small dots, while small targets remain visible and persistent. Gain levels further from your boat remain unchanged.

Super HD adjustments

You can generally use the default AUTO settings for best results, but two manual controls allow you to explore Super HD's capabilities.

Antenna boost

This scales the effective antenna size. At zero, the effective antenna size matches its actual size. At 95, the effective antenna size is doubled.

Increasing effective antenna size has the effect of separating targets that appear merged at lower settings.

In some circumstances, a larger effective scanner can be a drawback. In particular, if you are in a harbor or close to land, you may see more detail than is useful.

For that reason, the AUTO settings for Harbor and Coastal modes provide lower scale factors of about 30% and 60%.

Power boost

This adjusts effective transmit power. At zero, the radar operates at its standard power (4kW or 12kW). At 90, the effective power is increased by a factor of at least two.

Increasing power has the effect of making targets more distinct from noise. For maximum benefit, reduce gain to prevent saturation of strong targets.

The default power boost setting for all AUTO modes is 90.

8.11 Tuning the radar display: ENHANCE ECHOES

The ENHANCE ECHOES softkey gives you access to further features for tuning the radar display.

Interference rejection

Interference rejection automatically reduces mutual radar interference when two radar-equipped vessels are operating within range of each other. It is switched on by default.

You can adjust the strength of interference rejection in the Radar Setup Menu.

Turning interference rejection off altogether allows you to detect the presence of other radars in the vicinity.

To turn interference rejection off
1. Press the **ENHANCE ECHOES** softkey.
2. Toggle the setting to **OFF** on the **INT REJECT** softkey.

Expansion

The expansion function allows you to either override the pulse length or to give larger returns so targets are easier to see.

To override the pulse length
1. Open the **Radar Setup Menu**. You can either use the **MENU** button, or press and hold the **EXPANSION** softkey.
2. Set the magnification level for target expansion to **HIGH**.

To give larger returns
1. Open the **Radar Setup Menu**.
2. Set the magnification level for target expansion to **LOW**.

Note: *Selecting this option may compromise target resolution.*

Wakes

When the wakes function is switched on, you can see the direction and speed of moving targets relative to your boat. Targets are displayed in yellow, turning to paler shades of blue as the signal diminishes.

The wakes option is a local setting which applies only to the display on which you are working. You can choose to display wakes for a period of 10 seconds, 30 seconds, 1 minute, 5 minutes or 10 minutes.

To switch wakes display on
1. Press the **ENHANCE ECHOES** softkey.
2. Toggle wakes to **ON** using the **WAKES** softkey.
3. Select your preferred wakes setting.
4. Press **OK**.

To switch wakes display off
1. Press the **ENHANCE ECHOES** softkey.
2. Press the **WAKES ON/OFF** softkey.
3. Press **OK**

Scan to scan

When scan to scan is switched on, stationary objects appear stronger with each sweep of the radar. If the object moves, it appears relatively weakly on screen.

This can be used to reduce the effects of rain and sea clutter.

To switch scan to scan on or off
1. Press the **ENHANCE ECHOES** softkey.
2. Toggle to **ON** or **OFF** using the **SCAN TO SCAN** softkey.
3. Press **OK.**

8.12 Radar range

You can zoom in or out to view the radar display at different scales. The scale is measured from the centre to the top of the window and is displayed in the left-hand corner of the status bar.

- **Short-range scales** show nearby objects in greater detail, and are most suitable as you approach coastlines, harbors, or other vessels. The shortest range available is 1/8 nautical miles.

- **Long-range scales** provide the best overview of the vessel's relationship to landmasses, weather fronts and large ships within or beyond your field of vision. The longest range available is 72 nautical miles, depending upon the scanner fitted.

To change the radar range
1. Zoom to your required scale using the **RANGE** button on the keyboard.

Synchronizing radar range and chart scale

The chart application includes an option to synchronize the radar range with the chart scale.

When synchronization is switched on:

- The radar range in all radar windows changes to match the chart scale.
- 'Sync' is displayed in the top left-hand corner of the chart window.
- If you change the radar range, all synchronized chart views change scale to match.
- If you change the scale of a synchronized chart window, all radar windows update to match.

To synchronize radar range and chart scale
1. Make a **chart window** active.
2. Press the **PRESENTATION** softkey.
3. Press **CHART MODE AND ORIENTATION**.
4. Toggle to **RDR** on the **CHART SYNC** softkey.

