PREDICTOR ACCESS FROM OWNSHIP'S SETTINGS

The Predictor menus can also be accessed from Ownship Setting / Ownship tab (see section 6.34)

VESSEL PREDICTOR CONFIGURATION PREDICTOR LENGTH

The length of the Vessel Predictor is determined by the Vector Length.

PATH PREDICTOR

When enabled (ticked), places an orange vector on screen.

PREDICTOR VESSEL OUTLINES

When enabled (ticked) places outlines of the vessel on screen. The vessel outlines are shown at one-minute intervals. When this is ticked (selected), predictor outlines every 30 sec' becomes available for selection.

PREDICTOR OUTLINES EVERY 30 SEC

When enabled (ticked) a marker is placed on the predictor vector at 30 second intervals. This is only available when 'Predictor Vessel Outlines' has been selected (ticked).

STANDARD PREDICTOR COLOUR

SELECTED (TICKED) The predictor colour is White. NOT SELECTED (NOT TICKED)



The predictor colour is Orange.



Target Settings Trial		I Manoeuvre		
Vector Le	ngth	3	min	(R)
Vector True/Relative	Ves	sel	Tic	k Marks

V	ector Length	3 min (R)
-	Path Predictor	X
1	Predictor Vessel	Outlines
	Predictor Outlines	s Every 30 sec
~	Standard Predicto	or Colour

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VESSEL PREDICTOR SYMBOLS



CAUTION VESSEL OUTLINE

The scaled vessel outlines shown as part of the Vessel Predictor use the dimensions set during commissioning and is for reference use only.

6.65.2 Tick Marks

With the cursor over the Vector Length text (NOT THE ADJUSTMENT SLIDER), the following cursor options are available:

Tick marks (right click):	Time (tick) mark intervals can be
Vessel prediction (middle Click):	Switches the vessel prediction dialogue ON/ OFF.
Vector true/ relative (left click):	Switch between true (T) and relative (R) vectors.



TICK/ TIME MARKS

When Tick/ 'Time Marks' has been enabled, timed markers are placed on the Past Tracks line.

Times of Off, Auto, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 and 120 minutes can be selected.

When Auto is selected, the system automatically set a time-period suitable for the range or chart scale in use.

PAST TRACK CONFIGURATION

Please refer to section 6.34.2 for details on Past Tracks.

CLOSE TICK MARKS MENU

Press X to close the Tick Marks menu and return to the Vector Length adjustment.

TICK MARK SELECTION IN OWNSHIP'S SETTINGS

Tick Marks can also be configured in the Ownship's Settings / Past Tracks tab. See section 6.34 for details.



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6.66 Visual indication of operation

To assure the user that the display system is operational and has not frozen there is a visual indication of operation in the top right corner of display consisting of five vertically alternating dots.



A static dot is an indication that the display's processor has frozen in which case an orderly reset of the display should be considered.

6.67 Wind Information and display

Where connected and configured during commissioning, the Wind direction and speed in True or Relative can be viewed in all enabled display modes.





Dual Radar Display Select the Docking tab (shown above) or the HAP tab (not shown).

Single Radar Display Select the Wind tab located in the lower left hand side of the display

TRUE OR RELATIVE WIND INFORMATION

Where available, within the wind information display, place the cursor over the True or Relative button, and the following cursor options become available:

True wind (left click):	Sets the display to show true wind. Wind direction is displayed relative to North.
No function (middle Click):	The middle button has no function.
Relative wind (right click):	Sets the display to show relative wind. The wind direction is displayed relative to ships heading.





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7. Chart Maintenance App

Chart maintenance allows the management of chart data, licenses and updates. The various functions are accessed by selecting the **Chart Maintenance** app from the standby screen.

If the Chart maintenance section is '**greyed-out**' or cannot be accessed there may be a problem with the eToken *or* chart maintenance has not been enabled in optional features.

See the index entry for eToken software or optional features for additional details.



- Section 7.1:Chart Maintenance: Overview.An overview of the 'tabs' found along the top of the chart maintenance screen.
- Section 7.2: Common functions within chart maintenance. Details the functions and controls that are common to each tab within chart maintenance.
- Section 7.3: Charts... How do I...? Step by step instructions for common activities within chart maintenance such as loading permits and charts.



7.1 Chart Maintenance: Overview

Chart maintenance allows the installation, updating and general management of chart data and permits.

The system is capable of displaying the following charts:

IHO/ IC-ENC S-57:	Electronic Navigational Chart (ENC) vector based charts.
IHO/ IC-ENC S-63:	Encrypted ENCs as supplied by Primar Stavanger, UK Admiralty ENC service and other hydrographic offices.
С-Мар:	vector based charts including Professional, Professional+ and C-Map ENC.

NOTICE ARCS/ RASTER CHARTS

There are no facilities for installing or displaying ARCS/ Raster Navigation (RNS) charts

When opened, the Chart maintenance section comprises of 6 tabs as follows:

Kelvin Hughes Chart Maintenance

Chart View	Data View	Install Log	Chart License	View Updates	Colour Calibration

Chart View	View, install and update chart data.Charts to be used on a loaded route can be viewed and checked.
Data View	 View details of installed charts View chart details on external media. The data on external media can be selected for installation and installed data selected for deletion.
Install Log	Shows the progress of chart installations or updates.
Chart Licenses	Installation and management of chart licenses.
View updates	Installed updates can be viewed and manual updates applied.
Colour Calibration	This tab is used to view the various colour palettes used in chart radar modes

7.1.1 Chart view tab



The **Chart View** tab is used to view chart data that is already installed or is available for installation on removable media such as CD, DVD or USB flash memory.

The installed chart databases are shown in the top left hand side of the screen (Installed).

A database **must be selected** for the chart data to be viewed.

NOTICE SELECT A CHART DATABASE

If no chart database is selected no chart information or cell boundaries will be seen on the display.

The Data shown in the chart view tab is also dependent on the filter settings selected on the right hand side of the screen (**Filters**).

CELL BOUNDARY COLOURS

In chart view, cell boundaries are displayed in different colours that represent the following:



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7.1.2 Data view tab



Data View shows data that is available to be installed from external media (**Media column**) and data that is already installed (**Installed column**).

The permit status of individual cells can be viewed and cells can be selected, installed and uninstalled.

NOTICE SELECT A CHART DATABASE

If no chart database is selected, no chart information will be seen on the display

Information shown in the **Data View** tab is dependent on the filter settings selected on the right hand side of the screen (**Filters**).

Each cell edition/ update number and date can be viewed by using the +/ - buttons next to each cell.

SWITCH FROM DATA VIEW TO CHART VIEW

Clicking on any cell number automatically switches the view to the **Chart View** tab where the selected cell is shown.





Display switches to Chart view

DATA VIEW TAB: MEDIA COLUMN

The following example shows a group of cells that are available on external media (CD/ DVD/ USB etc.).

Media 🔲 Available 🏾 👹 Invalid Update 🔅 No Permit	
GB40284B Edition No: 24 (28/04/2011) Update No: 1 (21/06/2011) Updates Updates Updates Update Number : 001 Issue date: (21/06/2011) ⊡ ✓ GB40286B ぜ- ✓ GB501834	 THIS CELL IS AVAILABLE FOR INSTALLATION The cell is on a dark blue background indicating the permit is valid. The cell is expanded showing: Edition number/ issue date Update number with its issue date (the
. GB502572	edition and update details are only shown
E - ✓ GB50284D	where base data is installed).
E⊤ ✓ GB50284E - Edition No: 13 (03/12/2010) - Update No: 1 (18/03/2011) E⊤- Updates	
Update Number : 001	THIS CELL CANNOT BE INSTALLED
E- ≝ GB50284F	An expanded cell highlighted in light blue
⊞– ≝ GB50284G	indicating that there is no permit.
⊡- ✓ GB50284H	
⊡	
GB602572	Select ALL
E⊢ < GB603683	Selects all cells on the external media.
	Select Updates Selects cells on the media that have updates. New base cells are NOT installed using this function.
	Deselect ALL
Select ALL Select Updates De-select ALL	Deselects all cells.
Export Chart List	Export Chart List
	This function is currently not enabled

INVALID UPDATE(S)

If a cell is highlight in dark red then the update is invalid.

Invalid Updates are those charts that are installed, but the update cannot be installed either because the software version is not supported, or a previous update was not correctly installed.

NOTICE SELECT CHART IN DATA & CHART VIEW

If a cell is selected/ de-selected in the Data View tab it is also automatically selected/ de-selected in the Chart View tab.

DATA VIEW TAB: INSTALLED COLUMN

The following example shows a group of installed cells selected.

Installed Valid Permit Expired Permit GB501834.C00 GB50284J.C00 GB50284J.C00 Edition No: 19 (27/04/2011) Update No: 2 (19/07/2011) Updates Updates Updates Update Number : 001 Issue date: (02/06/2011) GB50284K.C00 GB50284K.C00 GB50284K.C00 GB50284M.C00 GB50284M.C00 GB602572.C00 GB603683.C00	 VALID PERMIT Where a permit for a cell is valid, the cell will be highlighted in Blue. EXPIRED PERMITS Where a permit for a cell has expired, the cell will be highlighted in Dark Red. INSTALLED CELL The cell is on a dark blue background indicating the permit is currently valid. The cell is expanded showing: Edition number/ issue date. Update number with its issue date (the edition and update details are only shown where base data is installed).
	Select All Installed Selects all installed cells.
	Deselect ALL Deselects all cells.
Uninstall Selected	Uninstall selected Removes all selected cells from the system.

7.1.3 Install Log



The **Install Log** tab shows the progress and results of a chart installation or update.

During installation, a progress bar is shown and the current installation is shown in the status field.

On completion of an installation the status box at the bottom of the page will show **Database Installation Complete**.

A list of the data installed and a results field is shown which can be expanded/ contracted using the +/ - button.

CHART HINK	COLOR COLOR	Finder cog	Citati Citati an	THEN OPARTIES	Colour Cartan
08501854.00	0				
GB50284H.00	0				
GB502642.00	0				
GBS0284K.00	0.				
GB50284L.00	0				
GBS0264M O SSE 26 - This Date	99 i ENC is not authenticated	l by the IHO acting as	the Scheme Administration		
GB602572.00	0				
GB603663.00 SSE 26 - The	0 : ENC is not authenticated #	by the IHO adding as	the Scherre Administra		
PEISLUTS GB91834 U GB9284H GB9284H GB9284K GB9284K GB9284K GB9284K GB9284K GB9284K GB9284K	NARNING MARNING MARNING AMRINIG AMRING CR IX MARNING				
tatus		(ENC) detabas	e installation complete		Open Log File

INSTALLATION ERRORS

When an installation is complete, any errors that occurred during the installation are shown.

If no errors occur, the S63 Decryption Results box is not shown.

OPEN LOG FILE

The **Open Log File** button opens a **Chart Installation Log File** which is a log of all chart maintenance activities such as installations, updates and deletions.

DELETE LOG FILE

This function deletes all log files. When **Delete Log File** is selected, a warning is presented that states **Are You Sure You Wish to Delete Chart Log?** All Log Data Will Be Lost.

Press **OK** to permanently delete all log file data. Press **Cancel** to abort the task.





7.1.4 Chart License tab

The **Chart License** tab allows the installation and management of chart permits. The installation of permits is fully detailed in section 6.3; **'how do l...**'

Kelvin Hughes Chart Maintenance								
Installed	Chart View	Data View	Install Log	Chart License	View Updates	Colour Calibration		
Enc E- C-Map ENC E- Jeppesen Primar	Auto Install Per	mits From Removal	ble Media				Fi Display Sele Display non-	lters cted selected
0- C-Map Professional+		Select Add Manual Licer	ise	A Icons\ Map Edit S Alarm Cont BackupAla BackupAla BackupAla	Add License from mbols\ g Dialog.khd coder5etlingsDialog.khd Config.khd	ı File	Chart Install New Chart I New Chart I New Chart I Background Overview U General Use	ed Vith Permit Vithout Permit Usage sage Ige
Uninstall Check Chart Update Status Media Select	License String: Current License:	[BackupCha	rData.khd C:\Mantadigital\GU	I Files\	Coastal Usa Approach U Harbour Usa Berthing Usa	ige sage age
	ENC Licenses eToken: Kelv R	in Hughes Unit ID: (e-Initialīse eToken	GeT10030	User Permit: 0 View/I	4FAB8483FD81619 Delete installed ENC	9D3D7AC3133 Permits	Route : Select Ch Reset	Not Loaded arts On Route Selected
Browse Install ChartCo	Install Certifi Install Public View Installe	icate From Remova Key From Remova ed Certificate and P	ble Media ble Media ublic Key				Scale 1:6,537,14	Chart Settings

7.1.5 View updates tab

The View Updates tab is used for:

MANUALLY UPDATING CHART DATA

- Information can be manually inserted onto chart data.
- Existing chart features can be edited.

REVIEWING OFFICIAL UPDATES

• Information on official updates applied to chart data can be viewed.

The updating and reviewing charts is detailed in Section 7.3; 'how do I...'



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7.1.6 Colour Calibration tab

The **Colour Calibration** tab is provided to enable the operator to check the performance of the display with regard to colours and contrast. In addition it may be used by the operator to ensure that they can differentiate between colours.

It should be noted that the identification of greyscale shades and display colours will vary according to the operator, so should not be considered as a quantitative test.

The Colour calibration is not used during normal operation system but can be used as a visual 'quick check' that all greyscale shades and colours are being correctly displayed.

When the Single Colour palette has been selected, each colour can be selected and viewed by left clicking any of the lines of text. Selecting *List all S52 colours* expands the list to show all colours used in S52 charts.



Black adjust selected



Colour Differentiation selected



Grey scale selected



Single colour selected

Full Window (left click): No function (middle & Right Click): **Switches the view mode to full screen.** The middle & Right buttons have no function

maintenance/ colour collaboration tab.

The cursor options then change to show the following:

Normal Window (left click): Full border Width (middle Click): Full No border (right click): Switches between normal view and Full with border view. Switches to full screen with border. Switches to full screen without border. Pressing the left button (Normal Window) returns the display to the chart







Normal view Full screen with border Full screen without border The above shows examples with the Grey scale colour test mode selected

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7.2 Common functions within chart maintenance



The following details functions that are common to all tabs within chart maintenance.

7.2.1 Installed

The **Installed** column (top left hand side of screen) shows a list of chart databases that are currently installed on the system. A chart database is a collection of cells from a data provider; for example UKHO, AVCS or other chart provider.

NOTICE NO CHARTS DISPLAYED?

When Chart Maintenance is opened, no database are selected so cell boundaries do not appear in the chart view tab. Select a database to view the chart data.



Example: The C-Map professional+ database is ticked and expanded to show the issue number. Installed C-Map cell boundaries are show in the **Chart View** tab.

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UNINSTALL BUTTON

Uninstall is used to remove/ uninstall the complete contents of a selected database. This can be used when a new source of charts data is to be loaded.

Select the database to be permanently deleted.

Press Uninstall.

The system will prompt with a warning asking if you wish to permanently delete the selected database.

Yes: Permanently deletes the selected database.

No: Cancels the action.



UNINSTALL DELETES THE SELECTED DATABASE The Uninstall function permanently deletes <u>ALL</u> data from the selected database. ONCE STARTED, THIS FUNCTION CANNOT BE STOPPED.

WARNING

CHECK CHART UPDATE STATUS BUTTON

The **Check Chart Update Status** button is used to view the current update status of all charts that are installed on the system.

The system checks installed data against a file called '**xxxProducts**' where xxx is the chart supplier (see examples on following page).

When you browse chart media, the 'xxx products' file is automatically loaded onto the system. If an out of date products file is loaded, the system will prompt for the latest CD to be loaded.

The system will check the status of all loaded chart permits and present a list that details when the report was run and the status of all charts.

The data server for the various charts loaded can be selected and each individual chart status viewed.

The file can be exported to a virus free USB memory device by selecting **Export Report**.

When inserted, the USB memory devices will be shown as:

- C:\ Operating System (do not use).
- D:\ Main program (do not use).
- E:\ User data (do not use).
- F:\ Internal memory device.

G:\ External USB memory device.

Vessel nar Identifier: ENC upda Date of rep Content:	ne: te referend port:	ce date:	MV Shipname MMSI ???? 14 Jan 2016 : 06 Apr 2016 Full	WK02-16	
Chart Stat	tus Sumn	nary			
Chart Stat	tus		Count		
Lin to date:		311			
Not up to o	date:		295/311		
Withdrawn			0/311		
Unknown:			6/311		
	Data Serv	/er:	6N	6N	cport Report
Cell Name	Edition	Update	Issue Date	StatUnknown	
FR301030	004	013	03 Dec 2015	Not up to date	
FR301040	004	019	09 Jul 2015	Not up to date	
FR366800	003	000	15 Jun 2015	Not up to date	
FR368240	002	005	10 Nov 2015	Not up to date	
FR368570	002	029	10 Nov 2015	Not up to date	
FR369300	003	003	05 Oct 2015	Not up to date	
FR369400	003	000	04 Jun 2015	Not up to date	
FR369410	003	000	20 May 2015	Not up to date	
FR369660	002	034	29 Apr 2015	Not up to date	
FR471200	002	002	24 Nov 2015	Not up to date	
FR471470	002	000	13 Nov 2015	Not up to date	
FR471480	001	000	16 Nov 2015	Not up to date	
FR471490	002	000	16 Nov 2015	Not up to date	
FR471500	001	000	23 Nov 2015	Not up to date	
the second second second					

The report is exported as a .pdf document and contains details on all charts that are loaded, i.e. you do not need to select the Data Server for each export.

NOTICE DATA LOADING TIME

Depending on the volume of charts loaded, it can take several minutes to generate the report. This function should only be used when the system is not required for safe navigation.

7.2.2 Media

Media: This section is used to browse, install and update chart data from removable media such as CD, DVD or USB flash memory.





Insert the CD, DVD or USB flash drive into the system and press **Browse**; the system will search for chart data.

Once the system has detected the source of data, pressing **Select** produces a list of the data that is available on the removable media. The Select button will change to show the name of the selected data.



Example of an AVCS Base CD

When the required data is selected, the following options are available when select is pressed:

In the following list, 'xxx' is the chart supplier e.g. Primar, AVCS etc.

xxx ENC: Shows the contents/ cell boundaries available on the inserted media.

xxx **Products:** Shows the global coverage/ cell boundaries and any updates that are available.

The region covered by the media can be installed however, if you attempt to install data for a region not covered, the system will request the appropriate CD/ media.

- Clear Selection: Clears the cell boundaries/ media contents from the chart view and data view tabs.
- **ChartCo:** The ChartCo button changes to Magenta when updates are available via the optional ChartCo system.

7.2.3 Chart control (zoom, reposition & select cells)



With the cursor placed over **Scale**, the chart scale can be adjusted as follows:

Select Scale (left click):	SELECT SCALE
	Opens a drop down list where Best Scale, Set scale, Full route and scales between 1:1,000 to 1:95,000,000 can be selected (see
	Set Scale in the contents page).
Zoom IN (middle Click):	ZOOM IN TO A LARGER SCALE.
	Repeated button presses continue to zoom IN by a factor of two
	limited to a minimum scale of 1:1,000.
Zoom OUT (right click):	ZOOM OUT TO A SMALLER SCALE.
	Repeated button presses continue to zoom OUT by a factor of
	two stopping at the world chart.

KEYBOARD SHORTCUTS

Where fitted, the optional keyboard '**Page up'** or '+' (increase scale) and '**Page down**' or '-' (decrease scale) buttons can also be used to zoom in and out of a chart.

7.2.4 Manual Zoom, selecting cells and reposition

MANUAL ZOOM

With the cursor placed over the chart presentation area, the following options are available:

Select (left click): Selects the chart cell(s) at the cursor position.

Deselect (middle Click): De-selects the chart cell(s) at the cursor position.

Reposition (right click): Centres the chart on the current cursor position.

To manually zoom into the chart, place the cursor in the desired position then press and hold the RIGHT button (reposition).

With the right button pressed, roll the trackerball and a magenta coloured box can be dragged over the required chart area. The cursor shows the GPS extent of the zoom area.

Release the button and the chart will zoom to the selected area.

During the Zoom, the cursor options change as follows:



Cancel zoom (left click):	Cancels the zoom.
No function (middle Click):	The middle button has no function.
End drag zoom (right click):	Centres the chart on the current cursor position.

SINGLE CELL BOUNDARY SELECTION

Place the cursor within the required cell and left click, the cell boundary becomes bold indicating that it has been selected.

When a cell boundary is selected, all boundaries that enclose that point will also be selected. For example; if you select a cell boundary for berthing, the other levels (overview, costal etc.) will also be selected.

To select an individual boundary, use the filters to select the layers that are not required.

SINGLE CELL BOUNDARY DE-SELECTION

Individual cells can be deselected by placing the cursor over the cell and pressing the middle (Deselect) button.

GROUP SELECTION AND DE-SELECTION OF CELL BOUNDARIES:

Cells can be individually selected using the left hand (select) and middle (Deselect) buttons:

NOTICE CHART AND DATA VIEW SELECTION

When a cell or group of cells selected in chart view they are also selected in the data view tab. This function only works when selecting cells from external media such as CD, DVD or USB flash drives.

GROUP SELECT

With the cursor placed in the chart area, press and hold the LEFT button and drag the cursor across the required cells. The cursor shows the latitude & longitude coordinates of the zoom area and an orange coloured box can be dragged over the required chart area.

All cells within the orange zoom will be selected; the selected Cells are shown in BOLD.



GROUP DESELECT

With the cursor placed in the chart area, press and hold the MIDDLE button and drag the cursor across the required cells. The cursor shows the latitude & longitude coordinates of the zoom area and an orange coloured box can be dragged over the required chart area.

All cells within the orange zoom will be deselected.

DESELECT ALL/ RESET SELECTED

All selected cell boundaries can be deselected using the **Reset Selected** button.

REPOSITION

Pressing the **Reposition** button centres the chart on the current cursor position.

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7.2.5 Filters

The level of cell boundaries that are viewed in the **Chart View** and **Data View** tabs can be set using Filters.

When a filter is selected/ de-selected, the view is changed in both Chart and Data view tabs.









DISPLAY SELECTED

Display Selected

Display non-selected

Selected cell boundaries are shown with bold outlines.

Non-Selected cell boundaries are not shown.

DISPLAY NON-SELECTED			
	Display Selected		
	Display non-selected		
Non-Se	lected cell boundaries shown.	s are	

Selected cell boundaries are NOT shown.

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Background, overview, general, coastal and approach filters de-selected.

Background Usage
 Overview Usage
 General Usage

Coastal Usage

Approach Usage
Harbour Usage
Berthing Usage

The above filers can be selected or deselected as required.

The cell boundary colour depends on the permit.

If all display levels are de-selected, no cell boundaries will be displayed on screen.

does

7.2.6 Routes in Chart view tab

A route can be loaded in chart maintenance and the cells that the route passes through can be selected.

With the cursor over the Route button, the following options are available:

Select main route (left click):	Select the route.	
Show/ Hide route (middle Click):	Show or Hide the route. not deselect the route.	This

Deselect Route (right click): Deselect the loaded route.

SELECT CHARTS ON ROUTE

With a route loaded, pressing **Select Charts On Route** will select all chart data along the path of the route.

Select Route Chart (left click):	Cells along the route currently loaded are selected.
No function (middle Click)	The middle button has no function.
No function (right click):	The right button has no function.

Sele	ct Charts On	Route
	Reset Selecte	ed
Scale 1:95,	000,000 🔍 🔻	Chart Settings
Daylight		Stand-By
Daylight		Stand-By



Example of a charts being selected along a loaded route. The selected charts are shown in BOLD.

RESET SELECTED

Left clicking on Reset Selected clears all cell boundaries that have been selected.

7.2.7 Brilliance control/ chart settings / Standby

This section of the display controls the screen colour palette, chart settings Alert messages, screen capture and access to the standby screen.

Scale	With the cursor placed over Scale , the chart scale can be adjusted. See section 7.2.4 for additional details	Scale 1:95,000,000 Chart Settings Daylight Stand-By
Chart Settings	Configuration of the chart display.	
Daylight Dusk Night	Allows the selection of Daylight (Left Click) Dusk (Middle Click) Night. (Right Click) The button name changes to reflect the palette selected. See Warning below and Section 6.61.4 for details on network control of brilliance.	Scale 1:95,000,000 Chart Settings Daylight Standby Daylight Disk
Standby	Go To Standby (Left Click) Exits Chart maintenance and returns the system to the standby screen. Show Sync Status (Middle Click) Accesses the Network Settings. See Section 6.31.2. Capture Screen (Right Click) This button also allows a screen capture to be taken in PNG format. See Section 6.6.	Scale 1:95,000,000 Chart Settings Daylight Standby Go to Show Sync Capture Standby Status

DAYLIGHT BRILLIANCE WARNING

BACKLIGHT/ DAYLIGHT

Switching from Night to Daylight instantly changes the backlight brilliance to maximum. This will affect the operator's night vision due to the relative brightness of the daylight colour scheme during night-time conditions.

7.3 Charts How do I?				
7.3.1 Access network setting	S			
Network Settings can be opened i over the Display Mode button. The available: Go to Standby (Left click):	in all APPS by placing the cursor e following cursor options become Return to the standby screen	Video Setti	ngs Disp	olay Mode
Network Settings (middle click):	Opens Network Settings (where enabled).	Change Display Mode	Show Sync Status	Capture Screen
Capture Screen (right click):	Takes a PNG screen grab of the current screen display			

Refer to section 6.31 for details on the network and its application.

7.3.2 User permit & eToken number

Where can I find the user Permit or eToken number?

- 1. Open chart Maintenance and select the Chart licence tab.
- 2. The eToken and user permit numbers are displayed in the ENC Licenses section.



NOTICE

The eToken number can also be found in Optional Features.

7.3.3 Copy permits to USB

WARNING

All removable media must be scanned for viruses prior to use.

USB MEMORY DEVICE

It is strongly recommended that a dedicated USB memory device is used for the transfer of permits and that it is not used for any other purpose. The memory device should be free from all other files, programs and documents.

a) PERMITS RECEIVED BY EMAIL

Where permits are received by email they normally contain instructions on how to prepare them for use. Permits may be emailed in a compressed format such as WinZip or WinRAR. It is ESSENTIAL that permits are decompressed (unzipped) prior to loading onto a USB memory device or into the HENSOLDT UK Navigation Display.

NOTICE

Compressed components cannot be decompressed or loaded on the HENSOLDT UK multi-function display.

b) DECOMPRESS PERMITS AND SCAN FOR VIRUSES

Where supplied in a compressed format, the decompressed files and the USB memory device should be scanned for viruses prior to use.

c) COPY PERMITS TO REMOVABLE MEDIA

Copy the permit files without the original zip file into the root directory of the USB memory device or burn the files directly to a CD.

- Do not copy permits into sub folders.
- Ensure only the permit is loaded. Remove all old permits, other files, programs or documents.

Name	Туре
MASTER	File Folder
🔁 Digital_Charts_EULA.pdf	Adobe Acrobat Document
SCHEDULEA_FULL_710821.PDF	Adobe Acrobat Document

Example of a decompressed (unzipped) permit

Name	Date modified
MASTER	21/03/2017 14:30
📙 My holiday pictures	21/03/2017 14:30
📙 OLD permits	21/03/2017 14:30
🔁 Digital_Charts_EULA.pdf.pdf	21/03/2017 11:29
Lunch menu.docx	21/03/2017 14:05
SCHEDULEA_FULL710821.pdf	21/03/2017 11:28

Remove ALL unnecessary files, folders, programs, documents or archived copies of old permits.

EXAMPLE OF CHARTS PERMIT(S)

Chart permits are usually sent as Zip files. When extracted, the following files and folders will be found:

The following is an example and may not match the actual file names received. Please consult with your chart provider for full details.

BACKUP A backup copy of the permits

MASTER A folder containing the Primary permits.

RESERVE 1, 2, 3.... Permits for 2nd, 3rd, 4th... ECDIS/ Chart Radar systems.

AVCS_Certificate.pdf A copy of the end user licence agreement or chart certificate.



Schedule_Full.pdf. This is the details of the purchase order showing which area(s) are included in the permit(s).

MASTER & RESERVE FOLDERS

Where issued, the Master and Reserve folders each contain the permits for a specific ECDIS/ Chart Radar or Route Planning system.

When the permits were initially requested a document would have been issued that references the Master/ Reserve folders to the serial numbers of the ECDIS/ Chart Radar or Route Planning terminal.

If the permit is for a single standalone system, Reserve folders will not be present.