Note: *Radar range synchronization is not available when the chart motion mode is set to autorange, nor when the selected scanner is set to dual range.*
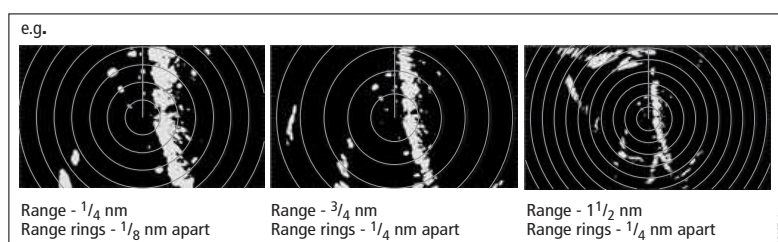
8.13 Measuring distance, range and bearing

You can measure distance, range and bearing in the radar application. Options for doing so are detailed in the table below.

Functions	Distances between points	Range from your boat	Bearings
Range Rings	Yes (approx.)	Yes (approx.)	-
Cursor	-	Yes	Yes
Variable Range Markers (VRMs)	-	Yes	-
Electronic Bearing Lines (EBLs)	-	-	Yes
Floating VRMs	Yes	-	-
Floating EBLs	-	-	Yes

Range rings

Range rings help you gauge the approximate distance between points at-a-glance. Range rings are centred on your position and displayed on the screen at pre-set intervals.

The number and spacing of range rings changes to suit the scale you have set.

e.g.

Range - $^1/_4$ nm
Range rings - $^1/_8$ nm apart

Range - $^3/_4$ nm
Range rings - $^1/_4$ nm apart

Range - $1^1/_2$ nm
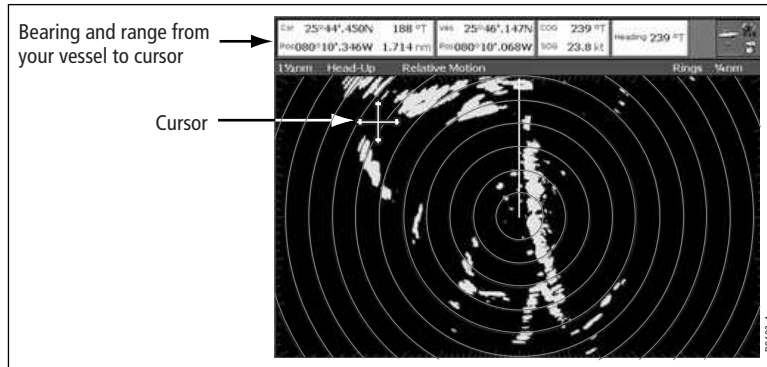Range rings - $^1/_4$ nm apart

To show or hide range rings
1. Press the **PRESENTATION** softkey.
2. Toggle to **ON** or **OFF** using the **RANGE RINGS** softkey.

Bearing and range

The radar display shows you bearing and range data to any object you highlight.

To find the bearing and range to an object

1. Move the cursor to the object's position.

2. Read off the bearing and range in the databar.

Bearing and range from your vessel to cursor

Cursor

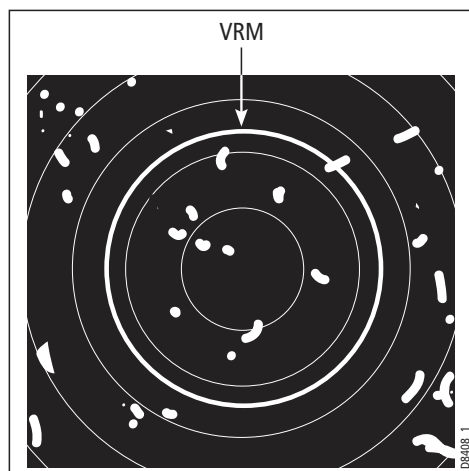# The Variable Range Marker (VRM) and Electronic Bearing Line (EBL)

The VRM/EBL softkey opens the toolbars shown below:

Variable Range Marker

A Variable Range Marker (VRM) is a circle of variable radius centred on your vessel's position.

You can use the VRM to measure the distance from your vessel to a selected object by adjusting the radius of the marker so that it intersects the object's position.

The range is displayed on the ADJUST VRM softkey label when you highlight the VRM.

VRM

Electronic Bearing Marker

An Electronic Bearing Line (EBL) is an on-screen marker drawn from your position to the edge of the window.

When this line is rotated to align with a target, the bearing relative to your current heading is measured and displayed on the ADJUST EBL softkey label.
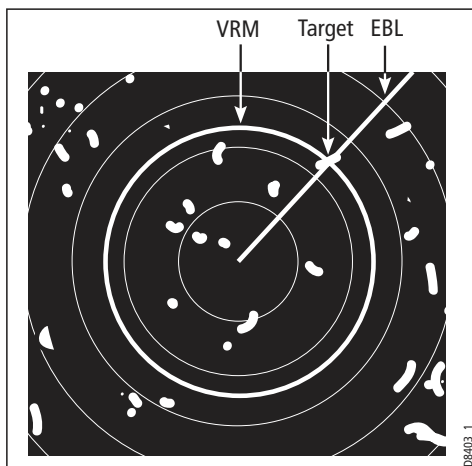
The data is also displayed if you select the EBL with the cursor.

To change the EBL reference from relative to magnetic or true, see *page 187*.

Combined range and bearing

You can combine a VRM and an EBL to measure range and bearing simultaneously:

Tracking a target with a VRM or EBL

You can tell which direction an object is travelling in by tracking its movement in relation to the EBL. If it continues travelling towards the EBL, it could be on a collision course with your boat.

To create a VRM or an EBL
1. Press the **VRM/EBL** softkey.
2. Toggle to **ON** with the **VRM/EBL** softkey.
3. To adjust settings, press either the **ADJUST VRM** or **ADJUST EBL** softkey and make changes with the rotary controller.

To place a second VRM or EBL
1. Press the **SET UP VRM/EBL 2** softkey.
2. Proceed as with **VRM/EBL 1**.

Floating VRM and EBL

The VRM/EBL float function allows you to measure range and bearing between any two points on the radar screen (rather than from your vessel's position).

First you move the VRM/EBL centre to the position you want to measure from. Then you change the radius of the VRM to measure distance, or change the angle of the EBL to take a bearing.

To use floating VRM
1. Create a standard VRM.
2. Highlight the VRM or press the **VRM/EBL** softkey.
3. Press the **FLOATING VRM** softkey.
4. Press the **ADJUST FLOAT** softkey.
5. Move the cursor to the point to **measure from**.
6. Press **OK**.
7. Move the cursor to the point to **measure to**.
8. The range between the two points is shown on the **ADJUST VRM** softkey label.

To use floating EBL
1. Create a standard EBL.
2. Highlight the EBL or press the **VRM/EBL** softkey.
3. Press the **ADJUST EBL** softkey.
4. Adjust the direction and start point of the EBL using the trackpad and rotary controller.
5. The bearing is shown on the ADJUST EBL softkey label.

To use a second floating VRM or EBL
1. Press **SET UP VRM/EBL 2**.
2. Toggle **VRM/EBL 2** to **ON**.
3. Repeat the steps for using a floating VRM (steps 1-8).

To unfloat a VRM or EBL

1. Press the **VRM/EBL** softkey.

2. Press the **FLOATING EBL** softkey (under **SET UP VRM/EBL 2** if you are using a second floating VRM or EBL).

3. Select **CENTER**.

4. Press **OK**.

8.14 Using radar to track objects

The TARGET TRACKING softkey opens the toolbars shown below:

Target tracking functions are used to help avoid collisions.

- **Guard zones** sound an alarm when an object comes within a specified range.
- **MARPA** displays information about tracked objects.
- **AIS** displays the identity and voyage information of other AIS-enabled vessels.

To track a target

1. Press the **TARGET TRACKING** softkey.

2. Highlight the object you wish to track.

3. Press the **ACQUIRE TARGET** softkey.

The 'target being acquired' icon is displayed, followed by the appropriate MARPA status icon.

Guard zones

A guard zone is a 'protected' area around your vessel: as soon as an object (like another vessel) enters the zone, it triggers an alarm on your Nav Station. Guard zones are managed from the Monitor in Zones toolbar.

Guard zones can be either circular- or sector-guards, and you can define up to two of them on your system.