It is also possible to have one Master permit that can be used on all systems on the vessel.

NOTICE MULTIPLE ECDIS/ CHART RADAR SYSTEMS

For systems with multiple permits, operators must have a copy of the document that cross references the Reserve folder number to the serial numbers of the Chart radar.

During permit installation, the operator will need to know which Master/ Reserve folder is associated with the ECDIS/ Chart Radar or Route Planning terminal in use.

7.3.4 USB socket location

Virus-free USB memory devices can be plugged into the lockable USB socket located on or close to the keyboard.

See section 4.15 for details.

Prior to loading permits and/ or chart data, it is strongly recommended that users familiarise themselves with the chart maintenance procedures detailed in the Chart Maintenance section of this handbook.

7.3.5 Automatically load a permit

Automatic license installation will search all removable media (CD, DVD and USB memory devices) for ENC/ C-Map permits.

a) **PERMIT PREPARATION**

Prepare the permit as shown in the previous sections and remove any Chart base data (CD/ DVD etc.).

Insert the removable media containing the permit(s) into the processor.

b) AUTO INSTALLATION

Open Chart Maintenance and select Chart License tab. Press Auto Install Licenses from Removable Media.

NOTICE

All files found on the removable media that end in .txt or .usr will be shown in the dialogue box.

c) SINGLE PERMIT INSTALLATION

(Please refer to step d) for multiple permit installation).

In a standalone system or a networked group of systems that has a single grouped permit there will be a single master folder in the permit.

The system will detect the permit and automatically install it.

As there is only one folder, the permit is not displayed; it does not need to be selected and is automatically installed.

Proceed to step e) on the following page when the permit installation is complete.

Note: Depending on the system configuration, other USB port arrangements may be available.


d) MULTIPLE PERMIT INSTALLATION

In systems that have multiple processors with separate permits (i.e. permits are not grouped or the system is not networked), permits will be provided in separate folders named Master and Reserve.

The permits are supplied with a document that references the folders named Master and Reserve and references to the serial number of each processor.

When **Auto Install from Removable Media** is selected, a list of available permits will be displayed.

- ENC permits will show as: Permit.txt
- C-Map permits will show as: Password.usr

During installation, the operator will need to know which Master or Reserve folder contains the permit required for the processor in use.

When multiple permits are detected on the removable media, they are listed in **Chart License – available files.**

To install the permit, identify and select the required permit folder.

The selected permit will now be automatically installed.

e) INSTALLATION COMPLETE

When permit installation is complete, a dialogue box opens displaying a list of the permits installed. Press close to exit the permit results and return to the Chart license tab.

f) WRONG PERMIT?

If the wrong permit, Master folder or Reserve folder is selected, a list of errors is shown stating:

Cell number, SSE 13 - Cell is invalid (checksum is incorrect).

This means the permit is incorrect; no permits for the cell number(s) listed have been loaded.

NOTICE

Check you have the correct permit or that the Master/ Reserve folder selected is for the processor in use, i.e. make sure the Master or Reserve folder matches the serial number of the unit in which the permits are being loaded.

Chart License - Available files e tbackupigermit.bd e trasservegermit.bd e tresserveggermit.bd Cancel



AU130150, SSE 13 - Cell Permit is invalid (checksum is incl
AU160120, SSE 13 - Cell Permit is invalid (checksum is incl
AU160150, SSE 13 - Cell Permit is invalid (checksum is inco
AU334152, SSE 13 - Cell Permit is invalid (checksum is inco
AU334153, SSE 13 - Cell Permit is invalid (checksum is inco
AU336151, SSE 13 - Cell Permit is invalid (checksum is inco
AU337151, SSE 13 - Cell Permit is invalid (checksum is inco
AU339150, SSE 13 - Cell Permit is invalid (checksum is inco
AU340145, SSE 13 · Cell Permit is invalid (checksum is incr
AU340149, SSE 13 - Cell Permit is invalid (checksum is inco
AU341149, SSE 13 - Cell Permit is invalid (checksum is inco
AU342149, SSE 13 - Cell Permit is invalid (checksum is inco
AU345147, SSE 13 - Cell Permit is invalid (checksum is inco
AU434151, SSE 13 - Cell Permit is invalid (checksum is incl
AU435150, SSE 13 - Cell Permit is invalid (checksum is inco
AU435151, SSE 13 - Cell Permit is invalid (checksum is inco
AU436150, SSE 13 - Cell Permit is invalid (checksum is inco
AU437149, SSE 13 - Cell Permit is invalid (checksum is inco
AU437150, SSE 13 - Cell Permit is invalid (checksum is inco
AU438144, SSE 13 - Cell Permit is invalid (checksum is inco

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7.3.6 Manually loading C-Map permits

For Automatic loading of C-Map permits, see the previous section.

a) To manually load a C-Map licence, open Chart Maintenance and select the Chart License tab.

Place the cursor on the button marked **Select** which is located below the **C-Map licenses** text and a list of installed C-Map databases is displayed.

- **b)** From the list that is displayed, select the required C-Map database.
- c) A list of C-Map zones is now presented.

The expiry date of the current license is also shown.

Select the required Zone and area.

The selected zone will be displayed below the list.

C-Map Licenses	
Select	C-Map ENC Jeppesen Primar C-Map Professional+
Add Manual License	A
Other Harrison	
C-Map Professional+	•
Add Manual License	
Zone 0	Ĩ
CTZone 1, Area 1	
Zone 1, Area 10	
Zone 1, Area 100	
Zone 1, Area 10	
License String:	
Current License: Expires on: 01/01/	2012
License String:	I

e) The licence is added; the relevant chart data can now be installed.

licence to the system.

 d) Using the keyboard, enter the C-Map licence for the Zone/ Area in the License String box and press Enter. Press Add Manual Licence to add the

Add Manual License

7.3.7 View C-Map permit

C-MAP PERMIT EXPIRED/ CHARTS DISAPPEAR

No warnings are shown that a C-Map permit has or is about to expire. When a permit has expired, chart data will show at initial switch-ON however 10 to 15 minutes later the C-Map chart data is no longer displayed.

If you restart the processor, the data again disappears after 10 to 15 minutes. This is *not* a fault with the system but an indication that the C-Map permit has expired.

VIEW C-Map PERMIT EXPIRY

- a) To view the C-Map permit expiry date it is necessary to identify the chart type installed on the system. From the Standby screen select **Chart Maintenance** then the **Chart View** tab.
- b) Expand the required C-Map product to obtain the chart issue number.



c) Select the Chart License tab and select the required product/ chart area from C-Map Licenses.

Chart View	Data View	install Log	Chart License	View Updates	Colour Calibration
Auto Install Pe	rmits From Removat	e Media			
C-Map Licenses					1
	C-Map Professiona	+	C-Map Profession	al+-	
	Add Manual Licen	se		Add License from	File
Zone 0			.\ Icons\ Map Edit Symbol Alarm Config D	iols\ ialog.khd	1
Zone 10			AnalogueDeco BackupAlarmC BackupAllData BackupChartC BackupChartD BackupChartD	derSettingsDialog.kho onfig.khd .khd onfig.khd ata.khd ermits.khd	
			D	:\MantaDigital\GU	l Files\
License String:					
Current License:	No License Exis	s for Professional+			

d) The expiry date of the selected license will be displayed in the Current License box. If no permits exist No Licence Exists for xxx is displayed (where xxx is the selected C-Map chart product).

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7.3.8 Manually load a permit from file

For Automatic loading of permits see section 7.3.3.

C-Map and ENC permits can be manually installed as follows:

- a) Prepare the permit as shown in the previous sections and select the Chart License tab.
- b) CD/DVDs or USB memory devices can be explored using the display window below the Add license from file button.

In a normal system the drives are allocated as follows:

- C:\ Operating System
- D:\ Main program
- E:\ User data
- F:\ Internal memory device
- G:\ External USB memory device

If you are not in the correct drive, click on the \dots symbol to go up a level.

- c) Using the display window, locate and select the required permit(s).
 - ENC permits will show as: Permit.txt
 - C-Map permits will show as: Password.usr

When a permit is selected it is shown below the display window.

d) Press Add License from File and the selected permit will be installed.

LOAD CHART DATA

When the required licence(s) has been installed, the relevant chart data can be installed.

ENC.PMT		
PERMIT.TXT		

7.3.9 View and delete ENC permits

VIEW PERMITS

- a) In Chart Maintenance, select the Chart License tab.
- b) Select View/ Delete Installed ENC Permits.
- c) In Installed ENC Permits, select the Data Server ID for the permit to be viewed, for example:
 GB = UKHO
 PR = Primar
 AU = Australian/ Seafarer
 Etc.
- **d)** All installed cells and their individual expiry date can be viewed.
- e) Press OK to exit the menu.

DELETE PERMITS

a) Open the Installed ENC Permits dialog as detailed above.

Cell	Expiry Date
AR201130	30/04/2012
AR201140	30/04/2012
AR301150	30/04/2012
AR302120	30/04/2012
AR302130	30/04/2012
AR302160	30/04/2012
AR401590	30/04/2012
AR402490	30/04/2012
AR402500	30/04/2012
AR402520	30/04/2012
AR402550	30/04/2012
AR402560	30/04/2012
AR402620	30/04/2012
AR402770	30/04/2012
AR420010	30/04/2012
AR420020	30/04/2012
AR420030	30/04/2012
Select All	Deselect All
Delete Selected	ок

Selecting cells or groups of cells

b) Select the required permits to be deleted. With the cursor placed over cells, the following cursor options are available:

Select/ Deselect (left click): Select or de-select individual permits. Selected cells are highlighted in light blue.

No function (middle Click):	The middle button has no function.
-----------------------------	------------------------------------

Deselect (right click): When a single permit has been selected, right clicking on another permit will select all permits between the first selection and the current selection.

The following buttons can also be used for selecting/ deselecting cells:

 Select All:
 Selects all installed permits. Selected cells are highlighted in light blue.

 Deselect All:
 Deselects all selected permits.

- c) Select Delete Selected and the selected cells will be permanently deleted from the system.
- d) Press OK to exit the menu.

7.3.10 View or install IHO Certificates and/ or public keys

The IHO S63 data encryption scheme provides licensing for vector charts. The scheme requires the installation of a public key from the scheme administrator (IHO) and an IHO certificate file.

NOTICE CERTIFICATE & PUBLIC KEYS ARE PRE-INSTALLED

HENSOLDT UK systems are supplied with the IHO certificate and Public key pre-installed.

The certificate and public key can be viewed and, in the event of accidental deletion or overwriting, reinstalled.

Copies of the current IHO certificate and public key can be obtained from your chart provider or downloaded from the IHO website at www.iho.shom.fr

NOTICE EXTERNAL WEB SITES

HENSOLDT UK is not responsible for the content of external web sites.

VIEW THE IHO CERTIFICATE

- a) Open Chart Maintenance and select the Chart License tab.
- b) Select the View Installed Certificate and Public Key button.
- c) The Digital Certificate and Public key data is displayed.

The Public Key data must correspond exactly with the 'Big y' data that can be viewed on the original permit certificate.

In circumstances of any doubt, please contact your chart provider.

TO RE-INSTALL THE IHO CERTIFICATE AND PUBLIC KEY

a) Obtain a copy of the IHO certificates; the files required are: IHO.CRT (IHO certificate).

IHO.PUB (Public key).

Copy the certificates to a virus free USB memory device and insert this into the system. Remove all other CDs, DVDs or USB memory devices (do not remove the eToken).

- b) Open Chart Maintenance and select the Chart License tab.
- c) IHO CERTIFICATE: Select the Install Certificate from Removable Media button, the system will browse for the IHO.CRT file. When displayed, click on the IHO.CRT file and the system will install the certificate.

A notification will appear when the installation is complete.

d) PUBLIC KEY: Select the Install Public Key from Removable Media button, the system will browse for the IHO.PUB file. When displayed, click on the IHO.PUB file and the system will install the certificate.

A notification will appear when the installation is complete.



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7.3.11 Re initialise eToken

The re-initialise eToken function should only be used in the following circumstances:

- An official replacement eToken has been provided by HENSOLDT UK or a HENSOLDT UK authorised agent.
- The eToken has accidently been swapped with a grouped eToken from another processor on the bridge.

CAUTION

RE-INITIALISING THE ETOKEN DELETES ALL PERMITS

Unless specifically advised by HENSOLDT UK, there are no other circumstances other than those listed above where the re-initialise eToken button should be used. When the eToken is re-initialised, all chart permits have to be re-installed.

- a) Open Chart Maintenance and select the Chart License tab.
- b) Ensure the correct eToken is inserted into the processor.
- c) Press the Re-initialise eToken button.
- d) The system will prompt with the following warning:
 You are about to initialise the eToken. This will mean that you will have to reinstall any licenses. Proceed?
 - **OK:** Re-initialises the eToken deleting all installed permits.
 - Cancel: Aborts the task.
- e) A notification will appear when the initialisation is complete. All chart permits will now have to be re-installed.

7.3.12 Install Base Data

a) Open CHART MAINTENANCE

Ensure the relevant permits are installed.

Insert the media to be loaded and press Browse.

Use the **Select** button to select the database or ENC exchange set to be installed onto the system.

b) SELECT THE DATA VIEW TAB

In the **Filters** column, de-select **New Chart Without Permit**. This stops the system trying to install cells that do not have permits.

Press the Select ALL button in the Media column.

All cells on the media that have a valid permit are selected and are ready to be installed.

The chart data can be viewed prior to installation in the Chart View tab.

c) PRESS INSTALL

Installation time: When Install is selected, the system will prompt with the following notice:

Installing data will take an estimated xxx minutes. Are you sure you wish to continue? (where xxx is the time in minutes)

OK: Starts the chart installation. **Cancel**: Aborts the operation.

The chart installation time varies depending on the amount of data being installed and the permit coverage.

CAUTION

Installation of base or update data can take a number of hours. Installation and updates of chart data should only be carried out when the system is not required for navigation purposes.

d) INSTALLATION PROGRESS

During installation, the **Install Log** tab is automatically selected and a progress bar shown.

A list of cells is displayed as they are installed.

The Status box at the bottom of tab shows the current activity.

Note: The examples shown demonstrate the installation of a single cell number GB402001.







Harbour Usage

Berthing Usage





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e) INSTALLATION COMPLETE

When the installation is complete, a pop-up box shows any issues that may have occurred during the installation.

In the **Status** box, the system will show **Database Installation Complete**.



f) INSTALLATION RESULTS

The results of all current and previous installations can be viewed by pressing the **Open Log File** button.

A list of installation dates is displayed which can be expanded and collapsed using the +/- symbol to see what data was installed and any problems encountered.

Chart Installation Log File	
24/09/2012 11:45 24/09/2012 11:54 11/10/2012 01:25 11/10/2012 01:25 11/10/2012 01:25 11/10/2012 01:25 16/10/2012 11:36 250/09/21/2015 16/10/2012 11:36 250/09/21/2016 01:45 16/10/2012 11:36 250/09/2020 01:31/10/09/40/201 10/09/2017 11/2017 10/09/2017 10/00	

g) REMOVE USB DEVICE

Before unplugging any removable media including USB memory devices, press the Eject Removable Media button located at the bottom of the Backup & Restore data page. This safely ejects the memory device.

UPDATES

Updates contained in a base data are automatically installed.

STOP THE INSTALLATION?

Returning to the Standby screen will stop chart data installation.

CAUTION DO NOT SWITCH TO STANDBY

Returning to the standby stops the installation and NO cells are installed. Chart databases may be permanently deleted or corrupted and will need complete reinstallation.

This is only applicable to direct data installation, see networking regarding the stopping of a networked update.

7.3.13 Check chart update status

The status of installed charts can be checked using the Check Chart Update Status button.

a) Open Chart Maintenance and press the Check Chart Update Status button.

Note: It is NOT necessary to select a chart database prior to pressing the Check Chart Update Status button.

b) LATEST EDITION?

If the system has not been checked before or a new database has been installed, the following warning will be displayed:

Products list is not available. Please browse the latest media.

Where this warning appears, place the latest chart media (base or update) into the system and press **Browse.** Browsing the media will automatically install the required file.



c) PRODUCTS LIST

In systems where a products list has been loaded, the system will display the following: The chart data will be checked to xxx. If newer media is available please insert and browse before checking. Continue Check?

(Where xxx is the last update applied e.g. AVCS 22/03/2017).

YES: The system checks the chart status. **NO**: Aborts the operation.

Note: If chart media inserted into the system is older than the last update, the system will warn that: **Products Data is older that the installed ENC data. Please browse the newest ENC media.** To correct this, insert and **Browse** the latest available media.

d) Status report

The system will produce an on screen report that can be exported (PDF) as shown on the following page.

CHART CONSISTENCY (NETWORKED SYSTEMS)

Please refer to section 6.8 for details on the **charts out of date** alert that can be raised in an INS/ Networked system.

- e) The Chart Update Status report will show how many cells are out of date:
 - Data Server: Allows the selection of other databases that may be loaded.
 - Cell: The cell number
 - Installed: The edition and update number of the installed cell.
 - Available: The edition and update number of the available update.
 - Reason: A brief detail on the cause of the error as detailed below.

Chart			t Update Status	Report		X
Vessel nam Identifier: ENC updat Date of rep Content:	ie: e referend ort:	ce date:	Kelvin Hughes MMSI 2001234 : WK- 02-JAN-2019 Full	56 -/		
Chart Stat	us Sumn	nary				
Chart State Total: Up to date: Not up to d Withdrawn: Unknown:	us ate:		Count 335 0/335 335/335 0/335 0/335			
	Data Serv	ver:	AVCS ENC	•	Export Report	
Cell Name	Edition	Update	Issue Date	Status		
GB100160	015	000	27-JAN-2017	Not up to	date	
GB1B20M4	005	000	22-SEP-2014	Not up to	date	
GB202649	007	000	27-JAN-2017	Not up to	date	
GB2A2182	011	001	27-JAN-2017	Not up to	date	
GB2C2182	011	003	30-DEC-2016	Not up to	date	
GB300105	004	000	12-AUG-2016	Not up to	date	
GB300106	005	000	12-AUG-2016	Not up to	date	
GB300107	009	007	10-FEB-2017	Not up to	date	
GB300108	013	000	13-JAN-2017	Not up to	date	
GB300121	006	002	28-OCT-2016	Not up to	date	
GB300129	004	005	27-JAN-2017	Not up to	date	
GB300134	004	000	21-AUG-2015	Not up to	date	
GB300152	006	001	30-SEP-2016	Not up to	date	
GB300156	005	002	24-FEB-2017	Not up to	date	
GB300160	003	003	18-DEC-2015	Not up to	date	

STATUS MESSAGES

Not up to date:

The chart is out of date and must be updated.

New chart edition is available:	A new edition of the cell is available.
New chart update is available:	An update for the cell is available.
Cell has been removed from service:	A cancellation update has not been applied.
Products list is out of date:	The cell is newer than the products.txt file loaded. This can occur if data is downloaded from the chart provider and the dataset contains cells from different hydrographic suppliers.

f) EXPORT REPORT: The Chart Update Status can be exported as a PDF document. Press the Export Report button and select the drive where the file is to be saved. An on-screen prompt is shown when the download is complete

7.3.14 Apply updates

Chart updates are installed as follows:

CAUTION

INSTALL & UPDATE

The update media must be **INSTALLED** first and then UPDATED.

Failure to install the update media will cause problems with subsequent updates.

a) Open Chart Maintenance and insert the relevant/ latest update media.

b) INSTALL THE MEDIA

Install the update media using the instructions found in section 7.3.12 (Install Base Data).

- c) It is essential the media is INSTALLED before selecting updates.
- d) UPDATE

When the data from the update media has been installed, press **Browse** again and reselect the C-Map database or ENC exchange set to be loaded.

- e) Select the Data View tab.
 Press the Select Updates button in the Media column.
- f) In the Filters section, de-select New Chart Without Permit which prevents the system trying to install cells without permits.

All data on the update media that has a valid permit is selected.

Update highlighted in RED.

⊡ IN121MTB.C00

If an update is highlighted in Red, it has been selected/ installed out of sequence and cannot be installed i.e. a week 15 update is being applied after a week 17 update has already been installed.

g) Press Install

The system will prompt with the approximate installation time.

During installation of updates, the **Install Log** tab is automatically selected showing a progress bar.

A list of cells is shown as they are updated.

A **Status** box at the bottom of the tab shows the current activity.









h) When the update is complete, a pop-up box shows any issues that may have occurred during the update.

In the **Status** box, the system will show **Database Installation Complete**.

i) The results of all current and previous installations can be viewed by pressing the **Open Log File** button.

See section 7.1.3 for additional details on the Open/ Delete Log File function.

A list of installation dates is displayed and can be expanded/ collapsed using the **+/-** symbol to see what data was installed and any problems encountered.

j) Repeat the above process for <u>ALL UPDATE</u> data supplied by the chart provider.





7.3.15 C-Map Online chart update

C-Map charts can be updated using the C-Map Online Charts Update function located within the Chart Maintenance menus.

Note: This function does not require the HENSOLDT UK Navigation system to be connected to the internet (see notice below).

FUNCTIONAL OVERVIEW

A request file is generated by the operator on the HENSOLDT UK Navigation Display and exported to a USB memory device. This file is emailed to the chart provider and an automatic response is returned containing an update file which is imported into the HENSOLDT UK Navigation Display. The system then automatically updates the C-Map chart database.

NOTICE INTERNET CONNECTION

In line with current IEC 61162-450 regulations, HENSOLDT UK does not permit the connection of internet or web based services to the HENSOLDT UK multi-function display or its associated network.

EQUIPMENT

The following equipment will be required to carry out this task:

- An independent computing device with internet/ email connection and a USB port.
- A virus free USB memory device.
 - Please refer to section 2 for additional information regarding anti-virus control of external USB devices.
 - The file sizes sent and received as part of this process are approximately 100 KB to 5 MB.
 - The memory device should be clear of all previous C-Map chart update requests and responses (files ending in *.ord or *.ans).

UPDATE PROCEDURE

a) Insert a virus free USB memory stick into the USB socket on the keyboard (see section 4.15 for details). Where no keyboard is fitted, provision should have been made for a USB socket for connection to the rear of the display.

Open Chart Maintenance. The C-Map Online Charts Update button is located in the Installed section of Chart Maintenance:



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- b) In the **Installed** menu, select (tick) the C-Map chart database to be updated.
- c) With the cursor placed over the C-Map Online Charts Update button, the following options are available:

Create Order (left Click):	Creates a *.ord file that is used to request the C-Map chart
	update.

No function (middle Click): The middle button has no function.

Import updates (right Click): Used to import the *.ans C-Map chart update response.

Left click on **Create Order** and the system will export a file to the root directory USB memory device.

NOTICE DO NOT OPEN THE DOCUMENT

The *.ord file does not contain data that can be used separately to obtain updates.

NOTIFICATIONS

• When an order file has been successfully created, the following prompt is presented:

Create Update Request An order has been created in 'E:*.ord.' Please send the order to: updates@c-map.no OK

In the above, **E:** is the drive location of the USB memory device and ***.ord** is the file named with the current date and the vessel name.

• If no C-Map database has been selected, the operator will be prompted with:

Create Update Request No C-Map database selected, please select a C-Map database for which to create an update request. OK

• If no USB memory device is inserted or detected, the operator will be prompted with:

Create Update Request

No removable media detected **OK**

- **d)** Eject and Remove the USB memory device (see section 14.6 Ejecting Removable Media) and connect it to a computing device that has email access.
 - Email the *.ord file to updates@c-map.no
 - An automated email will be returned that will contain an attached file called *.ans. This is the file that contains the update. Depending on the chart licence, a number of emails may be returned containing numerous *.ans files.
 The files are named "upgorithe and" where are in the file number and help in the total number.

The files are named "uaaaxbbb.ans" where aaa is the file number and bbb is the total number of files e.g. "u003x005.ans" is the third file of five.

- Copy all *.ans files relevant to the requested update to the root directory of the memory stick and scan the device for viruses.
- e) Connect the USB memory device containing all relevant *.ans files into the HENSOLDT UK Navigation Display.

f) With the cursor placed over the C-Map Online Charts Update button, the following options are available:

Create Order (left Click): Creates a *.ord file that is used to request the C-Map chart update. No function (middle Click): The middle button has no function.

Import updates (right Click): Used to import the *.ans C-Map chart update response.

Right click on **Import Updates** and the system will automatically import the updates from the USB memory device. The update should complete in approximately 1 to 2 minutes or less depending on the file size.

g) When the import is complete, the system will prompt with the following:

Create Update Request Successfully import C-Map update

OK

NOTIFICATIONS

• If no *.ans files are found on the USB memory device, the operator will be prompted with:

Create Update Request No C-Map update files found on root of removable media (E:) OK

- The following notice is raised when:
 - The wrong *.ans file is loaded onto the memory stick (i.e. the file is for another ECDIS system).
 - The *.ans file is corrupted.
 - The *.ans file is older than the last update already applied.

Create Update Request

Failed to import C-Map updates *.ans.

OK

NETWORKED UPDATES

In networked systems, the C-Map chart updates are automatically shared across the network with all other connected ECDIS systems running ZM-2300 software. It is therefore only necessary to apply the C-Map Online Chart Update to one workstation.

NOTICE NETWORKING OF CHARTS

In a networked system, C-Map chart updates are shared however chart databases and ENC updates are not shared and must be loaded/ applied to each individual ECDIS system.

STANDALONE SYSTEMS

Standalone systems that are NOT connected to a network must be individually updated.

Each workstation will require its own *.ord/ *.ans file i.e. an order request and response must be made and applied to each individual system.

NOTES

- No reminders or alerts are raised by the HENSOLDT UK Navigation Display to notify the operator that C-Map updates are required. C-map chart updates should be requested as advised by the chart provider or as per ship chart updating procedures.
- Any errors noted in the automated response email from updates@c-map.no should be addressed to the chart provider.

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7.3.16 View updates

a) Open Chart Maintenance and select the View Updates tab located at the top of the screen.

At the bottom of the screen, select the **Review Official Updates** tab.

In the **Filters** table, ensure that **Charts Installed** is selected. If this is not selected, the Cells drop down list will be empty.

- **b)** Use the **Agency** button to select the region for the required chart update.
- c) List Updates from & to is used to filter the updates by a user selected span of dates.

To adjust the date(s), place the cursor over the day, month or year and use the trackerball to scroll up/ down to adjust to the desired date.

CHECK THE DATE/ DATE DEFAULTS



Whilst the system is switched ON, the List Updates span of dates are retained in memory. The dates should be checked each time an update is viewed. The switch-on List updates defaults are from 01/01/2000 to 01/01/2050.

- d) Using the Cell button select the cell to be viewed. The selected cell is displayed with a list of updates filtered by the date set in List Updates Since.
- e) When a cell has been selected, the box containing updates can be expanded or contracted.
- f) The selected cell scale can be changed by placing the cursor over the *Zoom* button; the zoom options shown to the right are available.

Zoom IN (left click):	Zooms into the selected cell.
Overview (middle Click):	Shows the selected cell
Zoom OUT (right click):	Zoom out from the selected cell.

The chart scale can also be expanded using the drag-zoom facility and the keyboard 'Page up' or '+' (increase) and 'Page down' or '-' (decrease) buttons can also be used to change scale.





A Maximise screen

g) Select an update and the update is shown on the corresponding cell. The area of the update is outlined with a flashing orange pentagon.

The information on each update can be expanded/ contracted using the **+/-** symbol.

h) The level of detail shown on a cell can be configured using the **Chart Settings** button.

CHART QUERY

Left clicking on any object will open the Chart Query dialog.





NOTICE TIME FOR CHART UPDATE TO LOAD

On systems with a large chart database loaded, it may take some time for the chart/ chart updates to load in the View Updates tab.

i) MANUAL OR AUTOMATIC UPDATE?

MANUAL UPDATES are shown in normal orange text as shown below:

60-





AUTOMATIC UPDATES (as applied during a chart update) as shown in BOLD orange as shown below:

deleted	1111 80 + X	× ţ
gupdated	000000-000	

7.3.17 Manual updates – Adding a new feature

a) Open Chart Maintenance and select the View Updates tab located at the top of the screen.

At the bottom of the screen, select the **Manual Updates** tab.

Ensure the following Filters are SELECTED

- Display Selected
- Display Non-Selected
- Chart Installed



If these are not selected, updates may not be displayed.

- **b)** Use the **Agency** button to select the agency for the required chart update.
- c) Using the Cell button, select the required cell.

The selected cell is displayed on screen outlined in green.

When the cursor is on the chart area it shows the Lat and Lon position and a text label **MU** indicating that Manual Update has been selected.









d) TO ADD A NEW UPDATE: Select Insert New Feature and the Select

Feature to Insert box will open.