Circular
Guard Zone

Sector
Guard Zone

You can adjust the sensitivity of guard zones on the Alarms Setup Menu. For more information, see *Alarm Setup Menu* on *page 288*.

Guard zones only operate when the whole zone is displayed on the screen. To avoid inappropriate alarms, they become active ten seconds **after** being placed or edited.

To place a guard zone
1. Press the **TARGET TRACKING** softkey.
2. Press the **MONITOR IN ZONES** softkey.
3. Toggle **ZONE 1** or **ZONE 2** to **ON**, as appropriate.
4. Press the corresponding **SET UP ZONE** softkey.
5. Choose your zone shape.
6. Set the limits of the guard zone using the rotary controller.
7. Press **OK**.

MARPA

The Mini Automatic Radar Plotting Aid (MARPA) provides target-tracking and risk-analysis features. MARPA obtains detailed information for up to ten automatically tracked objects and provides continuous, accurate and rapid situation analysis.

To use MARPA, you need a fast heading sensor.

Setting up MARPA

You can customize the following parameters from the MARPA Options menu:

Parameter	Options
Vector Length The time period specified for drawing length of vectors.	0.5min, 1 min, 3 min, **6min**, 12min, 30 min, 60 min
Target History Plots a target's previous position at the specified intervals. The four most recent position points are displayed. If True target vectors are selected, the four most recent vessel position points are also displayed.	**OFF**, 0.5 min, 1 min, 3 min, 6 min
Own vessel safe zone The safe zone is a ring, centred on your boat, within which a target is considered dangerous if it will enter this zone within the *time to safe zone* period.	0.1 nm, 0.2nm, **0.5nm**, 1.0 nm, 2.0nm
Time to safe zone If a target enters your safe zone within this time period, it is considered dangerous.	**3 mins**, 6 mins, 12 mins, 24 mins
Safe zone ring Controls whether the safe zone ring is displayed or hidden on screen	Visible Hidden

To open the MARPA Options menu

1. Press the **TARGET TRACKING** softkey.

2. Press the **MARPA & AIS OPTIONS** softkey.

3. Change MARPA options as required.

Safety notices

MARPA can improve collision avoidance when used wisely. It is the User's responsibility to exercise common prudence and navigational judgements.

There are certain conditions under which acquiring a target may become difficult. Some of those conditions are:

- The target echo is weak.
- The target is very close to land, buoys or other large targets.
- The target or your own ship is making rapid manoeuvres.
- Choppy sea state conditions exist and the target is buried in excessive sea clutter or in deep swells.
- Choppy sea state conditions exist yielding poor stability.

- Inadequate heading data exists.

Symptoms of such conditions are that acquisition is difficult and the MARPA vectors are unstable; the symbol wanders away from the target, locks on to the wrong target or changes to a lost symbol target.

If any of these conditions are present, acquisition and tracking may need to be re-initiated or, in some cases be impossible to maintain. Improving the quality of the heading data will reduce the effect of the other conditions.

To acquire a target

MARPA automatically tracks acquired targets, calculates target bearing and range, speed and course, Closest Point of Approach (CPA), and Time to Closest Point of Approach (TCPA).

Each target tracked can be displayed with a CPA graphic which shows the target vessel, course and speed (as a vector) and indicates the CPA. The calculated target data can also be shown on your screen. Each target is continually assessed and an audible alarm is sounded if a target becomes dangerous, or is lost.

Effective MARPA operation is dependant on accurate own-ship's heading and speed. Speed Over Ground (SOG) and Course Over Ground (COG) information are required to show true target course and speed. The better the quality of the heading and speed data, the better MARPA will perform. MARPA will function without SOG and COG in relative mode. For the best heading data a Raymarine SMART heading sensor or a gyro-stabilized autopilot is required.

Risk assessment

Each target is monitored to see if it will be within a certain distance from your boat within a certain time. If so, the target is designated as dangerous and an audible warning is sounded along with an on-screen warning being shown. The target symbol changes to the dangerous target symbol and flashes to indicate that it is a dangerous target. Pressing the appropriate soft key will silence the alarm and remove the warning.

If a target is lost, either because the MARPA software has lost contact with it, or because it has moved out of range, an audible alarm is sounded and an on-screen warning appears. The on-screen symbol will change to the target lost symbol. Pressing the appropriate soft key will silence the alarm and remove the on-screen warning and the target lost symbol.
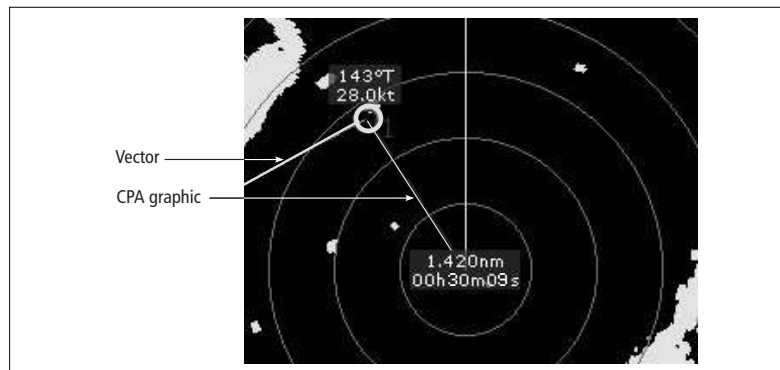
MARPA range

MARPA target acquisition is only available at radar range scales of up to 12nm, although tracking continues at all ranges.

If you change to a smaller range scale, targets may be beyond the range of your scanner and will be lost. In such cases, an on-screen warning will indicate that the target is off-screen.

Closest point of approach

Closest point-of-approach (CPA) graphics show vectors for your vessel and a selected target. (A vector is a line showing a predicted course.) Vector length varies with speed (settings can be changed in the MARPA Setup Menu).

To show or hide closest point-of-approach

1. Highlight the object with the cursor.

2. Toggle to the required CPA setting using the **CPA GRAPHIC** softkey.

How motion modes affect CPA

In **true motion** mode, the vectors of your vessel and the target are shown extended to their intersection point. The CPA is shown as a line that is placed on your boat's vector at the point of the CPA. The length and direction of the line indicates the distance and bearing of the target at CPA. The text indicates CPA and TCPA. The text next to the target symbol indicates its true course and speed.

In **relative motion mode**, no vector extension of your boat is shown. The CPA line emerges from your own boat, with the target vector extension being shown as relative, not true. The text next to the target indicates its course and speed.

Press SHOW DETAILS to display the calculated relative course and speed.

Displaying MARPA data
All MARPA data is held in a list containing:

- MARPA ID
- Bearing
- Range
- True Course
- True Speed
- CPA
- TCPA

Target display
The position of MARPA objects is marked with an icon, which also indicates its MARPA status.

	Target being acquired		Dangerous target
	Safe target		Lost target

To view the MARPA list
1. Press the **TARGET TRACKING** softkey.
2. Press the **MARPA LIST** softkey.

To cancel MARPA directly
1. Highlight a tracked **MARPA** object.
2. Press either the **CANCEL TARGET** or **CANCEL ALL TARGETS** softkey, as appropriate.

To cancel MARPA from the MARPA list
1. Open the MARPA list.
2. Select a target and press CANCEL TARGET or CANCEL ALL TARGETS, as required.

Displaying vessel identity (AIS)

If you have an AIS receiver fitted to your system, you can use it to:

- Show the position and display vessel data for other AIS-equipped vessels within a specified range of your boat.

- Display voyage data (position, course, speed and rate of turn) of AIS-equipped vessels.

- Display basic or detailed information for each target vessel including safety critical target data.

- Set up a safe zone around your boat.

- View alarm and safety related messages.

This information is displayed in the form of an overlay or as a dialog box on your radar screen. For more information about AIS, see *Chapter 17.*

To overlay AIS on a radar window

1. Press the **PRESENTATION** softkey.

2. Toggle the **AIS LAYER** to **ON**.

Chapter 9: Using the data application

9.1 Introduction

The data application enables you to view numeric data generated by the system or by instruments available on NMEA or SeaTalk.

		Heading	Speed
Ves Pos **50°49'.595N** **001°12'.306W**	Cog Sog 071°T 10.5kt	074°T	10.9kt
		Waypoint TTG **00h13m18s**	VMG Wpt 10.5kt
GOTO CURSOR **075°T** **2.324**nm **00h13m18s**	Set Drift 304°T 0.9kt	Depth 48.9ft	XTE 0.000nm
		Trip 73.48nm	Local Time **04:16:41** AM

9.2 Selecting a data application

To select a data application:

1. Select a page set that includes a data application:

2. Select a page which includes a data window:

9.3 Selecting the data for display

You can either select a panel of pre-configured data or customize the application to display the data of your choice.