EXISTING FEATURE?

See later in this section for editing/ deleting an existing chart feature or update.

e) Use the **Select Feature** tab to select the manual update feature to be added.

In the example shown opposite, "Caution area (CTNARE)" under **Dangers** has been selected.



f) When a feature has been selected, the **Set Attributes** tab automatically opens.

Depending on the feature selected, each attribute can be modified to reflect the data required for the manual update.

As an example, when **Category of Water Turbulence** is selected, a drop down list is available where **Breakers** can be selected.

Additionally in this example, when **Information** is selected, text can be entered to give additional information about the added feature.

	Select Feature to In	sert 🕺
Select Feature	Sel Attributes	
Selected Featurer bro	akers	
Calegory of water Information Object name Scale maximum Scale minimum	turbulence	
Selected Attribute In	formation	
Insert Text H	ere	
Туре: 💽 Ро	int	Insert

g) Time varying objects: When a time varying object is to be created, the following date formats must be used for the start/ end and periodic start/ end dates:

The formats to be used for Date start (DATSTA) and Date end (DATEND) are:

- "DD-MMM-YYYY" e.g. "20-JUN-2022"
- "MMM-YYYY" e.g. "JUN-2022"
- "YYYY" e.g. "2022"

Formats to be used for Periodic date start (PERSTA) and Periodic date end (PEREND) are:

- "DD-MMM" e.g. "20-JUN"
- "MMM" e.g. "JUN"

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h) When all data for the update has been entered, press **Insert** and use the cursor to place the update at the required position on the chart.

For point objects such as aids to navigation, a single click will drop the update at the required cursor position (the position can be 'fine-tuned' later in the process).

For objects that have to be drawn, a left click is used to place/ draw the object and a middle or right click is used to end the edit.



Create manual update areas in a Clockwise direction.

i) When an object is placed on screen, it is also shown in a drop down list in the manual updates tab. The dropdown list can be used to select, open and edit each item.

EDIT SELECTED

Select the feature to be edited and left click the **Edit Selected button.**

A new box appears called **Set Attribute to Edit**. See Section 7.3.18(f)

DELETE SELECTED

Select the feature to be deleted and right click the **Edit Selected button** to select **Delete Selected**.

The selected feature is deleted from the chart database.

Using the **Set Attribute to Edit** box, the position of the selected feature can be adjusted.

SAVE CHANGES

Saves the changes made to the update and applies them to the chart.



		Selec	t Attrib	oute to E	dit		X
Selected F	eature:	3 Navigal	lional sy	stem of m	arks		
Selected A	ttribute:						
Position of	Feature						
Latitude:	7142	59:495	8	Longitude:	166 2	4 439* V	1
						-	
						Save C	hanges

7.3.18 Manual updates – Amending an existing feature

a) Open Chart Maintenance and select the View Updates tab located at the top of the screen.

At the bottom of the screen, select the **Manual Updates** tab.

Ensure the following Filters are SELECTED

- Display Selected
- Display Non-Selected
- Chart Installed



If these are not selected, updates may not be displayed.

- **b)** Use the **Agency** button to select the region for the required chart update.
- c) Using the Cell button select the required cell.

The selected cell is displayed outlined in green.

When the cursor is on the chart area it shows the Latitude and Longitude position and a text label **MU** indicating that Manual Update has been selected.

 d) To amend an existing feature: Place the cursor over the feature of interest and the following cursor options become available: Select feature (left click): Selects the chart feature at the current cursor position for editing.

No function (middle Click): The middle button has no function.

Reposition (right click): Centres the chart on the current cursor position.







Manual updates - amending an existing feature (continued)

e) The details on the selected feature are now displayed and can be selected for editing.

Select the required object and press:

Х:

X:

Closes the edit function without making any changes.

Delete Selected: Deletes the selected item from the chart.

Edit Selected:	Opens the Select Attribute to Edit
	function for the selected object.

f) When Edit Selected is pressed, Select Attribute to Edit is opened.

Here the selected object name, position and object details can be edited.

All objects have their LAT/LONG positions adjusted by placing the cursor over the numeric value, press and hold the left button and use the trackerball to set the required value. This is the only adjustment available to point objects but for more complex objects as well as changing the LAT/LONG setting you can edit the shape using the Edit Vertex button detailed below.

Edit Vertex: When an object is selected, clicking the Edit Vertices button opens a list of LAT/ LON vertex position values for the selected object.

> Select the vertex to change (click on it). To change a position, place the cursor over the required Latitude or Longitude value and use the trackerball to scroll up/ down to adjust to the desired value. You can see the current value in the lower section of the Select Vertex to Edit' window.

When the required changes have been made, the **Accept Vertex Position** become available and can be used to save any changes made.

- Periodic Date: As required, dates (dd/mm/yyyy) can be added to selected objects (see section 7.3.17 for additional details).
 - Closes the Set Attribute to Edit function without making any changes.
- Save Changes: Saves all amendments and closes Set attribute to Edit.



Deleted: An Orange line is placed through the feature. Added/ Amended: An orange line is placed below the feature.



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7.3.19 Manual updates – Review, edit or remove updates

a) Open Chart Maintenance and select the View Updates tab located at the top of the screen.

At the bottom of the screen, select the **Manual Updates** tab.

Ensure the following Filters are SELECTED

- Display Selected
- Display Non-Selected
- Chart Installed



If these are not selected, updates may not be displayed.

- **b)** Use the Agency button to select the region for the required chart update.
- c) Using the Cell button select the required cell.

A drop down list of all updates for the cell is displayed.

Each update can be selected and edited by pressing the **Edit Selected** button. This opens the **Select Object to Edit/ Delete** box described in the previous manual update sections.

d) To remove a specific update or ALL updates: Place the cursor over the Remove updates button.





Agency: GB +	Cell	GB3	00121	Remove Update	s 🖉 Insert New Feature	
Edit Selected						
Manual Updates				Review Official I	Updates	

Agency:	GB *	Cell	GBM	0121	Remove Updates	Insert New Feature	
Edit	Selected		Move Move Modify Add	Depth area Depth area Of store pro Animor berth		54° 03 234° N, 000° 21 953° E 54° 03 234° N, 000° 21 953° E 53° 53 965° N, 000° 21 953° E 53° 51 985° N, 000° 22 135° E	

Agency: GB *	Cell	G	B300121	Remove Updates	Insert New Feature	
Edit Selected						
		1 Model Model 3 Add	Citytore p Anmor be		541,03,2547.94,0007,21,3637.E 537,56,96517.94,0007,25,6307.E 537,57,3857.94,0007,22,1337.E	

e) With the cursor over the Remove Updates button the options shown are available:

Remove updates (left click):	Removes the selected update. When an update has been selected and Remove Update is pressed a warning is presented: YES: The selected object update is removed. NO: The action is cancelled.
No function (middle Click):	The middle button has no function.
Clear ALL updates (right click):	Clears ALL manually entered updates. When pressed, a warning is presented: YES: All manual updates are removed. NO: The action is cancelled.

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7.3.20 Installation error messages

The following table explains the various error messages that may occur during chart installation. The table is sorted by the **SSE** number that appears as part of any error message.

DEFINITIONS

SA	Scheme administrator
SA Digital Certificate (Digital Certificates)	SA Certificates are digital files issued by a certification authority. They bind a specific public key together with other information to an individual or an organisation. Certificates help prevent someone from using a fake public key to impersonate someone else. The scheme uses a chain of certificates, each one certifying the previous one until all parties are confident as to the identities in question. The SA certificate used by the IHO will be a self-signed certificate and is the root certificate for the scheme. A copy of the SA certificate is available from your chart provider or from the IHO website
SA Public key	The IHO S63 data encryption scheme provides licensing for vector charts. The scheme requires the installation of a public key from the scheme administrator (IHO) and a certificate file. A copy of the public key is available from your chart provider or from the IHO website

INSTALLATION ERROR MESSAGES

ERROR	ERROR MESSAGE	EXPLANATION
SSE 05	SSE 05 - SA Digital Certificate (X509) file is not available. A valid certificate can be obtained from the IHO website or your data supplier	The Scheme administrator certificate is not installed. See section 7.3.10 in Chart maintenance for instructions on obtaining and installing the certificate.
SSE 05a	SSE 05 SA - Public Key installation failed. Please check whether the public key file is there. A valid file can be obtained from the IHO website or your data supplier	The installation of the Scheme administrator certificate has failed, this could be because the certificate has expired or is corrupted. See section 7.3.10 in Chart maintenance for instructions on obtaining and installing the certificate.
SSE 06	SSE 06 - The SA Signed Data Server Certificate is invalid. The SA may have issued a new public key or the ENC may originate from another service. A new SA public key (certificate) can be obtained from the IHO website or your data supplier.	The Public Key is invalid. See section 7.3.10 in Chart maintenance for instructions on obtaining and installing a new public Key.
SSE 08	SSE 08 - SA Digital Certificate (X509) file incorrect format. A valid certificate can be obtained from the IHO website or your data supplier	The Scheme administrator certificate is in the wrong format. See section 7.3.10 in Chart maintenance for instructions on obtaining and installing the certificate.
SSE 08	SSE 08 SA public Key file incorrect format. A valid file can be obtained from the IHO website or your data supplier	The Scheme administrator certificate is incorrect. This can be caused by accidently installing a SA certificate from a Chart Installation CD. See section 7.3.10 of Chart maintenance for instructions on obtaining and installing the correct certificate.
SSE 08	SSE 08 SA Digital Certificate (X509) and Public key are different. A valid certificate and public key can be obtained from the IHO website or your data supplier.	The Scheme administrator certificate and the Public Key are do not match. This can be caused by installing accidently a SA certificate or Public Key from a Chart Installation CD. See section 7.3.10 of Chart maintenance for instructions on obtaining and installing the certificate.
SSE 08	SSE 08 - Public Key installation failed. Please check whether the public key file is valid.	Check with your licence provider that the correct Public Key has been supplied
SSE 09	SSE 09 - ENC Signature is invalid.	The SA digital certificate, public key or permit does not match the data being installed. This could be an error with the SA digital certificate or public key or the permit is for a different supplier of data. Please contact your chart provider and obtain the correct permit(s).

ERROR	ERROR MESSAGE	EXPLANATION
SSE 10	SSE 10 - Permits not available for this data provider.	The installed permits are not valid for the dataset being installed. Please contact your chart provider and obtain the correct permit(s).
SSE 11	SSE 11 - Cell Permit not found. Load the permit file provided by the data supplier.	A permit for the cell(s) being installed cannot be found. Please re-install the permit(s) or contact your chart provider to obtain the necessary cell permit.
SSE 12	SSE 12 - Cell permit format is incorrect	The permit for the cell(s) being installed is incorrect. Please re-install the permit(s) or contact your chart provider to obtain the correct cell permit.
SSE13	SSE 13 - Cell Permit is invalid (checksum is incorrect)	There is an error in the permit. Please re-install the permit(s) or contact your chart provider to obtain a new copy of the permit(s).
SSE13a	SSE 13a - Cell Permit is not from this data provider (checksum is incorrect)	The installed permit is for another chart providers data. Please contact your chart provider and obtain the correct permit(s).
SSE 15	There are two possible descriptions as detailed below: SSE 15 - Subscription service has expired. Cell/update has been installed but charts may not be up to date OR Cell/update has not been installed. Please contact your data supplier to renew the subscription licence.	The licence period for permit has expired. The licence will need to be renewed with your chart provider.
SSE 16	SSE 16 - CRC is incorrect. Contact your data supplier as ENC(s) may be corrupt or missing data.	There is a problem with the data being installed. This could be because of a corrupt, faulty or dirty disk. Contact your chart provider to obtain a new copy of the data.
SSE 20	SSE 20 - Subscription service will expire in less than 30 days. Please contact your data supplier to renew the subscription licence.	The listed permits will expire in less than 30 days. The permits noted will need to be renewed with your chart provider.
SSE 21	SSE 21 - Decryption failed, no valid cell permit found. Permits may be for another system or new permits may be required. Please contact your data supplier to obtain a new licence.	Data is being installed but no valid permit can be found. This may be because the wrong permits have been loaded or existing permits may have expired. Load the correct permits or renew the existing ones with your chart provider.
SSE 22	SSE 22 - SA Digital Certificate file has expired. A new SA Public Key (certificate) can be obtained from the IHO website or your data supplier.	The Scheme administrator certificate has expired. See section 7.3.10 in Chart maintenance for instructions on obtaining and installing a new certificate.
SSE 23	SSE 23 - Non sequential update, previous update(s) missing. Try reloading from the base media. If the problem persists contact your data supplier.	A previous update has not been installed or has been installed incorrectly. If update data has not been installed AND updated, this warning will appear. Data will have to be reloaded from the base disk.
SSE 25	SSE 25 - The ENC permit for this cell has expired. This cell may be out of date and MUST NOT be used for NAVIGATION.	The permit for the cell has expired and updates may not have been applied. The cell may be out of date and must not be used for navigation. Please contact your chart provider and re-new the permit. When installed the chart database must be updated.
SSE 26	SSE 26 - This ENC is not authenticated by the IHO acting as the Scheme Administrator.	The signature files within this Exchange Set contain the UKHOs self-signed certificate. The SSE 26 warning is displayed because the ENC certificate has not been provided by the scheme administrator.

C-MAP LICENSE INSTALLATION ERRORS

Chart Licence Unable to add license – Please check string, Zone/ Area and expiry date. OK

The installation has failed due to an error which could be that the incorrect Zone/ area was selected or the incorrect permit for the zone was entered.

Reselect the zone/ area and re-enter the permit. If this fails to resolve the please contact you chart supplier and confirm the license is correct.

Chart Licence		
	Please enter a license string.	
	OK	

A zone/ area has been selected but a license number has not been entered in License String.

Chart Licence
Please enter a Zone/ Area.
OK

A zone has not been selected for the permit. Select the appropriate zone/ area and re-enter the permit.

Chart Licence		
	License string needs to be 16 characters	
	OK	

The permit number has been entered incorrectly. Recheck the zone/ area and re-enter the number. If this fails please contact you chart supplier and confirm the license is correct.

OTHER WARNING MESSAGES

Chart Licence	
Installation cancelled: Update and base cell issuing authorities are different.	
ОК	

The update being loaded does not match the issuing authority of the original data (i.e. a cell is installed from an AVCS base CD but the update for the same cell is Primar), the installation is cancelled.



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8. APP Licences

The App licences application allows the enabling of various different navigation apps and features. Some apps will be enabled by default, others are enabled during the commissioning of the system.

- Operators can request additional features or renew those that have expired.
- App licences can be set to be Permanent or configured to have an expiry date.
- With the exception of the default modes, ALL app licences are chargeable. A user generated file from the processor and a HENSOLDT UK generated pin number is required to enable *any* app/ feature. This pin number is unique to each individual processor.

ETOKEN

App licences are directly linked to the systems eToken. The eToken is a USB device connected to a USB socket on the rear of the processor.

If the eToken is removed, the system is disabled applications cannot be accessed.



Example eToken where YYYYY on the label is the eToken supplier name and XXXXX is the unique eToken number

CAUTION NO eToken FITTED / SYSTEM DISABLED

With no eToken fitted the system will not operate.

eToken DONGLE NOT DETECTED

When an eToken is not fitted or is removed, **eToken Dongle not detected; Optional features not available** is displayed on-screen, the system is disabled and the App Licences box in the standby screen will show **eToken not detected**.

OPTIONAL FEATURES MENU

The App Licences menu is accessed from the standby screen.

The unique eToken number for the processor is shown at the top of the **HENSOLDT UK** multi-function display **App licences Management** box.

During configuration of licences, the **Current Settings** button resets the page to the last saved configuration. This can be used to clear the screen if an error is made whilst enabling or disabling a feature or setting an expiry date



Pressing Current Settings does not delete the KHKey, licenses or licences that have already been installed.

TRIAL PERIOD

On new equipment some apps/ features have a trial period installed. When the trial period expires, the feature is disabled and a license has to be purchased for continued use.

8.1 Available optional features

Navigation apps	ECDIS	RADAR	CHART RADAR
MDS-030: Single Radar Display navigation mode.	0	✓	✓
MDS-032: Dual Radar Display navigation mode.	0	✓	✓
MDS-040: Chart Radar.		0	✓
MDS-010: ECDIS.	√	0	0
Additional apps		-	-
MDS-020: Navigation & Conning Display.	0	0	0
MDS-034: Enhanced Target Detection (note 1).		0	0
MDS-036: High Speed Craft	0	0	0
MDS-037: Advanced TCVR Control	0	0	0
MDS-038: Autonomous TCVR Control	0	0	0
MDS-060: Route Planning.	✓	0	✓
MDS-080: Simulation mode.	✓	✓	✓
MDS-012: Radar Interlay.	0		
MDS-091: Familiarisation mode (note 2).			
MDS-090: Non navigation mode (note 2).			
MDS-042: FLIR camera (note 3).		0	0
MDS-044: Enhanced Spyscope.		0	0
MDS-022: Conning Display.	0	0	0
SER-001: Password bypass (note 4).			
MDS-100: ChartCo interface.	0		0
MDS-110: User data synchronisation (this requires grouped eTokens).	0	0	0
SER-002: Setup password bypass (note 4)			
MDS-062: Track Control.	0		
MDS-014: ECS.	0		
MDS-120: External Applications	0	0	0

✓ Note 1: ETD mode is enabled for a 6 month trial period on new radar/ Chart radar installations.

✓ **Note 2**: Land based training systems only.

✓ **Note 3**: Dual Radar Display must be enabled for FLIR camera operation.

✓ Note 4: Strictly for use by HENSOLDT UK trained and authorised engineers but can be issued with HENSOLDT UK authorisation in exceptional circumstances.

APPS EXPLAINED

Enhanced Target Detection	See Section 6.23.
Simulation mode	See Simulation in the table of contents for details.
FLIR camera	Only available in the Dual Radar display app. This features allows the viewing and control of a HENSOLDT UK approved FLIR camera attached to the system.
Password bypass	Strictly for use by HENSOLDT UK trained and authorised engineers. This is only issued by HENSOLDT UK in exceptional circumstances with strict conditions of use.
ChartCo interface	Enables the interfacing of a ChartCo system into Chart radar enabled system. Please contact HENSOLDT UK for additional details.
User data synchronisation	Networking: Allows the synchronisation of chart data, routes and user generated maps. Requires additional hardware changes.
Setup password bypass	Allows temporary access to the system configuration pages. This is only issued by HENSOLDT UK in exceptional circumstances with strict conditions for use.

8.2 App Licences... How do I...?

8.2.1 Obtain prices for licence?

THE ENABLING OF NON-STANDARD OPTIONAL FEATURES IS CHARGEABLE

App licences can be enabled permanently or set to expire at a specified date.

To find the cost of a licence, please contact HENSOLDT UK/ commercial technical advice using the contact details shown at the bottom of the Standby screen or via the contact details shown at the end of this handbook.

To obtain licence, you will need the following information

- The app/ feature required.
- Is the feature to be enabled permanently or for a fixed period?
- The eToken and serial number of the system.
- The software version (ZM-230x- Vx.x) which can be found at the top of the standby screen.

8.2.2 Enable/ renew a licence using email

a) Insert a virus free USB memory device into processor then, from the standby screen, select **App licences**.



b) In the **App licences Management** table, select the function(s) required and place the cursor over the status column.

Select Enable.

Set an **Expiry Date** by clicking in the date field. The format must be dd/mm/yyyy.

If no expiry date is required, right click on the date field and **Permanent** is automatically selected.

L	Optional Mode Management					
	eToken ID: JGeT20690					
	Functionality	Status	Expiry Date (dd/mm/yyyy)			
	MDS-012: Radar Interlay MDS-091: Familiarisation Mode	Enabled Disabled	Permanent			
_				1		

c) Select Create Request. The system will write a file to the USB flash memory called eTxxxx.req, where xxxx is the e token number. Email the file (approximate file size is 500 b) to HENSOLDT UK, who will process the request and return a file called eTxxxxx.fun.

MDS-012: Radar Interla

- **d)** Copy the eTxxxxx.fun file returned from HENSOLDT UK onto a virus free USB memory device and plug this into the processor.
- e) Open App licences and select Import File. The system will automatically find and install the file. There are no confirmation messages but the required optional feature should now be enabled and be available for use.

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8.2.3 Enable/ renew a licence by phone

It is recommended that requests for licences are made using email. If no email or USB memory device is available, a licence can be requested and enabled by phone using the **Enter KHKey** function as follows:

a) Enable the required licence/ feature as shown in the previous section. Contact HENSOLDT UK / Commercial technical advice using the telephone number shown at the bottom of the systems Standby screen or using the contact details shown at the end of this publication.

THE FOLLOWING INFORMATION WILL BE REQUIRED:

- eToken number (requests cannot be processed without this number); the eToken number is shown at the top of the optional features screen.
- The App/ feature(s) that are currently enabled.
- The new app/ feature(s) that have been enabled as part of this process.
- Is the licence to be permanent or set to expire at a certain date?
- As licences are chargeable, a payment method will be required.
- **b)** HENSOLDT UK will process your enquiry and then advise a KHKey code which is a four digit pin number.

On receipt of the KHKey, open **App licences** and re-configure/ enable the required optional features with the correct expiry date.

Press the Enter KHKey button and carefully enter the number provided then click Accept.

No confirmation message is displayed. After entering the license key the desired functionally will be enabled.

8.2.4 Expiry warning

The system will warn if when a licence is about to expire. Warnings are shown at:

- Approximately 12:00 UTC 30, 7, 6, 5, 4, 3, 2 and 1 days prior to the feature expiring.
- On the hour, every hour on the day of expiry.
- If the system is not switched ON at the expiry date, a warning will be shown when the system is next switched on but only for a 24 hour period after the expiry date.

Once a licence has expired no further warnings are presented and the app/ feature is disabled.

8.2.5 Unlock

In normal operation, the Unlock button is not available for use. Where a system has been locked, the unlock button becomes available.

To unlock the system press the **Unlock** button and make a careful note of the unique number that is presented.

Contact HENSOLDT UK / Commercial technical advice quoting this number and they will respond with an unlock code that is entered using the Enter **KHKey** button.

UNLOCK CODE VALIDITY

The unlock code is only valid for 12 hours from the time of issue. If this time is exceeded, a new unlock code will need to be obtained using the above process.

eToken ID:	JGeT2069	0
MDS-030: Single Radar Display	Enabled	Permanent
/IDS-032: Dual Radar Display	Enabled	Permanent
/IDS-040: Chart Radar	Enabled	Permanent
MDS-010: ECDIS	Disabled	Permanent
MDS-020: Navigation & Conning Display	Enabled	Permanent
/IDS-034: Enhanced Target Detection	Enabled	Permanent
MDS-060: Route Planning	Enabled	Permanent
MDS-080: Simulation	Enabled	Permanent
/IDS-012: Radar Interlay	Enabled	Permanent
MDS-091: Familiarisation Mode	Disabled	Permanent
MDS-090: Non Navigation Mode	Disabled	Permanent
MDS-042: FLIR Camera	Enabled	Permanent
Enter KHKey Create	Request	

9. Route Planning App

Route planning allows the creation, safety checking and management of routes.

The various functions are accessed by selecting the **Route Planning** app from the standby screen.

If Route Planning is 'greyed-out' or cannot be accessed there may be a problem with the eToken *or* Route Planning has not been enabled in optional features.

 a
 Chart Maintenance

 a
 Route Planning

 a
 Alert Configuration

See index entry for eToken software or App licenses for additional details.

9.1 Route planning overview

CHART DISPLAY AREA

The level of information shown on the chart can be configured using the Chart Settings button.

Routes can be created directly onto the chart display area.



ROUTE CREATION TOOLS

Functions include creation, editing safety checking and management of routes.



SCREEN CONTROLS

Configuration of the screen palette, zoom levels, chart feature levels etc.

The Standby button exits route planning and returns the display to the standby screen.



NETWORK/ NETWORK SHARING

In an INS/ networked system, the Multi-Function Display being used for route planning should be configured as a **Data Resource Master** in **Network Settings** before starting route planning. This ensures that the workstation can share route information with the rest if the system.

Network Settings can be accessed by placing the cursor over the **Standby** button (bottom right) and middle click to select **Show Sync Status**.

See Data Resource within section 6.31 for details on networking and section 9.4.13 for details on sharing routes across the network.

ROUTE COMPATIBILITY

Routes from other manufactures systems that conform to IEC 61174 edition 4 (common route format 'RTZ') can be imported, edited and saved into Route Planning.

Routes generated in software version ZM-2300 V3.x and higher cannot be loaded onto systems running ZM-2300 V2.x or lower or any system running ZM-2144 software.

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9.2 Common functions

THE FOLLOWING FUNCTIONS ARE COMMON TO ALL SECTIONS OF ROUTE PLANNING.

UNDO/ REDO BUTTON

The Undo/ Redo button can be used to delete a previous action or 'redo' an action. With the cursor placed over the Undo/ Redo button the following options are available:

Undo / Redo	Scale 1:2,940 •		Chart Settings	
Append	Daylight		StandBy	
Reverse Route				
WGS84				
	Go to	Show Sync	Capture	
UTC +00:00	StandBy	Status	Screen	

No function (middle click): **Redo (right click):**

Undo previous (left click):

The middle button has no function. Redo (un-delete) the last action.

Undo (delete) the last

action.

REVERSE ROUTE

Selecting **Reverse route** reverses the selected route. Once a route has been reversed it must be saved under a different name.

APPEND

The append button can be used to add a waypoint to the last waypoint in a route or to generate a compound route. See sections 9.3.13 and 9.4.5 for details.

DATUM

The chart Datum can be selected by clicking on the Datum button.

UTC TIME

The adjustment of UTC time is common to all navigation modes and is explained in section 6.60.

CHART SCALE AND ZOOM

Please refer to section 7.2.3.

CENTRE WAYPOINT ON CHART

Selecting any waypoint, pilotage feature or critical point in the route list will place the selected item at the centre of the chart area. This can be useful when editing a long route at a low scale.

MAXIMISE/ MINIMISE EDIT ROUTES

The Route Editing tab can be maximised/ minimised by clicking on the blue up/ down arrow.

When maximized, clicking anywhere on the chart area automatically minimises the tab.



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9.3 Creating routes

There are a number of common cursor functions in route planning for the positioning, editing of waypoints and adding Pilotage tools as detailed below.

As waypoints, pilotage features and critical points (CP) are added to a route, they are listed in the **Edit Route** box and tabs shown below.

PILOTAGE TOOLS VISIBILITY

Pilotage tools such as parallel index lines can be added, edited and viewed in route planning. However when a route is loaded, the pilotage tools may not immediately be visible. Pilotage tools only become visible when ownship is in the leg preceding and/ or the leg containing the pilotage tool (see below).

CCRP REFERENCE

When a route is loaded in a navigation mode, the pilotage tool and route details are referenced to the CCRP of the vessel and not the centre line of the route.

NOTICE

The following functions are not detailed in the 'How do I...' section. It is therefore recommended that users familiarise themselves with the following functions prior to planning or editing a route.

9.3.1 Waypoint(s) & Channel widths

NEW WAYPOINT

When a route is being created, the following cursor options are available.

G_Start	15 0.5NM, 090*	00° 46 452' N 008° 02 605' W U End Of Route WP End 0.5NM, 090° from Pre-

Add WP/ Start Drag (left click):	Drops a waypoint at the current cursor position.
	or
	Press & Hold to drag the chart.
Finish Appending (middle click):	Finishes the route at the last placed waypoint (not the current cursor position).
Undo (right click):	Undo the last action.

EDIT A WAYPOINT

With the cursor placed over an existing waypoint, route details are shown next to the cursor and the following cursor options are available.

Start	15	00° 00.244' S
·	0.7NM, 090°	End Of Route WP WP 2
		0.7NM, 090° from Pre 0.7 NM from Start

Select Drag WP (left click):	Select a waypoint for editing.		
No function (middle click):	The middle button has no function.		
Select Action (right click):	Opens the Pilotage menu.		
With the waypoint selected, the cursor options change to:			
Accept position (left click):	Accept the position of the new waypoint.		
Undo (middle click):	Undo the last action.		
Undo (right click):	Undo the last action.		

ADD A WAYPOINT

With the cursor placed on the centre line of a route, route details are shown by the cursor and the following cursor options are available where a waypoint can be added.