Note: *Panel selection is a local setting and will therefore only affect the individual display on which you are working.*

Pre-configured data panels

The pre-configured data panels include data associated with Navigation, Waypoint, Route, Fishing or Sailing:

		Panel Type				
		Navigation	Waypoint	Route	Fishing	Sailing
Data content	Vessel position	✓	✓	✓	✓	
	Active waypoint	✓	✓	✓	✓	
	TTG	✓				
	VMG - Waypoint	✓				✓
	Depth	✓		✓	✓	
	Cog Sog	✓	✓	✓	✓	✓
	Heading	✓		✓	✓	✓
	Speed	✓			✓	✓
	Set/Drift	✓			✓	
	XTE	✓	✓	✓		
	Trip	✓				
	Local time	✓				
	Sea temperature				✓	
	Ground wind					✓
	App wind					✓
	True wind					✓
	VMG wind					✓

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To select a pre-configured data panel:

Customize the panels

You can customize each panel by changing:

- The panel name.
- The size and number of data cells
- The data contained in each cell. This data can include any transducer or internally calculated navigation data that is available on NMEA or SeaTalk. Additional data includes a compass rose, a distance log and four resettable trip counters.
- How the data is displayed. You can control whether the data is displayed in numerical, digits, gauge or graphical format as appropriate to each data item.

Note: *You can also configure the data panels in this way in the Engine Monitoring and CDI applications.*

Renaming a panel

You can customize the names of the panels as required e.g. the SAILING panel could be renamed RACING:

1. Select and rename the appropriate panel:

2. Save the changes:

Selecting cell data

To select the data that is to appear in each cell:

1. Select the data group for the relevant panel e.g.

2. Select the data to be inserted in the highlighted panel:

Changing the size of the cells

You can change the size of the cells to meet your own particular requirements by using the MERGE CELLS or SPLIT CELL function.

Splitting a cell

Use the SPLIT CELL function to create two smaller data cells:

1. Select the relevant cell within the required panel:

The direction in which the selected cell can be split is indicated on the soft key.

2. Split the highlighted cell:

Split horizontally

e.g.

| Heading 296⁰T | Speed 20.0kt |
| | Trip 13.85nm |

Cell for splitting selected

▮▮➤

SPLIT CELL ▲

Soft key indicates direction of split

▮▮➤

e.g.

| Heading 296⁰T | Speed 20.0kt |
| Depth 48.5ft | Trip 13.85nm |

Cell splits horizontally

▮▮➤

OK

────────────────────── OR ──────────────────────

Split vertically

e.g.

Heading 296⁰T

Cell for splitting selected

▮▮➤

SPLIT CELL ▶

Soft key indicates direction of split

▮▮➤

e.g.

| Heading 296⁰T | Speed 20.0kt |

Cell splits vertically

▮▮➤

OK

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Merging a cell

Use the MERGE CELLS function to make a cell larger and therefore easier to see:

1.   Select the relevant cell within the required panel:

e.g.

NAVIGATION

Press and hold relevant soft key

▮▮➤

e.g.

| Heading 296⁰T | Speed 20.0kt |
| | Trip 13.85nm |

Active cell highlighted

▮▮➤

e.g.

| Heading 296⁰T | Speed 20.0kt |
| | Trip 13.85nm |

Move highlight to relevant cell

▮▮➤

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The direction in which the selected cell can be merged is indicated on the soft key.

2.   Merge the highlighted cell (horizontally or vertically):

Merge horizontally

e.g.

| Heading 296⁰T | Speed 20.0kt |
| Depth 48.5ft | Trip 13.85nm |

Cell for merging selected

▮▮➤

MERGE CELLS ▼

Soft key indicates direction of merge

▮▮➤

e.g.

| Heading 296⁰T | Speed 20.0kt |
| | Trip 13.85nm |

Cell merges horizontally

▮▮➤

OK

────────────────────── OR ──────────────────────

Merge vertically

e.g.

| Heading 296⁰T | Speed 20.0kt |

Cell for merging selected

▮▮➤

MERGE CELLS ▶

Soft key indicates direction of merge

▮▮➤

e.g.