G_Start	15	00° 00.244' S 000° 00.157'W 2 L Leg 1: 0.7NM, 090'
	0.7NM, 090-	Chan Width: [0.10]N Design Speed: [15]k Dist Along: 0.6 NM

Insert WP (left click):	Inserts a waypoint at the current cursor position.
No function (middle click):	The middle button has no function.
Select Action (right click):	Opens the Pilotage menu.
With the new waypoint selected	d, the cursor options change to:
Accept position (left click):	Accept the position of the new waypoint.
Undo (middle click):	Undo the last action.
Undo (right click):	Undo the last action.

DELETE A WAYPOINT

With the cursor placed over a waypoint, the following cursor options are available.

Using **Select Action** a waypoint can be deleted from the pilotage tools.

	15	
G Start		Wiselect/Action
	0.7NM, 090*	Add Head Mar
		Delete WP

Variable function (left click):

No function (middle click):

Select Action (right click):

If a waypoint is placed directly on-top of another waypoint, all waypoints in-between the two are deleted. Function is dependent on cursor position.

The middle button has no function.

Opens the Pilotage menu.



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CHANNEL WIDTH: SELECT & EDIT

With the cursor placed over the channel width, route details are shown by the cursor and the following cursor options are available.

G_Start	15 0.7NM, 090*	⊕ ^{₩P 2}
		00° 00.346' S 1000° 00.056' W Leg 1: 0.7NM, 090 Chan Width (0.10)N Design Speed (15)k Dist Along: 0.75k

Select Drag Edge (left click):	Select a channel width for editing.	
No function (middle click):	The middle button has no function.	
Select Action (right click): Opens the Pilotage menu.		
With the channel selected, the cursor options change to:		
Accept Change (left click):	Accepts the new position of a selected channel width	
Undo (middle click):	Undo the last action.	
Undo (right click):	Undo the last action.	

9.3.2 Waypoints in the Edit Routes tab

To manually select, insert or delete a waypoint or pilotage feature, place the cursor over the required waypoint or pilotage feature in the **Edit Routes** tab, the following cursor options are available:

Select Row (left click):	Selects the waypoint or pilotage feature below the current cursor position.
Insert New (middle click):	Inserts a waypoint between the current and next waypoint
Delete (right click):	Deletes the selected waypoint.

9.3.3 Head and Stern Mark

With the cursor placed over a waypoint, the following cursor options are available and additional Pilotage features can be added and managed.

Select Action (right click):	Opens the Pilotage menu.
No function (middle click):	The middle button has no function.
Variable function (left click):	Function is dependent on cursor position.

From Select Action left click on Add Stern or Head Mark.

Stern/ Head marks can only be added to the 1st and last waypoints in a route.

ADJUST MARK

The Head and Stern Mark range and bearings can be adjusted and by left clicking on the Orange square and dragging to the required position.

DESCRIPTION

The textual description, latitude and longitude etc. can be edited in the Edit Pilotage tab.

DELETION

Head and Stern Marks can be deleted by right clicking on the Head Mark orange square or the associated waypoint and selecting **Delete Stern/ Head Mark**.



9.3.4 Turn Parallel Index

With the cursor placed on a waypoint, the following cursor options are available and additional Pilotage features can be added and managed.

Select Action (right click):	Opens the Pilotage menu.
No function (middle click):	The middle button has no function.
Variable function (left click):	Function is dependent on cursor position.

From the Select Action menu, click on Add TURN PI

ADJUST RANGE

Left click on the junction of the arrow and PI line to select and adjust the range.

ADJUST PI LENGTH

Left click on the either end of the PI line to select and adjust the distance of the PI line.

DESCRIPTION

The textual description, latitude and longitude etc. can be edited in the **Edit Pilotage** tab.

DELETE TURN PI

Right click on the arrow for a Turn PI and select **Delete this Pilotage tool**. Alternatively they can be deleted from within the **Edit Pilotage** tab.







9.3.5 Clearing Range

With the cursor placed on the route, the following cursor options are available and additional Pilotage features can be added and managed.

Select Action (right click):	Opens the Pilotage menu.
No function (middle click):	The middle button has no function.
Variable function (left click):	Function is dependent on cursor position.

From the Select Action menu, click on Add Clearing Range.

ADJUST POSITION

Left click on the orange square to select and reposition the clearing range.

ADJUST RANGE

Left click on the edge of the clearing bearing to select and resize the clearing range.

DESCRIPTION

The textual description, latitude and longitude etc. can be edited in the **Edit Pilotage** tab.

DELETE

Right click on the orange square to delete the clearing range. Alternatively they can be deleted from within the **Edit Pilotage** tab.





9.3.6 Clearing Bearing

With the cursor placed on the route, the following cursor options are available and additional Pilotage features can be added and managed.

Variable function (left click):	Function is dependent on cursor position.
No function (middle click):	The middle

button has no function.

Select Action (right click):

Opens the Pilotage menu.

From the Select Action menu, click on Add Clearing Bearing.

ADJUST POSITION

Left click on the orange square to select and reposition the clearing bearing.

ADJUST BEARING

Left click on the edge to select and adjust the bearing of the clearing range.

RESIZE BEARING BOX

Click on the orange arrow to resize the clearing bearing.

NMT/ NLT

Right click on the orange square to:

- Select NMT (Not More Than).
- Select NLT (Not Less Than).

DESCRIPTION

The textual description, latitude and longitude etc. can be edited in the **Edit Pilotage** tab.

DELETE

Right click on the orange square to delete the clearing bearing. Alternatively they can be deleted from within the **Edit Pilotage** tab.





9.3.7 Pilotage Note

With the cursor placed on the route, the following cursor options are available and additional Pilotage features can be added and managed.

Select Action (right click):	Opens the Pilotage menu.
No function (middle click):	The middle button has no function.
Variable function (left click):	Function is dependent on cursor position.



From the Select Action menu, click on Add Pilotage Note.

ADJUST POSITION

Left click on the orange square to select and reposition the Pilotage note.

INFO / CAUTION

Right click on the orange square to:

- Select an INFO symbol.
- Select a CAUTION symbol.

DESCRIPTION

The textual description, latitude and longitude etc. can be edited in the **Edit Pilotage** tab.

DELETE

Right click on the orange square to delete the pilotage note. Alternatively they can be deleted from within the **Edit Pilotage** tab.



9.3.8 Cross Track PI

With the cursor placed on the route, the following cursor options are available and additional Pilotage features can be added and managed.

Opens the Pilotage menu.
The middle button has no function.
Function is dependent on cursor position.

From the Select Action menu, click on Add Cross Track PI.

ADJUST PI POSITION

Left click on the orange arrow to select and reposition the cross track PI.

ADJUST PI LENGTH

Left click on the end of the Cross track PI line to select and adjust the distance of the line.

DESCRIPTION

The textual description, latitude and longitude etc. can be edited in the **Edit Pilotage** tab.

DELETE

Right click on the orange square to delete the pilotage note. Alternatively they can be deleted from within the **Edit Pilotage** tab.









9.3.9 Add ruler

With the cursor placed on the centre line of a route, the following cursor options are available that allow a ruler to be added to a route.

- The add ruler function is not present when the cursor is directly over a waypoint.
- Multiple rulers can be added as part of route planning.
- Rulers are saved and can be recalled in route planning mode but are *not displayed in navigation screens* when a route is loaded.

Select Action (right click):	Opens the Pilotage menu.
No function (middle click):	The middle button has no function.
Variable function (left click):	Function is dependent on cursor position



With the pilotage menu open, select **Add Ruler** and a ruler is placed with one end pointing towards the centre line of the route. Data on the ruler is also added to the **Edit Pilotage** tools menu at the bottom of the route planning screen.

ADJUST RULER LENGTH

Only one end of the ruler can be selected.
The adjustable end is

identified by a square around the arrow.

- Left click and release on the variable end of the ruler. The cursor option changes to **Start Drag Item** and the length and bearing of the ruler can be adjusted.
- Use the Undo buttons (middle or right click) to undo previous moves.
- To accept the new ruler length, left click (accept changes) and the ruler is dropped at the current cursor position.

MOVE RULER

- Left click and release on the dot located at the centre point of the ruler line. The cursor option changes to **Start Drag Item** and the position of the ruler can be adjusted.
- Use the Undo buttons (middle or right click) to undo previous moves.
- To accept the new position, left click (accept changes) and the ruler is dropped at the current cursor position.

CONFIGURE RULER

Data for rulers can be configured in the **Edit Pilotage** tab of the route data which is located at the bottom of the screen. Rulers are listed under type name Ruler:

	Route : New Route	Save / PDF	Mana	age Files	Chec	K)	Edit F	Poute	Edit Dila	itano	Edit CPs		Undo / Redo
Туре	Name/Text						Bearing	Category	On Leg	Colour	Distance		Append
RULER		49	9° 41.943' N	001° 28.515' W				INFO		Auto	14.2 NM	٦٢	Reverse Route
													WGS84 •
													UTC +00:00

Name/ Text:A name can be assigned to each ruler.Lat/ Lon:The latitude & Longitude for the adjustable end of the ruler.Category:This will always read Info.On leg:The leg of the route where the ruler was originated.Colour:Rulers can be Auto (orange), green, cyan or magenta.Length:The length of the ruler can be manually adjusted/ fine-tuned by entering the desired value. When a length is changed in the Edit Pilotage menu, the variable end of the ruler is the end that is moved.

9.3.10 Edit pilotage tab

Once a pilotage tool has been added, the parameters (name, position etc.) can be manually edited in the **Edit Pilotage** tab.

	Route : BRAMBLE TES	T)	Save / Pl	DF	Manage	Files	Check 4 days since ap	proval	Edit Ro	oute	Edit Pi	otage	Edit CF	Ps
WP	Name	Latitude	Longitude	Turn Type	Radius	Turn Rate	Planned TOA	Leg Length	Bearing	Chan Width	Speed	Leg Type	Dist Along	Chk
					0.500 NM	30 °/min	Reset Times			0.100 NM	5.0 kn			
1	WP1	50° 49.124' N	001° 17.802' W				10/04/17 09:27	0.335 NM	137.0°	0.100 NM	5.0 kn	RHUMB	0.000 NM	
2	WP2	50° 48.879' N	001° 17.442' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:31	0.491 NM	170.4°	0.100 NM	5.0 kn	RHUMB	0.335 NM	
3	WP3	50° 48.396' N	001° 17.314' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:37	0.354 NM	208.0°	0.100 NM	5.0 kn	RHUMB	0.826 NM	
4	WP4	50° 48.084' N	001° 17.576' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:41	0.487 NM	239.4°	0.100 NM	5.0 kn	RHUMB	1.18 NM	

To enter or amend a position of for example **51°29.705 N** highlight the latitude or longitude line and enter **51 29.705 N** ensuring you leave spaces as shown.

All other values are entered or amended by clicking in the text field and entering the desired value using the keyboard.

9.3.11 Editing route details

Having created a route, some details may require fine-tuning or adjustment.

NOTICE

The following functions are not detailed in the '**How do I**...' section. It is therefore recommended that users familiarise themselves with the following functions prior to planning or editing a route.

As waypoints, pilotage features and critical points (CP) are added to a route, they are listed in the **Edit Route** box and tabs shown below.

DEFAULT VALUES AND SET TO DEFAULT

A number of cursor functions show **Set to default** as an option, what is this? Values entered in the first line of a route (the line without a waypoint number) set a **default value** for the remainder of the route.

For example, if a channel width default value is set as 0.100 NM, all subsequent channel widths will be 0.100 NM, however individual values can then be manually adjusted by clicking in the required field.

These default values apply to **Radius of turn**, **Rate of turn**, **Channel Width** and **Speed** but not planned TOA (see section 9.3.12).

If one of these values is changed, it can be returned to the original default value by right clicking on **Set to Default**.

	Route : BRAMBLE TES	τ Ì	Save / PI	DE]	Manage	Files	Check)						
<u> </u>		·	Caro		manage	24	4 days since ap	proval	Edit Ro	oute	Edit Pil	otage	Edit CF	s
WP		Latitude		Turn Type		Turn Rate	Planned TOA	Leg Length	Bearing	Chan Width	Speed	Leg Type	Dist Along	Chk
					0.500 NM	30 °/min	Reset Times			0.100 NM	5.0 kn			
	WP1	50° 49.124' N	001° 17.802' W				10/04/17 09:27	0.335 NM	137.0°	0.100 NM	5.0 kn	RHUMB	0.000 NM	
	WP2	50° 48.879' N	001° 17.442' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:31	0.491 NM	170.4°	0.100 NM	5.0 kn	RHUMB	0.335 NM	
	WP3	50° 48.396' N	001° 17.314' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:37	0.354 NM	208.0°	0.100 NM	5.0 kn	RHUMB	0.826 NM	
	WP4	50° 48.084' N	001° 17.576' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:41	0.487 NM	239.4°	0.100 NM	5.0 kn	RHUMB	1.18 NM	
4	WP4	50° 48.084' N	001° 17.576' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:41	0.487 NM	239.4°	0.100 NM	5.0 kn	RHUMB	1.18 NM	

Edit routes tab in route planning

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CHANGING VALUES IN EDIT ROUTE

The following details the parameters that can be changed in the *Edit routes* tab.

Description	Function
WP	Waypoint number: This is the sequential waypoint number and cannot be changed. Where pilotage tools are added, they are added in-between the relevant waypoint number.
Name	Waypoint name: The name or description of a waypoint can be added and will be displayed on the route.
Latitude/ Longitude	Position of the waypoint: Waypoint positions can be manually added and amended. To enter a position of 51°29.705 N highlight the line and enter 51 29.705 N ensuring you leave spaces as shown.
Turn type	Select the turn type: Left click on the <i>Turn Type</i> for each waypoint and select from <i>Radius</i> or <i>ROT</i> (Rate of turn); the default is Radius
Radius	Sets the radius of the turn: The value at the top of the list (no waypoint number) sets the default value for the entire route. Left click to adjust a value / Right click to return to the default value. Note: When ROT is selected as a Turn Type, the radius value for the same waypoint cannot be set.
Turn rate	Sets the rate of turn: The value at the top of the list (no waypoint number) sets the default value for the entire route. Left click to adjust a value / Right click to return to the default value. Note: When Radius is selected as a Turn Type, the ROT value for the same waypoint cannot be set.
Planned TOA	Planned time of arrival: Sets a date and time of arrival for each waypoint (see following page).
Leg Length	Distance between waypoints: The length of each leg can be manually set or adjusted.
Bearing	Bearing of leg: The bearing of each leg can be manually set or adjusted.
Chan Width	Channel width: Sets the width of the channel either side of the vessel. The value at the top of the list (no waypoint number) sets the default value for the entire route. If ownship position is outside the channel width a <i>Cross track error (XTE)</i> Alert is generated. Left click to adjust a value / Right click to return to the default value.
Speed	Set the route/ leg speed: The value at the top of the list (no waypoint number) sets the default value for the entire route. Left click to adjust a value / Right click to return to the default value.
Leg Type	Rhumb or GT CIRC: Select between <i>Rhumb</i> Line or <i>Great Circle</i> ; the default is <i>Rhumb line</i> .
Distance along	Cumulative distance: The cumulative distance for each leg on a route.
Chk	Check: Shows the number of issues identified in each leg during safety checking.

9.3.12 Planned TOA

Individual times and dates can be configured for each waypoint. The time and date can also be set into the future.

DATE & TIME FORMAT

All Planned TOA entries must be set as **DD /MM /YY** and **HH:MM** (24 hour).

MANUAL ENTRY

With the cursor placed over a **Date/ Time** for an individual waypoint, the following options are available:

Set for Data Entry (left click):	Enables the date and time to be edited.
No function (middle click):	The middle button has no function.
Set to Default (right click):	Returns the date and time default.

Use the keyboard to enter the desired date and time of departure for waypoint. When the value is entered/ accepted, the text changes colour from **Yellow** to **White**.

SET FUTURE TIME & DATE

With the cursor placed over **Reset Times** the following options are available:

Set Voyage Times (left click):	Open Reset Planned Times for route.
No function (middle click):	The middle button has no function.
Clear Planned Times (right click):	Resets all TOAs to default.

When **Set Voyage Times** is selected, **Rest Planned** Times for Route is presented.

Departure time

Enter the required date and time.

Local Time

Tick *Local Time* if departure is to occur at local time. Un-tick if departure is to occur at UTC time.

Click on **Set Departure Time** and the date and time configured is set as the **Planned TOA** for waypoint 1.

The text for this date and time changes colour from yellow to white.



UPK 2200 1 jaqua 12
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 Manage Files
 Check
 Edit Route

 m Type
 Radius
 Tum Rate
 Planned TOA
 Leg Length
 Bearing
 Chan Width

 0 500 NM
 30 */min
 Reset Times
 0.100 NM
 0.100 NM

 22/08/12 06:22
 1.96 NM
 066 6*
 0.100 NM

 NDIUS
 0.500 NM
 29 */min
 22/08/12 06:23
 1.51 NM
 066 6*
 0.100 NM

 NDIUS
 0.500 NM
 29 */min
 22/08/12 08:35
 1.20 NM
 060 0*
 0.100 NM

 NDIUS
 0.500 NM
 29 */min
 22/08/12 08:35
 1.20 NM
 060 0*
 0.100 NM

 NDIUS
 0.500 NM
 29 */min
 22/08/12 08:35
 1.20 NM
 060 0*
 0.100 NM

CHANGE THE PLANNED TOA FOR OTHER WAYPOINTS.

To change the date and time for all other waypoints, click on the date and time and enter the required date. When a date and time is changed the text changes from yellow to white.

Yellow text (Default):The planned TOA is automatically calculated using the set speed and
distance for the leg.White text (set):The speed for the WP/ leg is calculated for arrival at the planned TOA.

ALL PLANNED TOA SHOWN IN YELLOW

In the example below, the planned TOA (**WPs 1 to 5**) are in yellow at the default values, i.e. the planned TOA is calculated using the set speed and leg length. The time and date shown reflects the time that the route was opened for editing.

WP	Name	Latitude	Longitude	Turn Type	Radius	Turn Rate	Planned TOA	Leg Length	Bearing	Chan Width	Speed	Leg Type	Dist Along	Chk
				1	0.500 NM	30 */min	Reset Times		الكسار	0.100 NM	15.0 km			
1	WP1	51* 28.969' N	000* 56.992' E			and the second sec	22/08/12 11:03	1.86 NM	066.6*	0.100 NM	15.0 kn	RHUMB	0.000 NM	
2	WP2	51° 29.705' N	000° 59.721' E	RADIUS	0.500 NM	29 °/min	22/08/12 11:10	1.51 NM	067.0*	0.100 NM	15.0 kn	RHUMB	1.86 NM	
3	WP3	51° 30 295' N	001° 01.944' E	RADIUS	0.500 NM	29 °/min	22/08/12 11:16	1.20 NM	060.0*	0.100 NM	15.0 kn	RHUMB	3 37 NM	-
4	WP4	51* 30.897' N	001* 03.611'E	RADIUS	0.500 NM	29 */min	22/08/12 11:21	0.999 NM	060.4°	0.100 NM	15.0 kn	RHUMB	4.57 NM	-
5	WP5	51" 31 390' N	001° 05.002' E				22/08/12 11:25						5 57 NM	

DEPARTURE DATE SET (WP1)

In the example below, the Planned TOA has been set to 23/08/2012 00:00 and is shown in white text (set). WPs 2 to 5 are still in yellow text (default) so their planned TOA is calculated using the set speed and leg length.

WP	Name	Latitude	Longitude	Turn Type	Radius	Tum Rate	Planned TOA	Leg Length	Bearing	Chan Width	Speed	Leg Type	Dist Along	Chk
		_			0.500 NM	30 °/min	Reset Times			0 100 NM	150 kn			
1	WP1	51* 28.969' N	000* 56.992' E				23/08/12 00:00	1.86 NM	066.6*	0.100 NM	15.0 kn	RHUMB	0.000 NM	
2	WP2	51° 29.705' N	000° 59 721' E	RADIUS	0.500 NM	29 °/min	23/08/12 00:07	1.51 NM	067.0°	0.100 NM	15.0 kn	RHUMB	1.86 NM	
3	WP3	51* 30.295' N	001° 01.944' E	RADIUS	0.500 NM	29 */min	23/08/12 00:13	1.20 NM	060.0*	0.100 NM	15.0 kn	RHUMB	3.37 NM	
4	WP4	51* 30.897' N	001* 03.611' E	RADIUS	0.500 NM	29 */min	23/08/12 00:18	0.999 NM	060.4*	0.100 NM	15.0 kn	RHUMB	4.57 NM	
5	WP5	51° 31.390' N	001° 05.002' E				23/08/12 00 22						5 57 NM	

PLANED TOA SET MID-ROUTE

In this example WP1 is still set to 23/08/2012 00:00 in white text (set). WP3 has now been set to 23/08/2012 02:00 and is shown in white text (set). WP2 is still in yellow (default) but the speed has been calculated to 1.7 kn so that the planned TOA between WP1 and WP3 can be achieved. WPs 4& 5 remain in yellow (default) with their planned TOA calculated using the set speed and leg length.

WP	Name	Latitude	Longitude	Turn Type	Radius	Turn Rate	Planned TOA	Leg Length	Bearing	Chan Width	Speed	Leg Type	Dist Along	Chk
					0.500 NM	30 °/min	Reset Times			0.100 NM	15.0 kn			
1	WP1	51° 28 969' N	000° 56 992' E		NA PENDANANA		23/08/12 00:00	1.86 NM	066.6°	0.100 NM	1.7 kn	RHUMB	0.000 NM	-
2	WP2	51° 29 705' N	000° 59.721' E	RADIUS	0.500 NM	29 °/min	23/08/12 01:06	1.51 NM	067.0°	0.100 NM	1.7 kn	RHUMB	1.86 NM	-
3	WP3	51° 30 295' N	001° 01 944' E	RADIUS	0.500 NM	29 °/min	23/08/12 02:00	1.20 NM	060.0°	0.100 NM	15.0 kn	RHUMB	3.37 NM	
4	WP4	51° 30.897' N	001° 03.611' E	RADIUS	0.500 NM	29 °/min	23/08/12 02:04	0.999 NM	060.4°	0.100 NM	15.0 kn	RHUMB	4.57 NM	-
5	WP5	51° 31 390' N	001° 05 002' E				23/08/12 02:08						5.57 NM	

WP1 RESET TO DEFAULT

WP1 has been reset to default and is now shown in yellow text. The planned TAO and speed for WP1 to WP2 is calculated using the speed, leg length and the planned TOA set for WP3.

WP3 is still manually set to 23/08/12 02:00 and shown in white (set).

WP4 & 5 remain in yellow (default) with the planned TOA calculated using the set speed and leg length.

WP	Name	Latitude	Longtude	Turn Type	Radius	Turn Rate	Planned TOA	Leg Length	Bearing	Chan Width	Speed	Leg Type	Dist Along	Chk
					0.500 NM	30 °/min	Reset Times			0.100 NM	15.0 kn			
1	WP1	51" 28.969' N	000* 56.992' E	1			23/06/12 00:46	1.86 NM	066.6*	0.100 NM	15.0 kn	RHUMB	0.000 NM	
2	WP2	51° 29.705' N	000* 59.721' E	RADIUS	0 500 NM	29 °/min	23/08/12 00:53	1.51 NM	067.0°	0.100 NM	15.0 kn	RHUMB	1.86 NM	
З	WP3	51° 30.295' N	001° 01 944' E	RADIUS	0.500 NM	29 °/min	23/08/12 01:00	1.20 NM	060.0*	0.100 NM	15.0 kn	RHUMB	3.37 NM	
4	WP4	51° 30.897' N	001° 03 611' E	RADIUS	0 500 NM	29 °/min	23/08/12 01:04	0 999 NM	060.4°	0.100 NM	15.0 kn	RHUMB	4.57 NM	
5	WP5	51° 31.390' N	001° 05.002' E				23/08/12 01:08						5.57 NM	

RESET ALL TIMES All Planned TOAs can be reset to the cursor on Paset Times and se	default by placing		Manage	Files	Check Hol Approve		Edit Ro	oute
Planned Times:	electing clear	па туре	0.500 NM	30 °/min	Reset Times	Leg Lengh	Deaning	0.100 NM
Set Voyage Times (left click):	Opens Reset Planned Times for route.	VDIUS VDIUS VDIUS	0.500 NM 0.500 NM 0.500 NM	29 */min 29 */min 29 */min	22/08/12 08:29 22/08/12 08:29 22/08/12 08:35 22/08/12 08:40	1.51 NM 1.20 NM 0.999 NM	066.6 067.0* 060.0* 060.4*	0.100 NM 0.100 NM 0.100 NM 0.100 NM
No function (middle click):	The middle button h	as no	functi	on.				
Clear Planned Times (right click):	Resets all TOAs to	defa	ult.					

9.3.13 Append button

With the cursor placed over the **Append** button, the following options are available:

Append Waypoint (left click):	Adds a new waypoint to the end of the route and selects it for editing. When first selected, the chart will centre on the waypoints current position.
No function (middle click):	The middle button has no function.
Append route component (right click):	Opens the Append Component Route Files menu. This allows the generation of a compound route that uses existing saved routes. See section 9.4.5 for details.

9.4 Route planning: How do I...?

9.4.1 Create / Save a new route

a) Create New Route

Place the cursor over the route selection button and the following options are available:

Select route to edit (left click): Selects a route to be edited.

No function (middle click): The middle button has no function.

Create new route (right click): Starts a new route.

Click **Create New Route**. If a route is already open in route planning, a warning is presented noting that the previous route will be closed and any changes lost.

MAXIMUM LENGTH OF ROUTE NAME

- Route names must not exceed 30 characters.
- Routes with names of 30 characters or more may not load.
- b) Create the desired route.

c) Safety checking

As required, the route should be safety checked and approved for use.

NOTICE: UNAPPROVED ROUTES

Unapproved routes cannot be loaded when a navigation mode has been selected.

d) Save the route.

To save the route, place the cursor on Save/ PDF and left click Save Route to File.

e) No route folder required, name the route

Where no route folders exist or folders are not required, enter a name for the route in **Route/ File name**, press **Save** and continue to point 7.

f) Create a new folder

Folders can be used to store selected routes e.g. a folder called Ports on the South Coast, Transatlantic routes etc.

To create a new folder, click **New Folder** in the Save route menu and **Create/ Rename Folder** opens.

Enter a name for the folder and click Accept.

Select the newly created folder from the list in the **Save Route** menu.

Enter a name for the route to be saved in **Route/ File name** and press **Save.**

g) Save a route in an existing folder

If folders have already been created select the folder where the route is to be saved. Enter a name for the route in **Route/ File name** and press **Save**.



Pressing **Cancel** in the **Save Route** menu abandons the save function and returns the user to the route planning menu.



(Create/Rename Folder	X
Selected Folder: A		
New Folder Name:		
	Accept	

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i) Abandon changes.

Returning the display to Standby will abandon any changes made to a route without saving.

The system will warn that **Abandon Changes to xxx?** (where xxx is the name of the route currently being edited).

YES: All changes to the loaded route are lost, the system will return to the standby screen. NO: Cancels the action and returns the user to route editing.

9.4.2 Protect a route

When a route is protected, all route editing functions for the route are suspended. This includes all editing functions within route planning and temporary route editing within Radar and ECDIS modes.

A route can be protected during the Save process using the **Protect Route** check box.

PREPARATION

All editing, pilotage tools, critical points and safety checking of a route should be completed prior to selecting Protect Route.

Route/File Name	
$ \Lambda $	
New Folder	Approve Route
	Protect Route
Cancel	Save
Pouto Sovo function	showing Protect Pouto hox

Route Save function showing Protect Route box checked.

Once protected, it is not possible to safety check a route or add route features such as pilotage information etc.

PROTECT A ROUTE

- a) Open or finish editing the required route.
- b) Safety check and Approve the route
- c) Tick/ select the Protect Route box.
- d) Save the route.

The route is now protected and cannot be edited, amended or safety checked.

UNPROTECT A ROUTE

Protection cannot be removed from a route. If the route is required without protection, it must be saved under a different name with **Protect Route** deselected.

9.4.3 Open, edit and save an existing route

a) Load a route.

Place the cursor over the **Route: Not Loaded** button, the following cursor options become available:

Select route to edit (left click):	Selects a route to be edited.
No function (middle click):	The middle button has no function.
Create new route (right click):	Starts a new route.

Left click on Select Route to Edit and a list of available route is presented,

Select the required route and click **Load.** If a route is already open for editing, a warning is presented noting that the previous route will be closed and any changes lost.

b) Edit and safety check the route as required. PROTECTED ROUTE?

If route editing functions cannot be accessed, the route may be protected. See section 9.4.2 for details.

NOTICE UNAPPROVED ROUTES

Unapproved routes cannot be loaded when a navigation mode has been selected.

c) Save the route.

To save the route, place the cursor on **Save/ PDF** and press **Save Route to File.** The route is saved.

d) Route name.

The existing route name is automatically shown in Route/ File name.

Press Save to save the edited route with the same name.

A warning is presented noting that the route already exists.

Press **OK** to replace the old version of the route with the edited version.

Press **Cancel** to exit save and return to route planning (changes to the route are NOT lost).

MAXIMUM LENGTH OF ROUTE NAME

- Route names must not exceed 30 characters.
- Routes with names of 30 characters or more may not load.

e) Cancel the Save.

Pressing **Cancel** in **Save Route** abandons the save function. The system returns to route planning; changes made to the route currently loaded are not lost.

f) Abandon all changes.

To abandon any changes made to a route click on the Stand-By button.

The system will warn that Abandon changes to xxx (where xxx is the name of the route).

- YES: All changes to the loaded route are lost, the system will return to the standby screen.
- **NO:** Cancels the action and returns the user to route editing.



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9.4.4 Opening edited versions of a route

When an edited route is selected and loaded in route planning, the system gives the option of opening the **Original Planned** route or an **Edited** version of the route:

Select edited version to load for		en an	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				1.1.1	1.1.1.1		1.1.1.	1.1.1.1.	1.1	
Not Loaded	Save / PE	DF] [Manage	Files	Check			ute		alara			
Original Planned 🔹 🔻	Lonaitude	Turn Type	Radius	Turn Rate	Planned TOA	Lea Lenath	Bearing	Chan Width	Speed	Leg Type	Dist Alona	S Chk	ł
			1.0 NM	30°/min				0.5 NM	15.0 kn				
Delete Edited Versions													

a) Original Planned route.

If an **Original Planned** version of a route is opened, edited and saved, all temporary edits are overwritten and are lost.

	Select edited version to load for	-
	Not Loaded	
	Original Planned	
Origina Edit 14	l Planned /03/2012 12:22	
	Delete Edited Versions	

b) Edited version of a route.

Edited versions of a route will show the time and date the revision(s) were made.

When an Edited version of a route is opened, edited and saved, all previous edits and the Original Planned route are overwritten with the edited version being saved.

			X
	Gelect edited ver	rsion to load for	
	Not Lo	baded	
	Original P	lanned	▼
Original Pl Edit 14/03	anned /2012 12:22		
	Delete Edite	d Versions	1

c) When opened, an edited version of a route can be saved using a new name. The original route can then be opened and the edited version(s) deleted as shown in the next step.

d) Deleting edited versions.

When opening an edited route, clicking **Delete Edited Versions** deletes all temporary edits of a route leaving the Original Planned route unchanged.

In networked systems, all changes made are automatically shared across the network.

	Select edited version to load for	
	Not Loaded	
	Original Planned	.
Origina Edit 14	l Planned /03/2012 12:22	
	Delete Edited Versions	

9.4.5 Component route creation (APPEND button)

Append Route Component allows the creation of a route using a combination of existing saved routes.

EXAMPLE: Two routes have been created and saved in the route library as **Exit from Dover** and **Entry to Calais**. The Exit from Dover route is added and a continuation of the route generated using the normal route planning tools. The Entry to Calais route can be added then the whole route saved as a single route.

a) CREATE A NEW COMPOUND ROUTE

Place the cursor over the Append button and the options shown are available:

Append Waypoint (left click):	Append the selected waypoint.
No function (middle click):	The middle button has no function.
Append route component (right click):	Edit a component of a route.

Right click and **Append Component Route Files** opens where existing routes can be added from the Route library to the Compound route files

b) ADD AN EXISTING ROUTE

In Append Component Route Files, left click on the desired route and then click Append to route >>>.

The selected route is added to **Component Route Files**.

The route is also presented on screen and in Edit routes.

To assist in identification, components (added routes) of a compound route are highlighted in the edit route dialog in Magenta.

Routes added in error can be selected and removed using the **Remove from Route >>>** button.

c) PLAN THE NEXT LEG

Close the **Append Component Route Files** dialog.

With the cursor placed over the **Append** button in the main route planning menu, left click on **Append waypoint**.

A new waypoint is added to the end of the route and is selected for editing.







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d) NEW WAYPOINTS

When new waypoints are added they are not highlighted in edit route.

This makes it easier to identify the components of a compound route.

e) ADD ANOTHER SAVED ROUTE To add another saved route, right click on the append button to open Append Component Route Files.

Component Route files will show the previously added routes and the waypoints manually entered.

Select the next desired saved route and then press **Append to Route >>>**.

The selected route is now added and is automatically joined to the last waypoint in the route thus creating one continuous route.

Protected routes can be added but the protection is removed from the new route when it is saved.

Waypoints added to the Component of a compound route which are not route. In this example the highlighted in the edit route highlighted section is the dialog. route that was added. Route Folder Route Library Component Route Files Entry to a port t Route Folder: Route Library ent Route File Entry to a port Exit from a port

f) SAFETY CHECK

When the route has been completed, it should be safety checked and approved for use.

NOTICE UNAPPROVED ROUTES

Unapproved routes cannot be loaded when a navigation mode has been selected.

g) SAVE

The route can now be saved as detailed in section 9.4.1

Note: Updating route. Where a saved route is added to a compound route, changes to the original are not shared to the new route. These must be individually updated and maintained.

APPEND ROUTE WARNINGS AND ALERTS SAME COMPONENT (ROUTE) ADDED TWICE



A component route has already been used in the route being created; when the operator attempts to add the component again (effectively duplicating it) the above warning is triggered and the action is cancelled.

DELETING A WAYPOINT



If the deletion of a waypoint in a compound route only leaves 1 waypoint in a route component, the entire component is removed.

ROUTE WILL NOT LOAD

Load Rou	ute Failure
٢	Only part of this route has been loaded. Component Route .\Channel Routes\Dover\Dover Out E.route is included more than once.
	OK

In very rare occasions, a route generated in earlier versions of software can contain the same component of a route (duplication); these cannot be loaded and the route would need to be replanned.

9.4.6 Safety check overview

Using the chart database installed on the system, the **Check** function scans the path of a loaded route for potential hazards which are then identified on screen.

WARNING Successful safety checking of a route is fully dependent on the following factors: Installed charts and permits must be fully up to date. Ships safety settings (depth, contour, safety contour etc.) are fully and correctly set.

PROTECTED ROUTE

Routes must be fully safety checked prior to saving as a protected route; see section 9.4.2 for details.

CHECK BUTTON NOTICES

In route planning, the text below the **Check** button shows the current status of the safety check for the loaded route:

Route : BRAMBLE TEST Save / PDF Manage Files Check Undo / Redo								Undo / Redo	Scale 1:11,	686 🛛 🗸	Chart Settings						
													Chk	Append	Daylight		
					30 °/min	Reset Times											
WP1	50° 49.124' N	001* 17.802' W				10/04/17 09:27	0.335 NM	137.0°	0.100 NM	5.0 kn	RHUMB	0.000 NM	[Reverse Route			
WP2	50° 48.879' N	001* 17.442' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:31	0.491 NM	170.4°	0.100 NM	5.0 kn	RHUMB	0.335 NM		WGS84			
WP3	50° 48.396' N	001° 17.314' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:37	0.354 NM	208.0°	0.100 NM	5.0 kn	RHUMB	0.826 NM	L	110004	Go to	Show Sync	Capture
WP4	50° 48.084' N	001* 17.576' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:41	0.487 NM	239.4*	0.100 NM		RHUMB	1.18 NM		UTC +00:00	StandBy	Status	Screen



Check text empty: If there is no text below the check box, a route has been loaded.

Not Checked: Where Not Checked is displayed, the loaded route has not been safety checked.





Results Ready: The route has been checked but the results have not been accepted/ saved.

Results saved: The route check has been run, accepted and saved.



Check overdue: The route check was run, accepted and saved *xx* days ago where *xx* is the number of days since the last check was run.

CHECK BUTTON OVERVIEW

With the cursor placed over the **Check** button, the following cursor options are available.

Safety check (left click):	A user configurable safety check.
Accept/Clear Results (middle click):	Accepts the safety check results and clears the results from the screen. Note: this button only becomes available when a safety check has been carried out.
Configure check (right click):	Opens Configure Parameter and initiate route checking menu.

ROUTE CHECKING PRELIMINARIES

Before running a safety check, the objects to be checked along the path of the route must be configured using **Configure Check** (see next page).

In addition and prior to running a safety check or approving a route for use, the following must be checked.

- All relevant charts and permits must be fully up to date.
- The ships safety settings (depth, contour, safety contour etc.) are fully and correctly set.

COMPOUND ROUTE

When safety checking a compound route, the components of a compound route are also checked and approved for use.

TIME VARYING OBJECTS

Some components of the route will only be visible at certain times.

Each separate leg of the journey will be checked using a range of dates derived from the planned Time of Arrival (TOA) of the start and end waypoints of the leg.

The display date range for the start and end dates of the whole route are based on these planned waypoint start and end TOAs. It is important these are correctly set or Time Varying Objects may not be displayed.

WARNING

Time Varying Objects will not be displayed if the Start and End TOAs of each leg are not correctly set.

9.4.7 Safety check parameters

With a route loaded and the cursor over the **Check** button, right click on **Configure check** to open **Configure Parameter and Initiate Route Checking**.





Add to Safety Checks

Objects can be added to the safety check list by selecting individual items or groups of items from the list of **Objects in Full Check** and pressing the **Add to Safety Checks** button.



Remove From Safety Check

Objects can be removed from the objects in safety check list by selecting individual items or groups of items and pressing **Remove From Safety Check.**



Reset Safety Checks

This resets **Objects in Safety Check** to the IMO recommended level (the same as a full check).

Safety and Depth Contours

Sets the safety depth and contour for the vessel.

Safety Height

Sets the safety height for the vessel.

Link Safety Depth and Contour

Links the Safety contour and depth values. The setting is directly linked to the values set in chart settings.

NOTICE Safety & depth Contours

Safety values are directly linked to these set in chart settings. Changing the safety settings in configure check also changes the values in chart settings and visa-versa.

Safety Check Safety Check button

Scans the selected route using objects listed in Objects in Safety Check.

Full Check Button

Scans the selected route using objects in **Objects in Full Check**.

CAUTION

SAFETY CHECK DURATION

Safety checking long routes may take some time.

9.4.8 Safety checking a route

NOTICE CHARTS, PERMITS & CONTOURS

For accurate safety checking, charts and permits should be up to date and the vessel safety settings (contours) should correctly configured.

Sections of a route without permits or chart data are NOT safety checked.

- a) Load the route to be checked and configure the safety check objects using **Configure check** table (see previous section).
- b) To commence the safety check, place the cursor on the **Check** button and left click on **Safety Check**.

The system will scan the route for hazards using the objects listed in the **Objects in Safety Check**. A progress bar is shown during the scan showing the leg currently being scanned and the number of issues that have been identified.

> NOTICE SAFETY CHECK DURATION This is NOT a full safety check. Safety checking long routes may take some time.

c) When the safety check is complete, hazards are shown on screen. In the Edit Routes tab, the number of hazards identified in each leg of the route is shown in the Chk column.

Left clicking (Chart Query) on any hazard on the chart will open the **Chart Query** dialogue which will show the nature and description of the selected hazard.



d) Accepting safety check

With the cursor placed over Check, middle click on Accept/Clear Results. The system prompts with Approve route for use.

YES: Saves the safety check time and date and clears the results from the screen.

NO: Cancels the safety check and clears the results from the screen.

The route should now be saved as described in section 9.4.1.

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9.4.9 Full safety check a route

NOTICE CHARTS, PERMITS & CONTOURS

For accurate safety checking, charts and permits should be up to date and the vessel safety settings (contours) should correctly configured.

Sections of a route without permits or chart data are NOT safety checked.

a) Load the route to be checked, place the cursor on **Check** and right click on **Configure Check**.

In Configure Parameters and initialise route checking, Select Full Check.

The system will scan the route for hazards using the IMO recommended objects listed in the **Objects in Full Check**. A progress bar is shown during the scan showing the leg currently being scanned and the number of issues that have been identified.

NOTICE FULL CHECK DURATION

Safety checking long routes may take some time.

b) When the full check is complete, hazards are shown on screen. In the Edit Routes tab, the number of hazards identified in each leg of the route is shown in the Chk column. ^{NOTE} Left clicking (Chart Query) on any hazard on the chart will open the Chart Query dialogue which will show the nature and description of the selected hazard.



c) Accepting safety check

With the cursor placed over Check, middle click on **Accept/Clear Results**. The system prompts with 'Approve route for use.'

- YES: Saves the safety check time and date and clears the results from the screen.
- **NO:** Cancels the safety check and clears the results from the screen.

The route should now be saved as described in section 9.4.1.

NOTE: When a route beyond 85° is loaded (Radar, ECDIS, HAP apps), the following alert will be displayed at the bottom of the chart presentation area: Where >85°N is displayed, Chart presentation North of 85°N should not be used. Refer to paper chart is displayed. Where >85°S is displayed, Chart presentation South of 85°S should not be used. Refer to paper chart is displayed. The system will then display Route exceeds 85° Latitude, do you wish to continue checking (Yes/ No)?

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9.4.10 Clear the safety/ full check results from screen

- a) The results of a Safety Check or Full Check can be removed from the display without affecting the route. Once removed, the results can only be recovered by re-running a safety or full check.
- b) Place the cursor on Check and middle click on Accept/Clear Results.
 Note: The Accept/Clear results button only becomes available when a safety/ full Check has been run.

The system prompts with **Approve route for use**, select **NO**. The results of the check are removed from the screen, Safety/ Full check results are NOT saved.

9.4.11 Save & Approve a route

A route can be approved for use whilst it is being saved by ticking the **Approve Route** box. This tick box can only be accessed when a route is loaded and has been safety checked.

NOTES

- Route can also be approved for use during safety checking; see the safety checking section for additional details.
- Route approval is an indication that a route has been safety checked and approved for use by a Navigator, Captain or responsible person.
- Routes that have not been approved cannot be loaded when a navigation mode is selected.
- In an INS/ Networked system, the display being used must be set as a Data Resource Master. See section 6.31 for details.

Examples of Approve Route Check Box:



Route checked but not approved (route ready)

APPROVED ROUTE INDICATION

When a route is approved and loaded in ECDIS mode, a tick is shown on the Route Data Icon.

PROTECTED ROUTE?

Routes must be fully approved prior to protecting a route. See section 9.4.2 for details.





9.4.12 Auto-Save route

If the system is accidently shutdown during route planning or there is a power failure, the system automatically saves the route that is currently being created or edited.

When re-entering Route Planning after an unexpected shutdown a dialog is displayed stating: A previous edit session was aborted. Do you want to continue it?

- YES: Opens the auto saved version of the route and allows creation/ editing to be continued.
- **NO:** Opens route planning with no route loaded. Changes to the route being created/ edited before the unexpected shutdown are lost.

SAFETY CHECK IN AUTO-SAVE

Safety or Full checking results are NOT saved as part of an auto recovery. If a route was being safety checked at the time of the unexpected shutdown, the safety/ full check should be run again.

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9.4.13 Network sharing of routes

In an INS/ networked system, the Multi-Function Display being used to create/ amend a route should be configured as a **Data Resource Master** in **Network Settings.** This ensures that the workstation can share route information with the rest of the system.

See Data Resource within section 6.31 for general details on networking

HOW TO SHARE ROUTES?

Please refer to section 6.31.4 for details on how to share routes across the network using the **Sync Selected** function in **Data Resource**.

9.4.14 Critical points on a route

Once a route has been created or an existing route loaded, critical points can be added in route planning by selecting the **Edit CPs** tab:

Route : TEST ROUTE Save / PDF Manage Files Check	Edit Route Edit Pilotage Edit CPs	Undo / Redo	Scale 1:10,	,336 😐 🚽 🕅	Chart Settings
Critical Points on Route: TEST ROUTE	Add Critical Point	Append	Daylight		StandBy
		Reverse Route Kelvin Hughes			
		WGS84 , Chart Radar			Carture
		UTC +00:00	StandBy	Status	Screen

Click on Add Critical Point to open the Edit Critical Points menu.

CRITICAL POINT NAME:

Using the keyboard, enter a name for the critical point.

This is the name that is displayed on the route and is also shown as the Critical Point Alert message.

0.000 NM BEFORE WAYPOINT:

Assign the distance before the assigned waypoint where the Critical Point will appear on the route.

If left at zero, the Critical point name does not appear on the route.

WAYPOINT SELECTION

Use the drop down list to select the required waypoint on the loaded route.

	Edit Critical Point	X
Critical I	Point Name: 1	
0.000	0 NM before waypoint: WP1:WP1	•
Alert:	Time before Critical Point	
	Alert enabled	
	Accept Changes	

		Edi	t Critical Point		X
Critical P	oint N	Name: 1			
0.000	NM	before waypoint:		WP1:WP1	•
Alart.		Time before (WP1:WP1 WP2:WP2 WP3:WP3 WP4:WP4		
Alert:		Time before (ontioar i oint		
	•	Alert enabled			
			Accept Changes		

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ALERT

Use the drop down list to select: **Time Before Critical Point** (minutes) or **Distance Before Critical Point** (NM).

ALERT ENABLED

If **Alarm Enabled** is de-selected (not ticked) no alert will sound for the time or distance before a critical point.

ACCEPT CHANGES

Pressing Accept Changes adds the critical Point to the loaded route.

EDIT OR DELETE CRITICAL POINTS

 Edit Critical Point
 X

 Critical Point Name:
 1

 0.000 NM
 before waypoint:
 WP1:WP1

 Alert:
 Time before Critical Point
 0 min

 Time before Critical Point
 0 min

 Distance before Critical Point
 Image: Alert enabled

When a Critical Point has been added to a route, it can be edited or deleted from the **Edit CPs** tab. With the cursor placed over a Critical point, the following options are available:

Edit CP details (left click):	Opens the selected Critical Point for editing.
No function (middle click):	The middle button has no function.
Delete CP (right click):	Permanently Deletes the selected Critical Point.

SAVING

Critical points are automatically saved as part of a route when it is saved.

CRITICAL POINTS IN USE

When a route is loaded, at the configured time and/ or distance to the Critical Point (not the waypoint) an alert will be triggered showing the text entered in Critical Point Name.



CP: APPROACHING WAYPOINT 2

VISIBLE SCALE

Critical Points on a loaded route can only be viewed when the scale is 3.0 NM or less.

CRITICAL POINTS IN ECDIS MODE

Critical points can be monitored, added and edited in **Route Settings** / **Alarms** tab.

With a route loaded and the cursor placed over the **Route** icon, the following cursor options are available.

Select Main Route (left click):	Select and load a route.					
Route Settings (middle Click):	Opens the route settings.					
Deselect Route (right click):	De-selects the route that is currently loaded.					

Within Route Settings, select the Alerts tab.

Information on the next Critical Point on a loaded route is shown.

Selecting Edit Critical Points opens Add Critical Points where existing CPs can be added or deleted.

SAVING CHANGES?

Any changes or deletions are automatically saved to the route.

CLOSING DIALOG BOXES

Critical Points continue to be displayed on a route when the Add/ Edit Critical point dialog boxes are closed.



icon







Example of a Critical Point displayed in Route Settings / Alerts with the alert showing on-screen and in the alert dialogue.

9.4.15 Manage Files - an overview

Routes can be sorted into a folder or set of folders; this can be useful in managing systems with multiple routes.

NETWORK/ DATA RESOURCE MASTER

In an INS/ networked system, the Multi-Function Display being used to import routes should be configured as a **Data Resource Master** in **Network Settings.** This ensures that the workstation can share route information with the rest of the system. See Data Resource within section 6.31 for general details on networking

MANAGE FILES

Folders are identified as they have a back slash (1) at the end of the folder name e.g. South Coast.

Folders can also be created within folders so for example a folder called **South Coast** could contain another folder called **Approaches to Southampton**.

Folders and their contents are managed in route planning using Manage Files.

	Route : BRAMBLE TES	т	Save / Pl	DF	Manage	Files	Check 4 days since ap	oroval	Edit Ro	oute	Edit Pi	lotage	Edit CF	⊳s	Undo / Redo	Scale 1:11,	686 😐 🗸 🤇	Chart Settings
WP														Chk	Append	Daylight		
						30 */min	Reset Times											
1	WP1	50° 49.124' N	001* 17.802' W				10/04/17 09:27	0.335 NM		0.100 NM		RHUMB	0.000 NM		Reverse Route			
	WP2	50° 48.879' N	001° 17.442' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:31	0.491 NM	170.4°	0.100 NM		RHUMB	0.335 NM		WGS84			
	WP3	50° 48.396' N	001° 17.314' W	RADIUS	0.500 NM	10 °/min	10/04/17 09:37	0.354 NM	208.0°	0.100 NM		RHUMB	0.826 NM		110000	Go to	Show Sync	Capture
		50° 48.084' N	001* 17.576' W	RADIUS		10 */min		0.487 NM	239.4*			RHUMB	1.18 NM		LITC +00:00	StandBy	Status	Screen
L																		

With the cursor placed over Manage File, the option shown is available:

Manage Route Files (left click): Opens Route File Management page.

No function (middle & right click): The middle and right buttons have no function.

Route file management is divided into two columns:

- Current Route Folder 1.
- Current Route Folder 2.

New folders can be created and existing folders renamed.

The contents of the route library can be explored using both columns and routes copied or moved between folders.

Routes and folders can be individually or 'block' deleted.

Routes from removable media can be viewed, imported and deleted.

Ro	ute File Manageme	nt 🕺
Current Route Folder 1 Λ		Current Route Folder 2
	>>> Move	
	Copy >>>	
	<<< Copy	
	Move <<<	
Select All Routes		Select All Routes
Deselect All Routes		Deselect All Routes
New Folder		Delete Selected
Rename Selected Folder		View Removable Media

BASIC OPERATIONS WITHIN ROUTE FILE MANAGEMENT

OPEN/ SELECT A FOLDER

In **Current Route Folders 1** or **2**, with the cursor placed over a folder name, the following options are available:

Open folder (left click):	Opens the select folder.
No function (middle click):	The middle button has no function.
Select folder (right click):	Highlights the folder for renaming, moving, copying or deleting.

SELECT A ROUTE

When a file or folder has been selected, in Current Route Folders 1 and 2, with the cursor placed over a route, the following options are available:



Select/ Deselect (left click):	Selects the individual route or folder at the cursor position.	
No function (middle click):	The middle button has no function.	
Block Select/ Deselect (right click):	Use to select a group of routes or folders.	

GO BACK/ UP A LEVEL IN A FOLDER

To go back a level or return to the root directly of a folder, click on ...

SELECT/ DESELECT ALL ROUTES

In Current Route Folders 1 or 2 use the Select All Routes or Deselect All Routes buttons below the respective column to selects/ deselect routes in the folder being viewed.

9.4.16 Create / rename a folder

There are two methods for creating route folders.

- Using the Manage Files menu.
- Using **New Folder** whilst saving a route.

In networked systems, any changes made must be manually synchronised across the network using the **Data Resource** function within **Network Settings**. Please refer to section 6.31.4 for details on how to share routes across the network.

NEW FOLDERS... IN MANAGE FILES

Open the Manage Files menu and left click on New Folder and Create/Rename Folder opens.

Enter a name for the folder and click **Accept** and the new folder is created.

NEW FOLDER... WHILST SAVING A ROUTE

Whilst saving a route, click **New Folder** in the **Save Route** menu.

Create/ Rename Folder opens.

Enter a name for the folder and click Accept.

MAXIMUM LENGTH OF ROUTE NAME

- Route names must not exceed 30 characters.
- Routes with names of 30 characters or more may not load.

C	reate/Rename Folder	X
Selected Folder: A New Folder Name:		
	Accept	

Save Route		
Folder: .\		
North Sea\ South coast\ Approach to Hu Approach to So	ill uthampton	
Route/File Nan	ne	
Route/File Nan .Vapproach to S	ne Southampton	
Route/File Nan .VApproach to S New Folde	ne Southampton r Approve Route 0 days since approval	

RENAME A FOLDER

Folders can only be renamed using Manage Files.

Open the **Manage Files** menu and select the folder to be renamed (folders are selected by right clicking on the required folder).

Left click on Rename Selected Folder.

Enter a new name for the folder and click Accept.

c	reate/Rename Folder	X
Selected Folder: A New Folder Name:		
	Accept	
9.4.17 Move or copy routes between folders

When routes and folders have been created, routes can be moved and copied between folders as follows:

SELECT THE ROUTE(S) AND FOLDER

In **Current Route Folder 1**, select the destination folder.

In **Current Route Folder 2**, select the route, routes or folder to be copied.

When a route or group of routes has been selected, they can be transferred as follows:

Select the **Move** or **Copy** buttons as required.

In the example shown, a route has been moved *from current route folder 2* to *current route folder 1*. However files can be moved and copied in any direction.



Example of a route being Moved

Ro	oute File Manag	gement	X
Current Route Folder 1		Current Route Folder 2	
Approach to Southampton	Nove Copy Nove Copy Move	North Seal South coastl Approach to Hull	
Select All Routes		Select All Routes	
Deselect All Routes		Deselect All Routes	
New Folder		Delete Selected	
Rename Selected Folder		View Removable Media	

WARNINGS DURING COPY & MOVE

If a *Route or file* is moved or copied into a folder where the same route/ folder exists, a warning is presented with the following options:

Copy/Move R	oute Files and Folde		
ę	1 routes were not	copied. This may be because the How do you wish to proce	y would replace existing files. ed?
	Skip	Overwrite	View Affected

Skip: Overwrite: View Affected: Cancels the move or copy action, no files are changed. The files are moved and the original files are overwritten/ deleted. Presents a list of files that are duplicated.

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9.4.18 Deleting routes

Routes and folders can only be deleted from Current Route Folder 2.

Open the Manage Files menu.

In **Current Route Folder 2**, select the route(s) or Folder(s) to be deleted.

Left click Delete Selected.

A warning is displayed stating **Press OK to confirm delete**.

- OK: The selected route(s) are permanently deleted from the system.
- Cancel: Cancels the delete; no routes are deleted.

Route File Management Current Route Folder 1 Current Route Folder 2 Worth Sea rth Sea\ uth coast\ proach to Hull Test route >>> Move Copy >>> <<< Copy Move Select All Routes Select All Routes Deselect All Routes Deselect All Routes New Folder Delete Selected ne Selected Folder View Removable Media

9.4.19 Network sharing of routes

Once the required route(s) have been imported/ managed, they must be manually shared across the network using the **Data Resource** function within **Network Settings**.

Please refer to section 6.31.4 for details on how to share routes across the network.

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9.4.20 View and import routes from removable media

Compatible routes can be listed (viewed), copied (imported) and deleted from removable media such as USB flash memory.

Note: To prevent accidental deletion, files cannot be moved to external media.

CAUTION

Prior to use, all removable media used with HENSOLDT UK products MUST be fully scanned for viruses on a PC that has up to date anti-virus software installed.

- a) Use Manage Files to open the Route File Management menu.
- b) Tick/ select View Removable Media.

The contents of the removable media are displayed in **Current Route Folder 2**, the drive letter (i.e. 'G') is also displayed.

Note 1: The system will only show routes that are compatible with the HENSOLDT UK multi-function display running ZM-2300 software.

Note 2: To prevent accidental deletion of routes from a system, the **Move** <<< & >>> buttons are not available.

c) If no removable media is found the system displays a warning noting No removable medium found.

R	oute File Manag	ement	X
Current Route Folder 1		Current Route Folder 2 D:\	
North Sea\ South coast\ Approach to Hull	Copy Copy SSS Copy Move Cocy	Will's roules\	
Select All Routes		Select All Routes	
Deselect All Routes		Deselect All Routes	
New Folder		Delete Selected	
Rename Selected Folder		View Removable Media	

- d) Routes from removable media can be selected and imported into the system or system folders using the processes described in the previous sections.
 Routes can also be deleted from removable media using **Delete Selected**.
- e) If a duplicate route or route folder is found during a copy, a warning is presented stating: Routes were not copied. This may be because they would replace existing files. How do you wish to proceed?

Skip: Cancels the move of all duplicate routes or route folders but continues with the copy of all other selected files.

- **Overwrite**: Overwrites all duplicate routes or route folders with those selected for importing.
- View affected: Presents a list of all routes or route folders where a duplicate exists.

9.4.21 Routes from external sources

When a compatible route is received from an external source such as a GNSS it is stored in a folder called **Externally Sourced**.

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9.4.22 Backup and restore routes

The backup and restoration of routes is carried out using the **Backup & Restore** function which is accessed from the standby screen.

9.4.23 Printing a route

Routes cannot be printed directly from the display, however they can be exported to a virus free USB memory device in a PDF format for printing on a PC.

The USB memory device can be connected into the USB socket located on the keyboard/ tracker ball assembly. See section 4.15 for details on unlocking the USB socket.

- a) In Route Planning, load the required route.
- b) Place the cursor over the Save / PDF button and Right click on Save Route as PDF.
- c) From the pop up box, select the required memory location.
 - C:\ Operating System (do not use).
 - D:\ Main program (do not use).
 - E:\ User data (do not use).
 - F:\ Internal memory device.

G:\ External USB memory device.

If the drive letter(s) cannot be seen, click on '.../' which will take the browsing window backup one level.

d) The route will be exported in a PDF format as shown below.

ROUTE INFORMATION FOR BRAMBLE TEST											
Datum WGS84											
WP	Name	Latitude	Longitude	Dist. From Start	Dist. To End	Turn Type	Radius	ROT	ETA	Time From Start	Time To End
							Leg Type	Course	Length	Planned Speed	Channel Width
001	WP1	50°49.124'N	001°17.802W	0.000 NM	2.07 NM				13/04/17 12:39	00h:00m	00h:24m
							Rhumb Line	137.0°	0.33 NM	5.0 kn	0.100 NM
002	WP2	50°48.879'N	001°17.442W	0.335 NM	1.74 NM	Radius	0.500 NM	10°/min	13/04/17 12:43	00h:04m	00h:20m
anni	MER	50540 000BU	00000000000000000	0.005 MM	4.05 MM	D. I	Rhumb Line	1/0.4"	0.49 NM	5.0 kn	0.100 NM
003	WP3	50°48.396 N	001°17.314 W	0.826 NM	1.25 NIVI	Radius	U.SUU NM	10.3min	13/04/17 12:48	UUN:U9m	0.100 MM
004	10(124	50°48 084'N	001117 57634	1.10 NM	0.901 NM	Dodius	RIUMD LINC	206.01	12/04/17 12:52	5.U KH	0.100 NIVI
004	111-4	00 40.004 N	001 17.070 14	1.10 NW	0.051 1444	Naulus	Dhumb Line	239.4	0.49 NM	5.0 kn	0.100 NM
0051	WPS	50*47 838'N	001*18 237W	1.67 NM	0.404 NM	Radius	0.500 NM	10°/min	13/04/17 12:58	00h:19m	00h:04m
0001		1 00 11 0001	001 10.207 11		0.1011011	reading a	Rhumb Line	228.11	0.40 NM	5.0 kn	0.100 NM
006	WP6	50°47.567'N	001°18.711W	2.07 NM	0.000 NM				13/04/17 13:03	00h:24m	00h:00m
	uthering of Dis			and Devena Cha	als Dec						
R	utronseu by:			Zhu rreison one	CK Dy:						
	Date:			Date:							
	Signed:			Signed:							

Example of a route exported as a PDF

9.4.24 Change the datum in route planning

The datum for the chart displayed in route planning can be selected. The CCRP, cursor, chart features and route planning table are converted to the selected datum.

- a) The default datum is WGS84.
- b) With the cursor placed over the **Datum** button a list of available datums is shown.
- c) Select the datum required; the button name will change to reflect the selected datum.

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10. Simulation app

Where enabled in App licences, the simulator is accessed by selecting the **Simulation** app on the standby screen. ^{Note}



If the Simulator is 'greyed-out' or cannot be accessed, Simulation mode has not been enabled in App licences or there may be a problem with the eToken.

See index entry for eToken software or App Licences for additional details.

With the cursor placed over the **Simulation Mode** button, the following options are available:

Radar Replay (left click):	Opens Single Radar Display mode running a simulated Radar replay. Other enabled navigation modes can then be selected.
No function (middle Click):	The middle button has no function.
100 Targets (right click):	Runs a simulation of 100 targets that can be used for target tracking familiarisation.

10.1 Radar Replay

When **Radar Replay** is selected, Single Radar Display app is started showing a prerecorded replay of navigation data, ownship data and AIS targets. The simulation replay can be viewed in the ECDIS app using the **Display Mode** function located in the lower right hand corner of the display.

The replay lasts approximately 5 minutes after which time the simulation automatically restarts.

In all simulation modes, a red '**S**' shown at the bottom of the screen indicates that the system is running in Simulator Mode.



Simulation mode (S) running ECDIS

WARNING

LIVE NAVIGATION STOPPED

All live navigation is suspended when simulation app is selected. No live navigation data or alerts are available, live navigation alerts are not generated.

The Simulation app should only be used when the display is not required for navigational purposes.

The following Radar control functions do not operate when simulation mode has been selected.

- Tune bar
- Pulse length control
- Performance monitor
- Mute
- Sea & Rain filters

Note: Simulation is not enabled on all systems. Please contact HENSOLDT UK for details.

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10.2 100 targets

This mode is only available in Radar enabled systems. Right clicking on the simulation app opens a screen that displays 100 simulated target returns that can be used by the operator to familiarise themselves with the radar Tracked Target functionality.

In all simulation modes, a red **S** shown at the bottom of the screen indicates that the system is running in Simulator Mode.

ACQUIRE BUTTON MISSING?

A Gyro input is required to enable target tracking in simulation. If no gyro input is available, the **Acquire** button is not available.

CHECKING ARPA/ TRACKED TARGET PERFORMANCE

Using the 100 target simulation mode, the performance of the ARPA/ Target tracking functionality can be checked against a set of simulation targets.

- a) Enter 100 Radar Target mode and acquire 4 targets in each corner of the simulated target grid as shown above.
- b) Once the targets have been acquired, the heading and speed of each target should be as follows:

Target	1	2	3	4	Tolerance
Heading	340.3°	20.4°	320.2°	47.7°	+/-3°
Speed	14.9	12.9	7.8	6.1	+/-0.5 or 1% of speed whichever is greater



Example of a simulation screen

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10.3 Changing display mode in the simulation app

WARNING SIMULATION CONTINUES WHEN CHANGING NAVIGATION APPS If the display/ Navigation app is changed whilst Simulator mode is running, the selected app will continue to run simulated data. THE SYSTEM DOES NOT RETURN TO THE DISPLAY OF LIVE NAVIGATION DATA.

When changing navigation screens when Simulation app has been selected, the simulation continues to run and live data is not displayed.

To return to live navigation data, the system must be returned to **Standby** before selection the required navigation mode.



10.4 Stop simulation mode

To stop the simulation, return to the **Standby Screen**.

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Access to the Set-up app is PASSWORD PROTECTED and can only be accessed by HENSOLDT UK trained and authorised engineers or agents.

Access to the Set-up page is logged by the system.

The system configuration is not detailed in this handbook, please contact HENSOLDT UK for details.

WARNING

SETUP ACCESS

Unauthorised access to the Set-up menus invalidates the warranty status of the unit and can inhibit the functionality of the system.

WARNING

WINDOWS DESKTOP

There are no operational or software requirements that require access to the operating system or the operating system desktop.

Unauthorised access to the operating system desktop by any means invalidates the warranty status of the unit.

Attempted access to the desktop is logged by the system.

HBK-2300-1 Navigation Display Operators Handbooks Chapter 11: Set-up App



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12. Crew Based Maintenance

This section provides information on routine maintenance for the HENSOLDT UK Navigation Display.

Preventive Maintenance comprises keeping the equipment clean, particularly the screen, console cabinets and fan vents, and carrying out transceiver performance checks.

All shipborne/ manufactures health and safety procedures and safety warnings must be read, understood and observed at all times when maintaining any part of a HENSOLDT UK navigation system. If you are in any doubt as to the nature of these warnings please consult with HENSOLDT UK or one of our official agents prior to carrying out any maintenance tasks.

WARNING AC & DC VOLTAGES

Lethal AC and DC voltages are present within the equipment. Maintenance procedures must be carried out with the relevant power sources switched OFF and fully isolated.

LIFED ITEMS

Components with a limited life should be scheduled for replacement ideally before failure or poor performance occurs. For example, magnetrons are thermionic devices and their performance will degrade slowly, typically over 4000 to 12000 hours (including standby time) depending on magnetron type, and weaker targets may not be detected nearer to the end of a magnetron's life. Infrequently, other faulty microwave components or a noisy receiver may likewise degrade performance.

The performance monitor is provided as a means to test overall performance. Any degradation in the microwave transmission line (coaxial or waveguide) could significantly reduce performance.

TRANSCEIVER MAINTENANCE

The following procedures refer to the HENSOLDT UK Navigation Display only. Please refer to the appropriate system handbook for transceiver maintenance.

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12.1 6-Monthly planned maintenance

MAINTENANCE SCHEDULE

The units detailed in this handbooks should be cleaned on a 6-monthly basis or in accordance with ships operating procedures. It may be necessary to increase the schedule for equipment operating in harsh or dirty environments.

POWER ISOLATION

Prior to cleaning any part of the system, ensure that all equipment is fully electrically and mechanically isolated from the respective power supplies.

EXTERNAL SURFACE

External surfaces (but not screens) should be cleaned with a soft, non-abrasive cloth moistened in a mild soap solution.

DISPLAY SCREENS

Screens are to be checked and cleaned regularly using a proprietary screen cleaner and a soft cloth.

- Do not use abrasive detergents or cleaning materials as these may damage the screen.
- The widescreen TFT display must not be dismantled.

FAN VENTS

All air/ fan vents should be checked.

If found to be clogged/ blocked, they should be cleaned using suitable vacuum cleaner and brush. The inspection routine should be increased where units are operating in dusty conditions. This is particularly important for the fans located on the rear of the display panel.

CAUTION: BLOCKED FAN VENTS

System performance can be inhibited if the fan vents become blocked or clogged up. Regular inspection is necessary to ensure full system operation.

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12.2 Trackerball

Trackerballs fitted to the MDC-A202 and MDC-A204 are not subject to routine scheduled maintenance.

The following cleaning procedure should only be used if the trackerball fails to operate or if the operation becomes erratic.

The trackerball is retained into the housing by a removable locking ring.

This can be loosened by twisting the ring anti-clockwise by hand approximately 100°.

Carefully lift the trackerball out of the module.

If the internal housing of the trackerball has become contaminated by particles such as grit or sand, it is very important to ensure that this contamination is not rubbed into the clear plastic housing of the trackerball.

Contamination can impede the operation of the laser that senses the trackerball location.





Gently wipe clean the internal surfaces with a clean lint free cloth. A small amount of ISO-Propyl Alcohol (IPA) cleaning fluid may be used if required. Allow the housing to fully dry before replacing the trackerball.

Reassemble the trackerball by reversing the removal process ensuring that the retaining ring locks into position.

12.3 Electrical connections

MAINTENANCE SCHEDULE

The inspection of electrical connections should be carried out every 6-months or in accordance with ships operating procedures. It may be necessary to increase the schedule for equipment operating under constant / severe vibration.

Observing all safety considerations and ensuring that all power supplies are isolated, check that all user accessible connections especially earth bondings are secure and in their correct positions.

12.4 System backup

The system set-up, commissioning data and all user generated data (routes, maps etc.) is internally stored on the systems hard disk. See section 14 for details.

- A back-up of all data should be taken at regular intervals and safely stored for possible use during service attendances.
- A backup should also be saved to the systems built in memory.

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12.5 Physical inspection

MAINTENANCE SCHEDULE

Physical inspections of the system should be carried out every 6-months or in accordance with ships operating procedures. It may be necessary to increase the schedule for equipment operating in in harsh environments.

The system should be checked to ensure that there is no obvious external damage or potential fault condition that could lead to a general failure of any part of the system. Any damage that is identified should immediately be reported to HENSOLDT UK and appropriate action taken to prevent further damage occurring.

12.6 Software upgrade

Regardless of the navigation mode in use, the HENSOLDT UK Navigation Display runs **ZM-2300** software. The current software version can be found on the standby screen as **Software version**: **ZM-2300 Vx.xx** (where x.xx is the version of software loaded).

HENSOLDT UK may occasionally advise that a software upgrade is available. When obtained, full installation documents would be supplied with the software. Software installation instructions are not shown in this handbook. Please contact HENSOLDT UK for details.

13. Fault Finding 13.1 Fault finding

CAUTION

Users must not attempt to change printed circuit boards, disassemble any part of the system, access the system setup pages or use diagnostic software without the prior agreement of HENSOLDT UK.

WARNING

Lethal AC and DC voltages are present within the equipment. The system must be fully electrically and mechanically isolated from all power sources prior to carrying out any maintenance tasks or opening any unit.

If a fault condition persists, please contact HENSOLDT UK using the contact details shown at the end of this publication.

SCREEN LOCK-UP/ PICTURE FREEZE					
Problem	Possible cause	Action			
Picture not updating or appears to be locked- up. This may be indicated by the UTC time not changing and/ or the System Failure Alert sounding	Possible system error.	Shut down and restart the processor.			
		•			

EATERNAL SENSOR FAILURES						
Problem	Possible cause	Action				
Heading, speed, position or depth sensor failure alert.	The indicated sensor has not been detected.	Ensure that the sensor is switched ON and a reading can be made on any repeaters or other navigation equipment. See section 6.47 for additional details on sensor failure.				

TRANSCEIVER PERFORMANCE ISSUES					
Problem	Possible cause	Action			
Poor discrimination in range.	Sea anti-clutter control not set correctly.	Adjust SEA anti-clutter control.			
Tuning adjusted	Low magnetron power.	Carry out a performance monitor check.			
	Receiver failure.	If the results show degradation there is possibly a fault in the transceiver or the magnetron needs replacing.			
correctly, but poor sensitivity.	Dirt on antenna radiator face.	If the performance monitor is OK there may be dirt of the antenna face. Observing all relevant health and safety requirements and ensuring all necessary equipment is fully isolated from the power supply, clean the antenna radiator face			
Target Tracking target not tracked correctly	Poor definition of targets in sea clutter	Adjust the SEA anti-clutter and RAIN anti-clutter controls to improve target definition.			

TRANSCEIVER WARNING MESSAGES						
Problem	Possible cause	Action				
No Sync	Transceiver sync pulses are not being detected at the processor	 This could be an indication that the transceiver is not transmitting. Ensure that the selected transceiver is: Selected as <i>Master</i> not <i>Slave</i>. Is showing as TX ready. 				
No Azimuth	Transceiver azimuth pulses are not being detected at the processor	 This could be an indication that the gearbox is not running. Ensure that the selected transceiver is: Selected as <i>Master</i> not <i>Slave</i>. Is showing as TX ready. The antenna is rotating when in Run mode 				
No Heading Line	Transceiver heading line pulses are not being detected at the processor	 This could also be an indication that the gearbox is not running. Ensure that the selected transceiver is: Selected as <i>Master</i> not <i>Slave</i>. Is showing as TX ready. The antenna is rotating when in Run mode 				
Receiver Sensitivity Low	SharpEye™ only The minimum detectable signal is below a pre-set threshold					
Antenna VSWR High	SharpEye™ only Indicates a mismatch in the VSWR into the antenna	In any of these alarm conditions, the SharpEye™ transceiver will enter one of the following modes:				
RF Power Low	SharpEye [™] only The RF power output from the transceiver has fallen below 100 watts	Degraded mode : The transceiver will continue to operate at reduced power with a loss of performance or functionality				
PLO Lock	SharpEye™ only Indicates hardware fault in phase locked oscillator	Fault mode: The transceiver will shut down.				
Synth Lock	SharpEye™ only Indicates hardware fault in frequency synthesiser	Call the HENSOLDT UK Service Control Centre or the agent.				
Transmitter Over- temperature	SharpEye™ only The temperature of the RF power transistors is high					

13.2 Fuse replacement

WARNING

HIGH VOLTAGES

Lethal voltages are present within the equipment.

Maintenance procedures and/ or fuse replacement must be carried out by a suitably trained engineer with the power supplies switched OFF and fully isolated at the appropriate power breaker.

CAUTION ESD DEVICES

This equipment contains electrostatic sensitive devices. To prevent damage to equipment; when implementing corrective maintenance, ensure that an earthing strap is used to connect the maintainer to the earth stud located within the navigation processor.

There are no user accessible fuses or over current protection devices in the system. AC and DC supplies to the system are protected by the external breakers.



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Set-Up Mode

🕶 🔛 Backup / Restore

Daylight

Capture Screen

14. Backup & Restore App

The Backup / Restore app is accessed from the standby screen.

RESTORE FUNCTION AVAILABILITY

Some restore functions are restricted and are shown in dark text. These restore functions can only be used for system restoration by an authorised and trained engineer.

	Operator B	lackup and Restore	
Backup		Restore	
Backup Ship & Sensor Data	Backup User Profile Data		Restore User Profile Data
Backup Transceiver Configuration	Backup Alert Configuration		
Backup Routes	Backup AIS Safety Data	Restore Routes	Restore AIS Safety Data
Backup User Maps	Backup Mariner Objects	Restore User Maps	Restore Mariner Objects
Backup Chart Permits	Backup Navtex Messages		Restore Navtex Messages
Backup Past Track			
Backup 12 Hour Log			
Backup Networking Configuration			

Example of the Backup & Restore screen

The data shown below can be backed up, restored (as applicable) or transferred to and from another HENSOLDT UK Navigation Display.

Backup/ Restore	Description	Backup	Restore
Ship & sensor data	Configuration of sensors such as position sensor, Gyro etc. and all ownship's settings.	1	×
Transmitter configuration	Configuration of all transmitters connected to the system.	1	×
Routes	User generated routes.	✓	✓
User maps	User generated maps.	✓	✓
Chart permits	Chart permits. Note	✓	×
Past track	The last 3 months of vessel tracks. Note	✓	×
12 hour log	A log of own ship primary sensor data, target data and current chart usage. Note	~	×
Networking Configuration	Configuration of all network settings.	✓	×
User profile data	User profiles stored on the system.	✓	✓
Alert configuration	Configuration of the alert setup page.	✓	×
AIS safety data	All SRMs (Safety related messages) received and not deleted by the user.	✓	✓
Mariners objects	All mariners' notes or events entered into the system. Note	1	1
Navtex Messages	All Navtex messages received by the system. Note	✓	√
ALL DATA	ALL DATA IS BACKED UP (RECOMMENDED).	✓	×

NOTICE: CHART DATA

Chart data is NOT stored as part of a data backup process.

Note: Backup function only available for ECDIS / Chart radar enabled systems.

14.1 Backup data locations

Data can be backed up and restored from an internal and/or external memory device.

INTERNAL MEMORY

The HENSOLDT UK Navigation Display is fitted with a fixed internal memory device (**F: Drive**) that is mechanically separate from the systems main memory. This device cannot be physically accessed or removed.

A Backup of all data to this internal drive is carried out during the commissioning of the system.

EXTERNAL MEMORY (USB).

A virus free USB memory device can be connected into the USB socket located on the keyboard/ tracker ball assembly. The USB socket will generally show as drive location **G**:

See section 4.15 for details on unlocking the USB socket.

NOTICE BACKUP SCHEDULE

It is strongly recommended that a Backup All data is carried out on a regular basis as this can be used to restore the system in the event of a failure.

14.2 Backup procedure

It is strongly recommended that a backup is taken of each workstation and is stored separately.

- a) Select the desired Backup function e.g. Backup ALL data.
- **b)** From the pop up box, select the required memory location.
 - C:\ Operating System (do not use).
 - D:\ Main program (do not use).
 - E:\ User data (do not use).
 - F:\ Internal memory device.

G:\ External USB memory device. If the drive letter(s) cannot be seen, click on '.../' which will take the browsing window backup one level.



- c) Select Backup.
- d) When the backup is complete, **Backup Restore Action Completed Successfully** is displayed; click **OK** to continue.
- e) Eject the USB memory device BEFORE unplugging it from the system (see **Eject Removable Media** later in this section).

BACKUP FILE FORMAT

A new backup file is generated for every backup function that is activated.

Each restoration file will be in the following format where the file name is the time and date that the backup was made, e.g.

MD BACKUP File identifier	MV Ship name Vessel's name	IE1234 System Function ID	20210127 Backup date (YYYY/MM/DD)	14:30 Backup time (UTC)			
WARNING							
REGISTRY FILES							

Some of the backup file(s) contain registry data that could damage the settings if opened on a PC. Do not attempt to open the contents of the backup files.

14.3 Restore procedure

CAUTION SYSTEM RESTART

Some restoration functions may force a system restart. Only restore files when the system is not required for safe navigation.

PROCEDURE

When restoring data from a USB memory device, insert the virus free device containing the backup into the USB socket located on the keyboard/ tracker ball assembly.

- a) Select the required Restore function i.e. Restore Routes.
- b) From the pop up box, select the required memory location.
 C:\ Operating System (do not use).
 D:\ Main program (do not use).
 E:\ User data (do not use).
 F:\ Internal memory device.
 G:\ External USB memory device.
 If the drive letter(s) cannot be seen, click on '.../' which will take the browsing window backup one level.



- c) Noting that there may be multiple backup folders, select the required backup folder then click on **Restore**. The system will then automatically locate the backup file.
- d) When the restore is complete **Backup restore action completed successfully** is displayed; click **OK** to continue.
- e) Depending on the restore function selected, the system may prompt with Registry settings have been changed. An application restart will occur for the changes to take effect; click OK to proceed and the system will shut down and restart.
- f) Eject the USB memory device BEFORE unplugging from the system (see Eject Removable Media later in this section).

14.4 Networked Systems

In a Networked system, the workstation being restored must be selected as a **Master** before commencing the restoration process.

The Network button within the Backup and Restore menu gives access to the network functions.

14.5 Export Debug Data

DEBUG DATA FILE CONTENTS

Export debug data downloads a compressed file that contains the following:

- Screen Grabs: Screen Grabs captured using the **Capture Screen** function. See section 6.6 for details.
- Debug Backups: The configuration/ setup files for the system and any debugging information collected by the processor.
- Win32Release Software debugging information.

Avoid opening debug backup files or release folders as they contain registry files that may corrupt the host computer.

CAUTION VIRUS PRECAUTIONS

Refer to the Health and Safety notices located at the front of this handbook regarding virus precautions prior to connecting any external memory device to the system.

RESTORE?

Export Debug Data has no data restoration functions.

DEBUG FILE FORMAT

Each debug file will be in the following format where the file name is the time and date that the backup was made:

MD BACKUP	MV Ship name	IE1234	20210127	14:30
File identifier	Vessel's name	System	Backup date	Backup time
		Function ID	(YYYY/MM/DD)	(UTC)

EXPORT PROCEDURE

NOTICE: DATA DELETED

Once exported, the Export Debug memory is reset and all debug data including screen grabs is permanently deleted from the system.

The Export Debug Data function can take several minutes to complete so should only be carried out when the system is not required for operational purposes.

- a) Place a virus free USB flash memory device into the USB port (see section 4.15 for details).
- b) Press Export Debug Data. Only press the export debug button ONCE as repeated presses can incorrectly transfer data.
- c) When the export is complete the system will prompt with **Backup restore action completed** successfully; click **OK** to continue.
- d) Eject the USB memory device BEFORE unplugging from the system (see Eject Removable Media later in this section).

14.6 Eject Removable media

Before unplugging any removable media including USB memory devices, press the **Eject Removable Media** button located at the bottom of the Backup & Restore data page. This safely ejects the memory device.

When pressed, the button will change colour to a lighter shade of blue. Do not remove the memory device until the button returns to the default background colour of dark blue.

14.7 Export Handbooks

Electronic copies (pdf) of the system handbooks can be downloaded directly from the system to a removable USB memory device. All handbooks are downloaded as part of the following procedure. It is not possible to select individual publications.

HANDBOOK DOWNLOAD PROCEDURE

- a) Place a virus free USB flash memory device into the USB port (see section 4.15 for details).
- b) Press the Export Handbook button.
- c) From the pop up box, select the required memory location.
 C:\ Operating System (do not use).
 D:\ Main program (do not use).
 E:\ User data (do not use).
 F:\ Internal memory device.
 G:\ External USB memory device.
 If the drive letter(s) cannot be seen, click on '.../' which will take the browsing window backup one level.



- A progress bar is displayed during the download process. When this is complete Handbook Successfully Exported is display; click OK to continue.
- e) Eject the USB memory device BEFORE unplugging from the system (see Eject Removable Media later in this section).

The handbooks will be found in the root directory of the memory device in a folder called **Handbooks**.



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15. Interpreting the Radar Display

This section describes some of the factors that influence radar performance and the presentation of a radar image.

This section of the handbook refers to the regulations specified in *IEC 62388 edition 1 F Dis Annex D*, Maritime navigation and radio communication equipment and systems. Copies of IEC specifications and additional information can be obtained via the IEC at www.iec.ch

Reference publications on the use of Radar at Sea are also available from the Royal Institute of Navigation at www.rin.org.uk or similar marine publication suppliers.

15.1 Factors Affecting Performance

The following factors influence target detection:

- Target characteristics such as Radar Cross Section (RCS), stability and aspect, height.
- Wind strength and direction relative to the line of sight between the antenna and the target.
- Sea state, wave height, clutter spike characteristics.
- Rainfall and rain extent.
- Radar antenna height.

A target may demonstrate low probability of detection in the near range with an acceptable or high probability of detection in the further ranges.

INSTALLATION FACTORS

A long transmission line will have losses and performance will typically be reduced by 3.0 dB for a 30 m transceiver to antenna separation. A damaged transmission line, poorly fitted transmission couplings, water or corrosion within the transmission line will all result in performance losses. Problems associated with transmission lines often cause a strong signal extending from zero range, similar to a sun at the centre.

ANTENNA DESIGN, HEIGHT, RANGE AND BEARING DISCRIMINATION

The antenna design influences detection performance. The vertical radiation pattern of the antenna is designed to perform when own ship pitches and rolls without undue loss of performance, while also providing a main beam pattern to curtail degradation in performance due to nearby structures and to minimise the illumination of precipitation. Both X-Band and S-Band radar systems operate in a horizontally polarised mode and the design minimises the antenna sidelobes that might otherwise be exhibited on larger targets.

Radar performance is very dependent on the location of a radar antenna. Sectors that need to be muted (no transmission) and potential blind sectors should be recorded for each sensor and bearings saved in the radar display. Antenna height is an important factor in target detection. A higher antenna will provide a better range of first detection however, it will also extend the clutter field and effectively mean small targets are more difficult to detect. A lower antenna may result in waves masking small targets that have a height which is significant relative to wave peaks.

The height of the Antenna above the waterline also affects the maximum and minimum range performance of the equipment. The ability to discriminate between objects that are very close together depends on the range and bearing discrimination performance. Range discrimination is mainly dependent on the Pulse Length in use, bearing discrimination is a factor of the size of target and Antenna parameters.

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MINIMUM RANGE

Radar performance on larger ships may suffer from shadowing where the minimum radar detection range will be degraded by a combination of antenna height, ship structures and cargo. The minimum range is defined by the shortest distance at which, using a scale of 1.5 or 0.75 NM, a target having an echoing area of 10 m² is still shown separate from the point representing the antenna position. It is mainly dependent on the pulse length, antenna height and location, own ship structure and an efficient transmission line.

MAXIMUM RANGE

The maximum detecting range of the radar varies considerably depending on several factors such as the height of the antenna above the waterline, the height of the target above the sea, the size, shape and material of the target, and the atmospheric conditions. Under normal atmospheric conditions, the maximum range is equal to the radar horizon or a little longer. The radar horizon is longer than the optical one by about 6% because of the diffraction property of the radar signal.



OPERATIONAL FACTORS

For a conventional (non-coherent) radar system, the user should check that:

- The transceiver is "on tune" to achieve optimum performance.
- The pulse length is optimum for the range scale and marine environment.
- The signal processing functions are used correctly, particularly settings for Gain, anti-clutter Sea, anti-clutter Rain and Correlation.

Components with a limited life should be scheduled for replacement, ideally before failure or poor performance occurs. For example, magnetrons are thermionic devices and their performance will degrade slowly, typically over 4000 to 12000 hours (including standby time) depending on magnetron type, and weaker targets may not be detected nearer to the end of life. Infrequently, other faulty microwave components or a noisy receiver may likewise degrade performance. The performance monitor is provided as a means to test overall performance. Any degradation in the microwave transmission line (coaxial or waveguide) could significantly reduce performance.

X-BAND AND S-BAND

In calm conditions, there is little difference between X and S Band regarding radar detection performance. However, in heavy precipitation and higher sea states, an S-Band radar system would normally give a better detection performance. X-Band will provide better bearing discrimination and higher gain for a similar antenna size.

RADAR RESOLUTION

There are two important factors in radar resolution (discrimination): *bearing resolution* and *range resolution*.

Bearing resolution: Bearing resolution is the ability of the radar to separate and present the echoes from two separate targets with an echoing area of 10 m² that are at the same range and positioned close to each other. It is proportional to the antenna length and reciprocally proportional to the wavelength. This condition is normally satisfied with a radiator of 1.2 m (4 foot) or longer in the X-Band. The S-Band radar requires a radiator of about 3.6 m (12 foot) or longer. An enhance function that increases target size in bearing will reduce the presented bearing discrimination.

Range resolution: Range resolution is the ability of the radar to separate and present the echoes from two separate targets with an echoing area of 10 m² that are on the same bearing and positioned close to each other. The resolution is primarily a factor of pulse length. However, an Enhance function that increases target size in range will reduce range discrimination.

BEARING ACCURACY

One of the most important features of the radar is how accurately the bearing of a target can be measured. However, the bearing is usually taken relative to the ship's heading, and thus, proper adjustment of the heading line at installation is an important factor in ensuring bearing accuracy. The bearing of a target can be measured more accurately if it is positioned towards the outer extreme of the radar operational area.

To minimize error when measuring the bearing of a target, show the target echo at the extreme position on the screen by selecting a suitable range.

BLIND ARCS

Where the path of the transmitted energy is interrupted by the superstructure, funnels, masts, etc., beam or energy scatter takes place and the radar beam is blocked.

When the obstruction is narrow in relation to the transmission path, a sector of reduced sensitivity and increased beam width is formed behind the obstruction.



For a large obstruction, such as a superstructure, a blind arc is formed in which there is no radar coverage, but in which false echoes or elongated targets may occur due to reflections from the obstruction. Targets cannot be detected within the blind arc.

FALSE ECHOES

Any large obstruction may reflect energy, causing false echoes. The surface of the obstruction reflects a significant proportion of the transmitted energy at an angle creating a false echo. Reflected signals from these objects reach the antenna and are presented on the bearing at which the Antenna is pointing. The range of the false echo is the true distance (via the reflecting surface) of the object causing the false echo; however, it is possible to have false echoes at multiples of that range.

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False targets (echoes) usually occur as a result of reflections originating from large structures such as other substantial ships, a harbour building, storage tanks or wind farms. Note that own ship structures can generate similar reflections. These reflections are normally seen as a large arc on the radar presentation.

Adjusting the signal processing control functions may reduce or suppress a reflection, but at the expense of a lower target detection performance. Radar transmitters provide techniques to prevent false targets resulting from previous transmissions (second-time-around echoes).

SharpEye[™] has superior processing techniques to reduce reflections.

The user must be acquainted with the bearings of obstructions from which false echoes may be obtained.

MULTIPLE ECHOES

Multiple echoes may be obtained when another ship or vessel is passing on a parallel course at close range.

This effect occurs when return signals are sufficiently strong to be reflected backwards and forwards between the two vessels. Multiple echoes always occur on the same bearing as the true target and at exact multiples of the true target range.

The echoes become weaker as the amount of energy reflected diminishes with each return.

Multiple reflection echoes can be reduced and often removed by decreasing the gain (sensitivity) or properly adjusting the SEA anticlutter control.



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SPURIOUS ECHOES

In built up areas and in narrow congested waters, transmitted energy may be reflected along a number of paths producing confusing spurious echo patterns on the screen. Spurious echoes may not always appear in the same location and may not correlate.

Note: Adjustment of the GAIN control helps to minimise these spurious echoes.



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GHOST ECHOES

In a similar manner to false echoes, the proportion of transmitted energy reflected off obstructions may be directed towards a real target causing a **ghost echo** of the real target to appear on the bearing at which the antenna is pointing. The ghost echo will appear to be a real target and behave in the same way. However, because the antenna is not directed at the real target the returns from the ghost target will be weaker than those of the real target. The range of the ghost echo is the true distance of the real target.

The suspected Ghost target echo will appear on the screen at the same radius as the real target.

The VRM facility can be used to confirm this. However, there is no real way of determining whether the indicated target is a ghost or a real target.

Other types of ghosting include echoes of groups of targets (which appear to be real). When in the vicinity of land masses, these may be from large inland objects and may be caused by a combination of atmospheric conditions, unusual propagation conditions and reflection.

Target Smear

Where obstructions occur in close proximity to the antenna, the radar beam may be dispersed causing target smearing to occur.

This is indicated by a number of weaker echoes appearing around a stronger target echo on the screen.

When the antenna points directly at the target the returns are at their strongest and these form the thickest part of the arc shaped pattern on the screen.



SIDELOBE ECHOES

Every time the radar pulse is transmitted, some radiation occurs on each side of the beam, called "Sidelobes." If a strong target exists where it can be detected by the side lobes as well as the main lobe, the side echoes may be represented on both sides of the true echo at the same range. They can be reduced through careful reduction of the gain or proper adjustment of the SEA anti-clutter control.

VIRTUAL IMAGE

A relatively large target close to own ship may be represented at two positions on the screen. One of them is the true echo directly reflected by the target and the other is a false echo which is caused by the mirror effect of a large object on or close to own ship. If own ship comes close to a large metal bridge, for example, such a false echo may temporarily be seen on the screen.

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15.2 Multipath interference

Radar energy reflects from the target directly or following reflection at the surface of the sea. The result is that sometimes the two signals will reinforce each other while at other times they will cancel and create a null.



Multipath is most pronounced when the sea is calm, acting like a mirror, and when the target is simple (essentially comprising a single reflector) such as a buoy. Here multipath reflection may produce a large number of signal nulls at short range. These become less frequent as range increases.

In the higher sea states when the sea is rough and is less like a mirror or when the target is complex (comprising a number of reflectors), as are many vessels, the effect of multipath is less pronounced so that the nulls are less deep.

As the height of the radar antenna (or target) increases, then the frequency of the nulls also increases. The frequency of the nulls also increments with increasing radar frequency, i.e. an X-Band system will have more nulls than an S-Band system, although they may not be so deep.

15.3 Atmospheric Conditions

The propagation of radar signals in acute atmospheric conditions may have an adverse effect on the radar presentation. A transmitted beam of energy normally travels in a straight 'line of sight' path but certain atmospheric conditions may contribute to the beam bending upwards or downwards.

The effect of this condition (known as anomalous propagation) is where the beam is 'bent' upwards, distant targets appear below the beam and consequently the maximum detection range of the equipment is impaired.

When the transmitted beam is 'bent' downwards, the beam tends to follow the earth's surface and improves maximum range performance, with the detection of targets over the horizon.

Under specific atmospheric conditions the beam may be 'bent' to reflect from the earth's surface to the upper atmosphere where, due to the presence of a layer of dense air, the beam is reflected back to earth.

This condition, known as 'ducting,' may happen several times and echoes may be obtained over great distances. However, these echoes may return several transmissions later and are shown as false ranges on the screen. Transmission 'jitter' techniques are applied to minimise these false echoes or second time round returns.

Example of these conditions are shown on the following page.

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Fog: Fog and mist may cause some signal attenuation resulting in a small reduction in detection range.

Dust: Dust storms in some locations can produce difficult propagation conditions, appearing similar to clutter.

Hail, Snow and Ice: Hail and wet snow produce effects similar to that of rain clutter. Dense snow has a greater effect than that of light flurries which, owing to the small reflecting surface, have minimal effect. The echoes obtained from ice depend on the form and shape that the ice presents. The generalisation of the effects produced by various ice flows are as follows:

Smooth Flat Ice:	Most of the radar energy is reflected at the angle of incidence, providing little or no return signal. Sometimes an advantage is gained by setting up the controls to obtain sea clutter right up to the edge of the ice. Patches of water in a smooth ice field are often revealed by clutter return if sufficient wind disturbs the surface of the water.
Pack Ice:	Strong multiple echoes are obtained from pack ice, producing a pattern on the screen not unlike excessive sea clutter. The ice left in the wake of a vessel

passing through an ice field may be distinguished clearly on the screen.

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Ice Walls:	These objects give strong return echoes depending on the angle that the walls are to the sea surface to scatter the reflected energy.
lcebergs:	As the angle of iceberg faces is rarely normal to the surface of the sea, much of the reflected energy from the transmitted pulse does not reach the receiver aerial, giving a poor signal return. Also the surrounding dense air produces a higher than usual atmospheric attenuation.
Growlers:	The detection of growlers by radar is uncertain due to the small surface area above water and the mass that is submerged.

15.4 Radar Reflectors and Beacons

Reflectors are designed to give maximum return from radar transmissions and may be fitted to buoys to aid navigation, to sundry features such as dangerous outcrops of rocks, and to any hazard that would impair the navigation of a vessel. Small boats may also have reflectors fitted to increase the boat's detection range.

Note: Some small buoys have a reduced cross-sectional area when heeling over in high sea states.

Radar beacons produce a specific, coded signal response when the radar transmission interrogates the beacon. The reflected signal then gives a precise echo paint on the radar presentation. This effect can be reduced when using a high Correlation level (RACONS are not normally affected by Correlator Interference Rejection or Scan/Scan).

15.5 The radar image

OPEN SEA

At sea, out of sight of land, interpreting the radar operational area presents little difficulty. Echoes on the screen depend on the size, range, shape and aspect of the targets. Wake echoes may sometimes be seen, particularly where a vessel is moving or turning at high speed.

COASTAL WATERS

The behaviour of sea clutter in coastal waters is different from that experienced in open sea conditions. There is insufficient time for waves in coastal waters achieve maturity and therefore the waves are shorter and choppy in nature. There is also increased breaking of waves in shallower waters, and in addition the water depth, seabed contours and coastline features contribute to influence water currents and the radar reflective characteristics of the sea surface. In these choppy coastal conditions, the sea clutter returns are greater than might be expected in a comparatively low sea state, sometimes resulting in buoys and other navigational aids becoming more difficult to detect. Careful use of anti-clutter controls and signal processing (particularly correlation) will assist the mariner/user, however the detection of ships moving at high speed may prove more difficult on lower range scales with correlation processing applied.

LAND ECHOES

Echo paints of a coastline require careful examination and translation since the presence or absence of return signals depend on parameters such as height, slope, composition, aspect and distance of the feature. When a radar beam strikes a high reflecting surface, including cliffs and large buildings at close range, a sharp echo with a blank area behind is presented on the screen. Coastlines with flat areas return echoes depicting every small reflecting surface that the radar beam strikes for several miles inland. The variation of tide may also affect the presentation owing to the height at which the Antenna is relative to that of the coastlines.

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At low tide, the radar operational area presentation shows less of an area of coastline due to the reflected echo from cliffs or sand dunes etc. High tide gives the radar the ability to slightly 'look over' low lying objects.

15.6 Factors affecting target detection

The detection of targets, particularly small or marginal radar targets, is very susceptible to antenna height and horizontal beam width, target size and height, sea state, clutter characteristics, and atmospheric conditions. Even small changes in these parameters will impact target detection. Target Radar Cross Sections provide the means to define different targets and the radar signal they generate.

RADAR CROSS SECTION (RCS) VALUES

The relationship between X-Band and S-Band Radar Cross Section (RCS) values for small point targets is often assumed to be in the ratio of 10:1. Some targets may produce a smaller ratio or an even larger RCS value for S-Band, depending on the target characteristics. Simple, stable targets provide a more consistent radar signal than a distributed target. An example of a distributed target is a large yacht, comprising multiple reflective surfaces, each of differing radar cross section and at various heights, and having multiple polarisation reflections.

The RCS of a shoreline is variable according to the reflectivity of the surface. As the range of a shoreline increases, the RCS may increase as a greater surface is illuminated by the antenna beam. The surface illuminated is partly offset by the curvature of the earth and increased scattering of reflected signals.

The RCS of a large SOLAS ship will vary primarily according to the structure, profile and aspect of the ship. Newer shipping, particularly High Speed Craft (HSC), will tend to have a much smoother profile and therefore have a correspondingly lower RCS. The aspect of the ship observed will also influence the RCS value. For example, a change from 50,000 m² to 5,000 m² could reduce the detection range by about 10%.

Distributed targets generate a more complex multi-path and may produce different RCS values according to the antenna polarisation in use. A simple cylinder reflector such as a channel marker pole will provide a known RCS if the reflector is correctly installed to be stable and vertical. A small angular offset (for example, a buoy heeling over in strong wind) will greatly decrease the RCS values. For distributed targets including all ships, the target centroid height shall be assumed rather than maximum height.

TARGET DETECTION IN CALM SEA

The extent of ducting or other performance dependent phenomena will not be apparent at sea. However, multipath effects may cause deep detection nulls.

Atmospheric conditions and the sea surface may enhance or degrade the range of first detection listed in the following tables.

Coherent SharpEye[™] radar systems provide a superior detection performance; therefore the detection ranges noted in IEC 62388 will be exceeded.

The following table lists the range of first detection in clutter free conditions (conventional radar):

Target Description <i>(see note 5)</i>	Height above	Detection range in NM (see note 6)	
	sea (meters)	X-Band	S-Band
Shorelines (see note 9)	Rising to 30	20	20
Shoreline (see note 10)	Rising to 6.0	8.0	8.0
Shoreline (2.5 m ² for X-Band & S-Band)	Rising to 3	6.0	6.0
SOLAS ships >5000 gross tonnage (see note 7)	10	11	11
SOLAS ships >500 gross tonnage (see note 8)	5.0	8.0	8.0
Small vessel with radar reflector meeting IMO performance standards	4.0	5.0	3.7
Navigation buoy with corner reflector (see note 2)	3.5	4.9	3.6
Typical navigation buoy (see note 3)	3.5	4.6	3.0
Small vessel of length 10 m, no radar reflector (see note 4)	2.0	3.4	3.0
Channel markers (see note 3)	1.0	2.0	1.0

Notes

- I. IMO revised performance standards for radar reflectors (resolution MSC164 (78)) radar cross section is defined as (RCS) 7.5 m² for X-Band, 0.5 m² for S-Band. The reflector used should not exceed the stated RCS by more than 50%.
- II. Target is taken as 10 m^2 for X-Band and 1.0 m^2 for S-Band.
- III. The typical navigation buoy is taken as 5.0 m² for X-Band and 0.5 m² for S-Band. For typical channel markers, with an RCS of 1.0 m² (X-Band) and 0.1 m² (S-Band) and height of 1 metre, a detection range of 2.0 NM and 1.0 NM, respectively.
- IV. RCS for 10 m small vessel taken as 2.5 m² for X-Band and 1.4 m² for S-Band (taken as a distributed target).
- V. Reflectors are taken as point targets, vessels as complex targets and shorelines as distributed targets (typical values for a rocky shoreline but are dependent on profile).
- VI. Detection ranges experienced in practice will be affected by various factors, including atmospheric conditions (for example evaporation duct), target speed and aspect, target material and target structure. These and other factors may either enhance or degrade the target detection at all ranges. At ranges between the first detection and own ship, the radar return may be reduced or enhanced by signal multi-path, which depend on factors such as antenna/target centroid height, target structure, sea state and radar frequency band.
- VII. 5000 gt = 50.000 m² at X-Band and 30.000 m² at S-Band
- VIII. 500 gt = 1800 m^2 at X-Band and 1000 m^2 at S-Band
- IX. Predictions used 50.000 m² for both X-Band and S-Band
- X. Predictions used 5.000 m² for both X-Band and S-Band

General notes

- RCS values can vary according to target characteristics and aspect, resulting in changes in detection range. The RCS value of a given class of ship can vary by as much as 30 dB, depending on radar frequency, specific target characteristics and target aspect (Skolni11.12).
- Detection performance predictions (zero clutter) are derived from CARPET software calculations (CARPET: radar performance analysis software: Computer Aided Radar Performance Evaluation Tool).
- Performance will vary for example with antenna height, radar antenna and system configuration.

The following table shows target size, height and RCS value.

Torract Description	Height above	Target parameters	
	sea (meters)	X-Band	S-Band
Shorelines rising to 60 m	50	50000	50000
Shorelines rising to 6.0 m	5	5000	5000
Shorelines rising to 3.0 m	2.5	2500	2500
SOLAS ships >5000 gross tonnage	10	50000	30000
SOLAS ships >500 gross tonnage	5	1800	100
Small vessel with radar reflector meeting IMO performance standards	4	7.5	0.5
Navigation buoy with corner reflector	3.5	10	1
Typical navigation buoy	3.5	5	0.5
Small vessel of length 10 m, no radar reflector	2	2.5	1.4
Channel markers	1	1	0.1

The data listed above is based on IEC 62388.

The aspect of ships varies their RCS figures, for example a small coaster (42 m in length, 225 gross tonnage and 4.5 m height) can typically vary between 20 m² and 680 m² and a small inshore fishing vessel (8.5 m length, 2.4 m height and 5 gross tonnage) can vary between 2 m² and 10 m².

The table in the previous page showing first detection figures should be taken as indicative of the minimum detection performance. Enhancing radar system parameters (for example, using a larger and higher gain antenna) and applying radar signal processing will improve the performance indicated in Table 1, which is based on a 1.3 m antenna and a 10 kW transceiver.

15.7 Target detection in clutter conditions

The following paragraphs provide general information on clutter conditions.

Gain: The raw Radar signal consists of targets, precipitation and sea clutter, and in addition, a level of noise generated by the receiver system. The gain and signal processing functions serve to reduce unwanted radar returns and optimise the display. The Manual Gain function sets a detection threshold for the strength of targets. The gain should be set to a level that just preserves a minimal amount of receiver noise, as viewed beyond any sea clutter field. The gain may require resetting on different ranges.

Calm sea: Multi-path signals may enhance or reduce signal strength depending on the target range and characteristics. The range of detection of a target at optimum Gain, assuming that it is not obscured by the horizon, will depend on target's characteristics and the propagation (ducting) conditions. In some circumstances, ducting will permit visibility of targets at much longer ranges than could normally be expected. A higher radar antenna will normally increase the range of detection but may deteriorate performance in an adverse clutter environment. SharpEye[™] transmits multiple pulse lengths, thereby enhancing detection.

Rough sea: As the roughness of sea increases, targets are less affected by multi-path effects but must compete with radar signals generated by sea clutter. The nature of the signal reflected from a wave differs from the signal reflected from a target.

Processing techniques assist in making the target more visible. Note that clutter signals increase when viewed upwind. Although sea clutter signals can exhibit target-like behaviour, as most clutter is in the form of sea spikes, correlation techniques reduce the impact. <u>Applying signal correlation has limitations when detecting high speed ships</u>, especially on shorter range scales, where the rapid movement of these ships may fail to correlate, impacting on target visibility.

Very large waves may obscure targets, and in these conditions targets may not be visible to the radar system. High winds will cause small targets (e.g. buoys and yachts) to heel over, thereby reducing the radar reflected signal and the resulting detection.

Rain clutter: Precipitation (rain and wet snow) generates noise-like reflections and reduces target detection capability. The reduction in detection performance is dependent on the radar antenna characteristics, the transmission frequency (S-Band or X-Band) and pulse length selected. In light rain the range to first detection due to precipitation is similar for S-Band and X-Band radars. However in heavy rain, S-Band has a superior performance. For both S-Band and X-Band radars, a short transmission pulse provides better detection, but this is more evident at X-Band. The Rain Anti-clutter control signal processing function improves target detection. However, while reducing the impact of rain, it will thin solid targets, for example land masses. Auto-Rain optimises the detection and selects a short pulse for conventional magnetron transmitters to provide best performance. SharpEye[™] features a high discrimination on all range scales so maintaining a higher detection performance in rain clutter conditions.

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Sea Clutter: Sea spray, backscatter and breaking waves will produce a radar clutter field, predominantly at close range around own ship. The clutter field will extend to a range largely depending on the radar antenna height and the sea state, though other factors may influence the extent and properties of the clutter. The wind direction will make the clutter field non-uniform. The Sea Anti-clutter control provides both manual and automatic means to reduce the visibility of clutter. The anti-clutter processing applies maximum attenuation at zero range (own ship) and reduces the attenuation as the range increases.

The following tables provides an indication of the performance for a sample of small targets positioned at the range specified (multi path peaks) for a typical radar system in sea state 5 with zero perception.

X-Band target RCS	Target visibility in sea states					
(conventional radar)	1 to 2	2 to 3	3 to 4	4 to 5		
1.0 m ²	>80%	50 to 80%	0	0		
5.0 m ²	>80%	>80%	50 to 80%	0		
10 m ²	>80%	>80%	>80%	50 to 80%		
Note: Target range is nominally 0.7 NM						
S-Band target RCS	I arget visibility in sea states					
(conventional radar)	1 to 2	2 to 3	3 to 4	4 to 5		
0.1 m ²	>80%	>80%	0	0		

>80%

>80%

>80%

>80%

50 to 80%

50 to 80%

Note: Target range is nominally 0.4 NM

0.5 m²

1.0 m²

The data listed above is based on IEC 62388

Predictions have assumed minimal signal processing. Excessive sea clutter spikes above the mean clutter level will degrade the false alarm rate and may therefore reduce target visibility (for a given false alarm rate) compared to those predictions shown in the above tables. The characteristics of the sea clutter may vary in different locations, according to geographical characteristics.

Target masking (screening) has not been included in these calculations and in high sea states, masking (shadowing) will also degrade visibility of low targets. The antenna height is taken as 15 m; other antenna height will give differing predictions and will be subject to different effect of multi-path. The targets are assumed to have the characteristics shown and fluctuate in accordance with Swerling case 1.

A combination of wind speed and average wave height may be used as a means of assessing the sea state. The following influences target detection:

Target description (characteristics), RCS, stability, aspect, height.

>80%

>80%

- Wind strength and direction relative to the line of sight between antenna and target.
- Estimated sea state, wave height, clutter spike characteristics.
- Measured or estimated rainfall and rain extent.
- Any variation in antenna height.

Many variables impact on actual radar performance and therefore all predictions are indicative. A target may demonstrate low probability of detection in the near range with an acceptable or high probability of detection in the further ranges. This may be a result of multi-path signals creating signal cancellation at near range. Atmospheric conditions, for example ducting, can enhance or degrade detection performance depending on antenna height, target height and range, and radar frequency.

If the Gain or Sea anti-clutter threshold is set too high, point targets appear small or may even be fully suppressed. The user should set the signal processing control functions to retain some clutter speckles to promote a better sensitivity within the clutter field. Although such a setting increases the false alarm rate and gives a noisier presentation, detection sensitivity is improved.

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In adverse weather conditions considerable echo return may be obtained from the sea. Under these circumstances the sea clutter return may be greater than the reflections from buoys and other small targets and thus prejudice the detection of these echoes. Use the Gain and Sea functions to combat these varying conditions.

High sea swell tends to produce random echoes and clutter on the screen. Clutter returns from sea breaking on shoals and sand banks may help to show the position of these hazards.

Sea spikes generate signals with similar characteristic to targets and vary in density and intensity in different localities. Their presence raises the false alarm rate and degrades the presentation of the radar image; therefore spikes will reduce the probability of detection with the radar presentation set up for a low false alarm rate. The radar equation has a clutter distribution factor (k) and also includes a distribution shape factor, *v* to represent the effect of sea spikes.

The following graph indicates the variation of the shape factor v and demonstrates the impact of sea spikes on target detection. The lower v equates to a more spiky clutter. High sea spikes will degrade the false alarm rate and therefore detection performance. The upper plot shows the detection of a buoy in a clutter free environment, clearly showing the effects of multi-path nulls. This figure illustrates this case for a probability of detection with a low false alarm rate. Sea clutter may vary such that lower detection is achieved due to the presence of wave spikes. Atmospheric conditions can enhance or degrade detection performance. The presence of rain will degrade performance in the rain area by causing additional clutter and target return loss.





SEA STATE

The following table provides information for assessing the sea state, using a combination of wave height and wind conditions.

Douglas sea state	Mean wind speed kn	Significant wave height M	Sea state description	Notes: • Significant wave height is defined as the areat to trough bright of the highest 1/2
0	<4	<0,2	Flat, very calm	waves. Individual waves and/or swell can combine to significantly increase the
1	5-7	0,6	Smooth	wave height and may result in
2	7-11	0,9	Slight	obscuration of the target. This table only applies to waves formed by local wind
3	12-16	1,2	Moderate	 The table values are approximate due to
4	17-19	2,0	Rough	the subjective nature of the sea state
5	20-25	3,0	Very rough	assessment.
6	26-33	4,0	High	 Sea swell will make assessment of wave height very difficult.

The data listed above is based on IEC 62388

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RAIN CLUTTER (PRECIPITATION)

The presence of rain (precipitation) will degrade performance by causing additional clutter and target return loss. This condition differs from sea clutter, as falling rain produces a continuous return, blanketing whole areas of the screen. The plotting of rain storms and torrential rain conditions may be easily determined due to the continual movement of the weather over an area. Rain clutter creates a high return of noise-like reflections that effectively decreases the signal to noise levels within the radar receiver. In addition, it creates an attenuation of the radar signal, which also decreases the signal to noise levels. Both these effects reduce the target detection capability of a radar system.

SharpEye[™] is a coherent radar system and maintains a high resolution at all ranges and together with front-end processing, will provide superior performance in rain.

The following graphs illustrate the advantage of short pulse and S Band radar systems:



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15.7.1 Factors affecting target tracking, acquisition and tracking accuracy

The Target Tracking processing monitors the same signal as the radar image presented. It follows therefore that, if the screen is showing clearly visible strong echoes, the tracking system can also 'see' those targets and be capable of acquiring and tracking them.

Automatic target acquisition within the guard zone requires 3 out of 4 visible 'hits' on the target during successive antenna resolutions, whilst successful tracking of a target requires 5 out of 10 hits. If a target is not detected for 7 successive antenna revolutions it is indicated as weak, and after 20 successive antenna revolutions, it is dropped and indicated as lost.

ADVERSE CONDITIONS

It will be appreciated that any of the adverse factors listed earlier in this section affecting the radar operational area, such as clutter, or spurious reflections, can also affect the reliability or accuracy of Target Tracking. In particular, unexpected swinging of vectors can arise if an echo appears unstable due to target glint or local abnormal reflections of the microwave beam. Such effects do not indicate a malfunction but should be recognised by the user to avoid misleading decisions.

KEY SOURCES OF ERROR

A comprehensive guide to Target Tracking use and potential error sources is to be found in the "Automatic Radar Plotting Aids Manual" by A G Bole and K D Jones (Heinemann, London). The following summary of key sources of error and their consequences is included here as a short form user guide.

Own Ship HL	Must be correctly aligned.
Own Ship Gyro Error	This will introduce error into the predicted course of other ships but is unlikely to conceal a Target Tracking collision situation since all course data will be affected, including own ship. It can, however, result in miss-assessment in dealing with collision avoidance.
Own Ship Log Error	This will result in incorrect 'true' speed and course readout for every other ship. Any stationary targets being tracked will also acquire an apparent speed. Log error can result in dangerous miss-assessment of a situation.
Pitch and Roll of Own Ship	This inevitably reduces bearing and range accuracy. The errors are usually small; typically less than 1 degree in azimuth and 50 metres in range, but serious rolling can cause intermittent echo paint and target loss.
Target Swap	This is a recognised tracking phenomenon if echoes pass very close or merge. Processing includes features designed to minimise the effect, but the user should still be alert to the possibility that swap can occur.
Tracker Smoothing	In some circumstances this can cause the Tracking vectors to lag behind the real world situation. In order to present a usefully stable vector presentation despite the changes in the radar echo returns, the Target Tracking processing includes sophisticated mathematical filters. These present an averaged picture which is the best indication of the current track, whilst also detecting manoeuvre as quickly as possible.

SUMMARY

This inevitable compromise between stability and responsiveness can affect vector presentation and course and speed readings during and immediately after a target manoeuvre or own ship manoeuvre.

When a Tracked Target or own ship has completed a manoeuvre, the system presents in a period of not more than 1 minute, an indication of the target's motion trend and shown within 3 minutes the target's predicted motion in accordance with specified tolerances.

The user must therefore allow the necessary time to elapse before using Target Tracking data as the basis for a critical decision.

15.8 SART (Search and rescue transmitter)

The Search and Rescue Transmitter (SART) is a 9 GHz receiver/transmitter which provides a position indication by producing range and bearing (BRG) information on any 9 GHz radar screen (with no modification). The SART code shown on the radar screen is a series of dots extending radially outwards from the location of the transmitter. The series of dots represents a range of approximately 10 nautical miles. This indication is an internationally accepted signal for search and rescue operations. In addition, the SART gives confidence to survivors by giving a loud audible signal and/or visual indication of the approach of assistance.

OPERATION OF MARINE RADAR FOR SART DETECTION RADAR RANGE SCALE

To observe for a SART signal, select a range scale of 6 or 12 nautical miles. The spacing between the SART responses is about 0.6 nautical miles (1125 metres) and a number of returns are required to distinguish the SART from other responses.

SART RANGE ERRORS

Inherent delays occur in the SART responses due to the in-built trigger delay. Also SART may have to sweep through the whole radar band before reaching the frequency of the search radar. At medium ranges of about 6 nautical miles the range delay may be between about 150 metres and 0.6 nautical miles beyond the SART position.

As the SART is approached, the radar detects the initial fast sweep of the SART and double dots are shown. The range delay of the first dot is no more than 150 metres beyond the SART position.

RADAR BANDWIDTH

Any radar bandwidth of less than 5 MHz attenuates the SART signal slightly, so a medium bandwidth is normally selected to ensure optimum detection of the SART. Operating Instructions are to be consulted about the particular radar parameters and bandwidth selections.

RADAR SIDE LOBES

As the SART is approached side lobes from the radar antenna may show the SART responses as a series of arcs or concentric rings. These can be removed by the use of the sea anti-clutter control. Operationally, observation of the side lobes can be used to confirm that the SART is near to the ship.

DETUNING THE RADAR

To increase the visibility of the SART in clutter conditions, the radar can be detuned to reduce the clutter without reducing the SART response. The radar AFC system permits sufficient manual control to detune the receiver. Care is to be taken when operating the radar while detuned, as other wanted navigational and collision avoidance information may not be detected. The radar tuning must be returned to normal operation as soon as possible.

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GAIN

For maximum range SART detection the normal operational gain level is to be used.

SEA ANTI-CLUTTER CONTROL

For optimum range SART detection, this control is to be set to the minimum. Care must be exercised as targets in sea clutter may be obscured when the radar system is retuned for normal operation.

Automatic/manual anti-clutter sea control facilities are to be switched to manual.

RAIN ANTI-CLUTTER CONTROL

Rain control should not be used when trying to detect SARTs, as the SART responses may be reduced or suppressed.

RACON

A RACON is a radar beacon which emits radar receivable signals in the radar frequency spectrum (X or S Band).

There are several signal formats; in general, the RACON signal appears on the radar screen as a rectangular echo originating at a point just beyond the position of the radar beacon.

It has a Morse coded pattern. Note that the position on the screen may not be accurate but is sufficiently close to the beacon radar image.



Example of a SART



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16. Symbols

The following tables provide information on the symbols used in the radar operational area and are based on those shown in IEC 62388 Ed 1. Further information on the IEC specification is available from <u>www.iec.ch</u>

16.1 Ownship Symbols

NAME	SYMBOL	DESCRIPTION
Own Ship True Scale Outline		Own Ship True Scale Outline is presented as a scaled outline of own ship drawn relative to the CCRP and oriented along its heading. Own Ship minimised symbol is used when the beam of Own Ship True Scale Outline is less than 6 mm.
Own Ship Minimised symbol (Heading line and Beam Line)		Own Ship Heading Line is presented as a single line originating at the CCRP extending to the bearing scale in the direction of own ship heading. Own Ship Beam Line is presented as a single line perpendicular to the heading line with its midpoint at the CCRP.
Own Ship Radar Antenna Position		Own Ship Radar Antenna Position is presented as crossed lines centred at the physical location of the radar antenna that is the source of the displayed radar image.
Own Ship Speed Vector	e e e e e e e e e e e e e e e e e e e	Own Ship Speed Vector is presented as a single line originating at the CCRP and drawn at a length to represent the distance own ship will travel in a user-selected time interval.
Own Ship Speed Vector Time Increments	and a trans	Own Ship Speed Vector Time Increments are presented as single lines perpendicular to Own Ship Speed Vector. They are located along the vector to represent the distance own ship will travel in a user-selected time increment of the time interval.
Own Ship Speed Vector Water- Stabilized Indicator	For a contraction of the second secon	Own Ship Speed Vector Water-Stabilized Indicator is presented as a single arrowhead added to the end of Own Ship Speed Vector.
Own Ship Speed Vector Ground- Stabilized Indicator	per a a T	Own Ship Speed Vector Ground-Stabilized Indicator is presented as a double arrowhead added to the end of Own Ship Speed Vector.
Own Ship Stern Line		A Stern Line may be shown that originates at CCRP and extends, in the direction 180 degrees from the heading to the bearing scale.

16.2 Tracked Target Symbols

NAME	SYMBOL	DESCRIPTION
Tracked Target	O xxx	A Tracked Target is presented as a circle centred at the target's tracked position. A Dangerous Tracked Target is drawn as a slightly larger circle using the colour red and flashes until acknowledged.
Reported Tracked Target	• 18	A Tracked Target received from an external source is presented as small, filled circle centred at the target's position. A Dangerous Tracked Target received from an external source is presented using the colour red. It does not flash or raise an alert.
Target in Acquisition State		A Target in Acquisition State is presented as a broken circle centred at the acquisition position.
Target Automatically Detected in Acquisition Zone	0	A Target Automatically Detected in an Acquisition Zone is presented as a broken circle centred at the acquisition position. It is coloured red and flashes until acknowledged.
Tracked Target Speed Vector	() · · · ·	A Tracked Target Speed Vector is presented as a single line originating at the target's tracked position and extends to a length representing the distance the Tracked Target will travel in the user- selected time interval. The vector for a Dangerous Tracked Target is drawn using the colour red and flashes until acknowledged.
Target Time Increments	18 Locally tracked	Target Time Increments are presented as single lines perpendicular to a target speed vector. They are located along the vector to represent the distance the Tracked Target will travel in the user-selected time increment. The time increments for a Dangerous Tracked Target are drawn using the colour red and flash until acknowledged. The presentation of target time increments is user selectable.
Lost Target	×	A Lost Target is presented as crossed lines centred on the symbol of the lost target The symbol flashes until acknowledged. The Lost Target symbol for a Dangerous Tracked Target is drawn using the colour red.

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ΤΟΡΙϹ	SYMBOL	DESCRIPTION
Selected Target		A Selected Target is presented as a broken square indicated by its corners centred on the symbol of the selected target and clearly extending beyond the symbol.
Target Past Positions	• • •	Target Past Positions are presented as a series of dots indicating the target's past positions. They are connected by a single thin dotted line drawn through the past positions.
Reference Target	O R	The label for a Tracked Target designated as a Reference Target is presented as the letter "R" adjacent to the symbol of the Tracked Target.
Target Acquisition Area (guardzone)		A Target Acquisition Area guardzone is presented as a series of lines encompassing the acquisition area.
Target Exclusion Zone (guardzone)		A Target Exclusion Area guardzone is presented as a series of lines encompassing the acquisition area filled with diagonal lines.

16.3 AIS Symbols

TOPIC	SYMBOL	DESCRIPTION
Activated AIS Target	√ _{xxx}	An Activated AIS Target is presented as an acute isosceles triangle centred at the target's reported position and oriented to the target's reported heading (or COG if heading is not reported). A Dangerous AIS Target is drawn using the colour red and flashes until acknowledged.
AIS Target without Heading or COG	A	An AIS Target without a Heading or COG is oriented toward the top of the operational display area and has a diagonal line through it. As its velocity is not available, it is not included in collision calculations.

ΤΟΡΙϹ	SYMBOL	DESCRIPTION
	Associated Targets represented by AIS target symbols	The user may select to present Associated Targets (i.e. Activated AIS Targets associated with Tracked Radar Targets) as either Activated AIS Target symbols or Tracked Radar Target symbols.
	Sarah J Sarah J	Alternatively, Activated AIS Target symbols representing Associated Targets may be modified by circumscribing a circle around the symbols' isosceles triangle. Tracked Radar
Associated targets - alternative	Associated Targets represented by radar target symbols:	Target symbols representing Associated Targets may be presented with larger diameter circles, modified by inscribing an isosceles triangle inside the symbols' circle.
		The circumscribed circle and inscribed triangle shall be drawn using a solid line style with the same basic colour used for target symbols.
		Associated Targets may be labelled or numbered, as appropriate. Alphanumeric text used to label/number Associated Targets shall be drawn with the same basic colour as used for target symbols.
Activated AIS Target True Scale Outline	Sarah J	An Activated AIS Target True Scale Outline is presented as a scaled outline of the reported target drawn around the triangle symbol relative to the target's reported position, oriented along the target's reported heading, according to the reported position offsets, beam and length.
		used when the target's heading is not reported.
Activated AIS Target Heading Line		An Activated AIS Target Heading Line is presented as a single line originating at the apex of the Activated AIS Target symbol triangle.
Activated AIS Target Turn Indicator	Sarah J Sarah J	An Activated AIS Target Turn Indicator is presented as a single line perpendicular to the heading line in the direction of turn.

ΤΟΡΙϹ	SYMBOL	DESCRIPTION
Activated AIS Target Speed Vector	V	An Activated AIS Target Speed Vector is presented as a single line originating at the target's reported position and extends to a length representing the distance the AIS target will travel in the user-selected time interval.
Target Time Increments	Sarah J Sarah J	Target Time Increments are presented as single lines perpendicular to a target speed vector. They are located along the vector to represent the distance the Tracked Target will travel in the user-selected time increment.
Lost Target	\times	A Lost Target is presented as red crossed lines centred on the symbol of the lost target. It flashes until acknowledged.
Selected Target	xxx	A Selected Target is presented as a broken square indicated by its corners centred on the symbol of the selected target and clearly extending beyond the symbol.
Target Past Positions		Target Past Positions are presented as a series of dots indicating the target's past positions. They are connected by a single thin dotted line drawn through the past positions.
Sleeping AIS Target	4	A Sleeping AIS Target is presented as an acute isosceles triangle centred at the target's reported position and oriented to the target's reported heading (or COG if heading is not reported).
AIS ATON (physical)	$\langle + \rangle$	An AIS physical ATON is presented as a diamond with crossed lines centred at the ATON reported position. The symbol may also have a top mark.
AIS ATON (virtual)		An AIS virtual ATON is presented as a dashed diamond with crossed lines centred at the ATON reported position. The symbol may also have a top mark.
AIS ATON (physical with error)	Error	If the ATON reports a problem the problem text is presented above the symbol e.g. Unlit, Racon err or Error
AIS ATON (Off position and missing)	Off Poen Missing	If a physical ATON is off position, it is presented with an Off Posn text above the symbol and the symbol is shown as yellow. This may be used in conjunction with a virtual missing ATON symbol at the position where the physical ATON should be.

AIS Mobile ATON (physical or virtual)	M M M M M M M M M M M M M M	A mobile AIS ATON is presented as a diamond topped with the letter "M" and a compass rose inside.
AIS Mobile ATON (direction of movement)		A mobile AIS ATON which is self propelled, but the direction of motion is not reported is presented with a dot at the centre of the symbol. Where the direction of motion is reported, an arrow is shown along one of the compass rose lines.
AIS Mobile ATON (tethered)		A mobile AIS ATON which is tethered from a watercraft (e.g. a cable, pipe or net) is presented with a diagonal line extending from the centre of the symbol.
AIS Locating device	$\otimes \otimes_{\text{test}}$	An AIS locating device (AIS SART, AIS EPIRB or AIS MOB) is presented as a circle with a cross inside. If in test mode is will have the text TEST next to it.
AIS SAR Aircraft	公 次	An AIS Search and Rescue aircraft is presented as a fixed wing or helicopter 'aircraft' symbol.
AIS SAR Vessel	\bigotimes	An AIS Search and Rescue vessel is presented with a circle with a cross inside added to the active AIS target symbol. This is used for both active and sleeping SAR vessels.
AIS Base Station	BS	An AIS Base station presented as a diamond with the text "BS" inside.

16.4 Navigation Symbols

NAME	SYMBOL	DESCRIPTION
Monitored Route	œ — ⊕ ``	The monitored route symbol is presented as lines connecting origin and waypoints.
Waypoint	O	The waypoint symbol is used in conjunction with the monitored route.
Fix and time	1115 GNSS	The fix position and time symbol are presented as a circle and crosshairs centred at the fix position.
Dead reckoning position and time (DR)	1115 ⊕ DR	The dead reckoning position and time (DR) symbol are presented as a circle and crosshairs centred at the DR position.
Estimated position and time (EP)	1115 ⊕ EP X	The estimated position and time (EP) symbol are presented as a circle and crosshairs centred at the EP position.
Position and time of "wheel-over"	_WQ(1489) Q WP2	The symbol is presented as a thin line. The line is labelled with the planned rudder bearing.

16.5 Tools and other symbols

TOPIC	SYMBOL	DESCRIPTION
Trial Manoeuvre	Т	When a Trial Manoeuvre function is performed, a large "T" is presented in a conspicuous location on the display, nominally centred at the bottom of the operational display area. The symbol is drawn using the colour red.
Simulation Mode	S	When in simulation mode a large "S" is presented in a conspicuous location on the display, nominally centred at the bottom of the operational display area. The symbol is drawn using the colour red.
Cursor		The symbol is presented as a crosshair using single thin lines perpendicular to each other with the midpoint on the line, extending at least 3 mm from the centre on all sides. The centre may be open. Both alternatives may be used.
Range Rings		The symbol is composed of a series of concentric circles using single thin lines centred on the CCRP and equally spaced in range.
Variable Range Marker		The symbol is presented as a circle (part shown) with the first VRM using a thin long- dashed line. The symbol is drawn using the orange colour. Additional VRMs are distinguished from each other by different colours or different styles of dashed lines. A VRM and EBL may be combined.
Electronic Bearing Line		The symbol is presented as a dashed line. When offset from own ship, the origin is marked with 2 mm dot. The first EBL symbol uses a thin long. Additional EBL lines are distinguished from each other by different colours or different styles of dashed lines. A VRM and EBL may be combined.
Event Mark	Мов	The event mark symbol is presented as a rectangle with a diagonal inside it. A label (e.g. "MOB" for man overboard) may be added for clarification.
Parallel index lines	с — -о	The parallel index lines are presented as a thin dashed or dotted lines The parallel index lines are distinguishable from electronic bearing lines by colour and/or line style.

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17. IEC 61162 Messages

The following list details the IEC 61162-1 messages.

STANDARD MESSAGES DECODED (INPUTS)				
Decoder	Description	Decoder	Description	
ACK	Acknowledge (alerts)	RRT	Route Transfer	
ACN	Alert Command	RSA	Rudder sensor angle	
ALR	Set Alarm State	RTE	Routes	
DBT	Water depth reference to the transducer	SSD	AIS Data	
DDC	Display Colour Scheme	THS	True heading and status	
DPT	Water depth reference to the transducer	TLB	Target Label & Association	
DTM	Datum reference	TTD	Tracked Target Data	
GGA	Global position system fix data	TTM	Target data	
GLL	Geographic position – latitude and longitude	TTD	Tracked Target Data	
GNS	GNSS fix data	VBW	Dual ground/ water speed	
HBT	Heartbeat supervision sentence	VDM	AIS VHF data link message	
HDT	Heading true	VDO	AIS VHF data link own vessel reports	
HTC	Remote Heading Track Control Data	VHW	Water speed and heading	
HTD	Heading Track Control Data	VLW	Dual ground/ water distance	
MWV	Wind speed and angle	VSD	AIS Data	
NRM	Navtex Receiver Mask	VTG	Actual track and ground speed	
NRX	Navtex Message	WPL	Waypoint location	
NSR	Navigation Status Report	XDR	Azipod data/ VDR-A4 DIU data	
RMC	Recommended minimum specific position transit data	XTE	Cross Track Error	
ROT	Rate of turn	ZDA	Time and date	
RPM	Revolutions per minute			

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STANDARD MESSAGES (OUTPUTS)			
Decoder	Description	Decoder	Description
ACK	Acknowledge (alerts)	OSD	Own ship data
AIQ SSD	AIS Data	RSD	Radar system data
AIQ VSD	Al Data	RRT	Route Transfer
ALC	Cyclic alert list	RTE	Routes
ALF	Alert handling	SPW	AIS Password
ALR	Alarm Status	SSD	AIS Data
ARC	Alert command refused	TLB	Target label & Association
CRQ	Navtex Receiver Mask Query	TTD	Tracked Target data
DDC	Display Colour Scheme	TTM	Tracked Target message
EVE	General event message	VER	System Version
HBT	Heartbeat supervision sentence	VSD	AIS Data
HTC	Heading / track control	WPL	Waypoint location
HTD	Remote Heading Track Control Data	XTE	Cross Track Error

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18.1 Performance Monitor

The Performance Monitor button is labelled 'MON' and is used to manually start the Performance Monitor.

This will check power, receiver sensitivity and temperature. If any of these parameters fall outside predetermined levels, an alert is generated at the display indicating the nature of the fault.

To operate move the cursor to the 'MON' button in the top right corner of the PPI display and right click to select MON ON. The Button will change to 'MON ON.'

Before starting the performance monitor, ensure that Beacon mode is switched Off else results will be compromised. Beacon mode can be turned off and on using the Beacon button in the top left of the PPI display.

The radar must have been transmitting for more than two minutes before the Performance Monitor can be selected.

Do not use any controls while the performance monitor is in as this will also compromise the results.

Once complete a "Performance Monitor" window will appear.



Calibrated Values are the values measured during the calibration process performed during commissioning.

Measured Values are the values actually measured during the Performance Monitor Test. **Threshold values** Measured Values should be above the Threshold values.

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N-UP

Rings

RM

Range Rings

GND STAB

Profile: Last Setting

6 NM

Chart OFF

HL ON

6 NM

18.2 Range.

The range button allows changing of the current range and control of range rings.

With the cursor placed over the **Range** button, the following cursor options are available:

Range Down (left click):	Selects the next available lower range.	
Rings ON/ OFF (middle Click):	Switches range rings ON/ OFF.	
Range Up (right click):	Selects the next available higher range.	Rang

RANGE

Use range up and Range down to change the current range.

On systems fitted with an optional keyboard, the **Page up** or + (increase) and **Page down** or - (decrease) buttons can also be used to change range.

The Ranges available and the corresponding Range Mode (Shown Top Left in the Information Panel in Section 18.3) that can be selected with the Manta NEO X-Band are as follows:

Range	Range Mode
0.125 NM	12 NM
0.25 NM	12 NM
0.5 NM	12 NM
0.75 NM	12 NM
1.5 NM	12 NM
3 NM	12 NM
6 NM	24 NM
12 NM	24 NM
24 NM	48 NM
48 NM	71.9 NM
96 NM	71.9 NM

18.3 Transceiver Information Panel

There are changes to the top left information panel to the one shown in Section 6.42.13.

This panel displays the status of **Mode**, **Frequency** and **Tx**. This is for information only, settings can not be changed using this panel.

48NM
22
Run

Transceiver Information Panel

- **Mode**: Range Mode can be 12 NM, 24 NM, 48 NM or 71.9 NM and will correspond to the selected Range selected in Section 18.2.
- Freq: Frequency number will be 18, 20 or 22.
- Tx: Will be Run or Standby

HBK-2300-1 Navigation Display Operators Handbooks Chapter 19: Annex B - Autonomous Mode

19. Annex B - Autonomous Mode 19.1 Overview

Certain HENSOLDT UK transceivers support Autonomous Mode which will allow radars to operate when not under control by a display.

Usually antennas will stop rotating and transmitting when the Master display returns to the Standby screen.

When in Autonomous Mode, the antenna will remain operational and will rotate and transmit when the display is returned to the Standby screen. This allows radar data to be available to systems that require constant data.

When using Autonomous Mode, every transceiver and every Multi Function Display on the system must have Autonomous Mode enabled.

At least one Multi Function Display must be in an operational mode (see below) for any transceiver to transmit autonomously.

Operational modes:

- Single Radar Display,
- Dual Radar Display,
- Navigation & Conning Display (with radar display enabled)
- ECDIS (with radar display enabled).

In the event that there is no display in operational mode, all transceivers on the system will enter standby mode causing antenna rotation and transmission to cease.

Multi Function Display autonomous mode is enabled using the eToken dongle (see section 4.4). Manta Digital optional functions are listed in Section 8.1. Setup information is detailed in HBK-2300-2.

Please note that not all HENSOLDT UK transceivers are able to operate in Autonomous mode.

19.2 Alerts

When operating in Autonomous Mode any alert sent from a transceiver is received by all Multi Function Displays in the system.

Any alerts received from a transceiver not being mastered will be shown as a Caution.

The alert text will include the name or ID of the transceiver sending the alert.

19.3 Standby Screen

19.3.1 Transceiver Status

A typical Standby screen is shown below. Each transceiver has a coloured square which indicates the status of the transceiver.



The Autonomous Mode indicator status will vary from the standard system detailed Section 6.42.12.

Indicato	r Status	Transceiver State	Description
	Red square	Not Ready	Tx Not Ready.
	Green Square	Ready	The transceiver is ready to transmit.
10	Green square with a number	Ready Mastered	The transceiver is Ready, mastered by a display but is not currently transmitting.
10	Green square flashing with a number	Run Mastered and Transmitting	The transceiver is mastered by a display and is transmitting. This indicates the display number that is controlling (mastering) the transceiver
	Green square flashing with no number	Run Transmitting Autonomously	The transceiver is transmitting autonomously

19.3.2 Transceiver Selection:

With the cursor over the required transceiver, the display can be selected as either a master or slave.

19.3.3 Operational Mode Selection:

An operational mode can be selected by selecting any of the enabled radar related operational modes in the **Apps...** menu. This will not change the Run status of the selected transceiver.

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19.4 Transceiver Run State:

The Run state of selected transceiver is shown in the transceiver status dialogue box.

The status is also shown on the additional RUN / STBY button located to the right of the transceiver status dialogue box.

If the display is the master of the selected transceiver, the selected transceiver can be set to Run or Standby by use of the RUN/STBY button.

If the display is a slave of the selected transceiver, RUN/STBY button is not available and the displayed status is greyed out.



Display is Master of the Transceiver



Display is the Slave of the Transceiver

NOTE: The Run / Standby button is only available on systems using Autonomous Mode.

19.5 Transceiver Selection:

The selected transceiver can be changed by left clicking on the transceiver button to show the transceiver selection dialog.

120.0° 🔻	Mk 11 X Band	Master	TCUR 1 TCUR Mr. 11.1 Clark E Run Run Run	Rader Sener Delector	RA TCVRS S2W	TOVR 6 We 11 S Bend Not Reedy
D Select Rad	dar, ode Goto 24 MM FieqStandby 8	330 J		Matter Network Switch		
150	Power High Sweep Up	320		Rader Crispiay Dispray 12		

19.5.1 Go to Standby:

Centre Clicking the transceiver button returns the display to the Standby Screen. This will not change the transceiver's run state and it will continue to transmit as before.

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19.5.2 Transceiver mastership:

The selected transceiver can be mastered (if not already mastered) by left clicking the Slave button.

The button will change to Master.



NOTES

- Any Radar display on the network can take mastership of any radar transceiver.
- Only one display can be master of a transceiver. If mastership is taken, the previous master will become slave
- All HUK Radar Systems on the vessel shall have "Autonomous" mode enabled. There shall not be a mix of traditional and autonomous transceivers or displays.

19.5.3 Data Output

While transmitting, Radar transceivers will continuously send ASTERIX radar video to the LAN.

Depending on configuration, ASTERIX radar video may also be sent while the transceivers are in standby. This will be noise only and not contain radar video.

A display generating tracks will continuously send them to the LAN provided the display is in an operational screen.

Sending of tracks from the radar display will cease if the main Standby screen or External Apps screen is selected.

HBK-2300-1 Navigation Display Operators Handbooks Chapter 20: Abbreviations

20. Abbreviations

ACK	Acknowledge	ENT	Enter
ACQ	Acquire/ acquisition	ire/ acquisition EP	
AFC	Automatic frequency control	EPA	Electronic plotting aid
AGC	Automatic gain control	FPFS	External position fixing
AIS	Automatic Identification	2110	system
Ale	System	EPIRB	Emergency position
ALT	Altitude/ alternative		Indicating beacon
	Anchor	ERBL	Electronic range and bearing
ANCH ²	Anchor watch	EDD	Ine
ANT	Antenna	ERK	Entimeted time of arrival
AP	Autopilot		Estimated time of doparture
ARCS	Admiralty raster chart service	ETD ²	Estimated time of departure
AUD	Audio/ audible	EYT	External
	Available	E7	Exclusion zone
	Acquisition zone	FWD	Forward
AZ-	Azimuth	GC	Great circle
BCR	Bow Crossing Range	GND	Ground
BUI	Bow Crossing Time	0.112	Global navigation satellite
BRGRD	Background	GNSS	system
BRU	Brillionee	GZ	Guard zone
DRILL	Brilliance Rearing wayneint to		Harbour approach and
BWW	waypoint	НАР	pilotage
CAL	Calibrate/ calibration	HDG	Heading
0,12	Central Alert Management	HL	Heading line
CAM-HMI	Human Machine Interface	H-UP	Head up
0000	Consistent common	IBS	Integrated bridge system
CCRP	reference point	IND	Indication
CCPS	Consistent common	INS	Integrated navigation system
CONS	reference system	INT	Interval
CENT	Centre	IR	Interference rejection
CHG	Change	KN	Knots
CLR	Clear	LAT	Latitude
CNCL	Cancel	LIM	Limit
COG	Course over ground	LON	Longitude
CONT	Contrast	LOP	Line of position
CORR ¹	Correction	LP	Long pulse
CORR		LR	Long range
CPA		MAN	Manual
CKS	Course through water	MOB	Man over board
Cillo		MON	monitor
CSR	Cursor	MP	Medium pulse
	Day/night	MVR	Manoeuvre
DECR	Decrease		Maritime Mobile service
DEL	Delete	MMSI	identity
DEP	Departure	NAV	Navigation
DEST	Destination	NMT	Not more than
DEV	Deviation	NORM	Normal
DISP	Display	N-UP	North Up
DIST	Distance	OOW	Officer on watch
DG	Dangerous goods	OS	Ownship
DOPS	Differential global positioning	PI	Parallel index lines
DGPS	system	PL	Pulse length
DPTH	Depth	PM	Performance monitor
DR	Dead reckoning	POSN	Position
DTG	Distance to go	PPI	Planned position indicator
EBL	Electronic bearing line	PPR	Pulse per revolution
EDDI	Electronic bearing and range	PRF	Pulse repetition frequency
EBKL	line	PWR	Power
ECS	Electronic chart system	RAD	Radius
ENC	Electronic navigation chart	RADAR	Radar detection and ranging
ENH	Enhance	RCDS	Raster chart display system
		Roba	Naster Unan Usplay system

RCRS	Elative course
REF	Reference
REL	Relative
RIP	Radar interlay processor
RL	Rhumb line
RM	Relative motion
RM(R)	Relative motion with relative trails
RNC	Raster navigation chart
RNG	Range
ROT	Rate of turn
ROHS	Restriction of Hazardous Substances
RR	Range rings
R SPD	Relative speed
RTD	Real time display
Rx	Receiver/ receive
SART	Search and rescue
SAT	
50/50	Scan to scan correlation
SEL	Select
SOLAS	Safety of life at soc
SULAS	Short pulso
SPD	Sheed
STAB	Stability
STBY	Standby
STG	Speed to go
STW	Speed through water
SYM	Symbol
SYNC	Synchronised
т	True
TCPA	Time to closet point of
	approach
T CTW	I rue course through water
T SPW	True speed through water
TM	Target
	True motion with true trails
	Time of arrival
тор	Time of departure
TPL	Transferred line of position
TRK	Track
TT	Target tracking
TTG	Time to go
Тх	Transmit
TWOL	Time to wheel over line
UNSTAB	Unstabilised
VAR	Variation/ variable
VECT	Vector
VID	Video
VOY	Voyage
VRM	Variable range marker
WGS	Wheel ever line
WOR	Wheel over point
WOF	Wheel over time
WP	Waypoint
WPT	Waypoint
XTD	Cross track distance
XTE	Cross track error

HBK-2300-1 Navigation Display Operators Handbooks Chapter 20: Abbreviations



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HBK-2300-1 Navigation Display Operators Handbooks Chapter 21: Contact Details

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CUSTOMER SERVICES ON-LINE

Service visits can be arranged on-line using the HENSOLDT UK web site. In the search box, enter "**Customer service**," the **Request Service** form can be opened from the customer services section of the web page.

REGIONAL OFFICES/ AUTHORISED SERVICE AGENTS

A list of HENSOLDT UK regional offices and authorised service agents can be found on the HENSOLDT UK web site. In the search box, enter "**Commercial marine agents**."

APPROVAL CERTIFICATES

Copies of the type approval certificates for the system can be obtained through the HENSOLDT UK website. In the search box, enter "**Type approval certificates**."

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