Heading 296⁰T

Cell merge vertically

▮▮➤

OK

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Chapter 10:Autopilot Control

If you have a Raymarine autopilot installed, you can access some of its functions from the E-Series display unit.

WARNING:The autopilot functions available on the E-Series display unit do not replace the autopilot control head. You must have a pilot control head installed before you enable or engage the autopilot.

Emergency disengage

You can disable the autopilot using the power key.

1. Press and release the **power** button.
2. Press the **STANDBY** softkey.

This puts the autopilot into standby mode.

10.1 Enabling and engaging the autopilot

To allow the E-Series to control autopilot functions, you need to enable autopilot control on the display unit.

With autopilot control enabled, the unit lets you engage the autopilot whenever it has a target waypoint. You can see information for the target waypoint on the Pilot Control pop-up.

The default autopilot setting is *disabled.*

To enable autopilot control

On the E-Series display:

1. Press the **MENU** button to open the Setup Menu.
2. Select **System Setup** > **System Integration** > **Autopilot Control** > **Enabled.**
3. Press the **OK** button.

To engage the autopilot in normal operation

When the autopilot is enabled, the unit prompts you to engage the autopilot whenever you initiate a GOTO or FOLLOW ROUTE.

1. Select **GOTO** or **FOLLOW ROUTE** to display the Engage Pilot screen.
2. Select **ENGAGE PILOT** to display the Pilot Control screen.

If you press **OK** or **CANCEL** without engaging the autopilot, you go back to the navigation screen with the autopilot disengaged.

When the autopilot is engaged, or you hotspot an active route or waypoint, the toolbar gives you the following options:

Table 10-1:   Active Navigation Toolbar

STOP GOTO/FOLLOW	Opens the Pilot Control screen. If the autopilot is in track mode, the route complete alarm sounds.
ADVANCE WAYPOINT	Opens the Pilot Control screen and provides the AUTO and TRACK softkeys. The screen stays open until you choose either AUTO or TRACK.

Note: *You can only perform individual advance waypoint operations: it is not possible to perform one track command for multiple advance waypoints.*

To engage the autopilot from the Setup Menu

At any time, you can open the Pilot Control screen from the Setup menu:

1. Press **MENU**.

2. On the Setup Menu, select **Autopilot Control**.

3. Press the **ENGAGE PILOT -TRACK-** softkey.

Press **OK** or **CANCEL** to go back to the previous screen.

To disengage the autopilot in normal operation

You can disengage the autopilot from the Pilot Control screen.

1. Press the **STANDBY** softkey.

Emergency disengage

Alternatively, if the Pilot Control screen is not displayed, you can disable the autopilot using the power key.

1. Press and release the **power** button.

2. Press the **STANDBY** softkey.

This puts the autopilot into standby mode.

Autopilot Status Indicator

An indicator in the top-right corner of the display unit tells you the current status of the autopilot.

Table 10-2:   Autopilot status indicators

Icon	Autopilot mode
STBY	Standby.
TRACK	Track.
AUTO	Auto.
PILOT	No autopilot detected.
ALARM	Autopilot alarm is active.

10.2 The autopilot control screen

The Pilot Control pop-up screen is displayed when you engage the autopilot in track mode, at waypoint arrival, or when you select it from the Setup Menu. It gives you:

- Autopilot status
- Live navigation information
- Toolbar with softkeys to control the autopilot

```
+-------------------------------------------------------+
|                     Pilot Control                     |
| Pilot Information:          Active Waypoint:          |
| +-------------------------+ +-------------------------+|
| | Status:      TRACK      | | Name:   Waypoint 19    ||
| | Locked HDG:  211°M      | | BTW:    184°M          ||
| |                         | | DTW:    0.532nm        ||
| +-------------------------+ +-------------------------+|
| ------------------------------------------------------|
| AUTO : To steer on current heading                    |
| STANDBY : For manual steering                         |
|                                                       |
| OK or CANCEL : To remove dialog                       |
+-------------------------------------------------------+
```

For a list of the softkeys available while the Autopilot Control screen is open, see *Table 10-3, Autopilot Control Toolbar*.

Table 10-3:   Autopilot Control Toolbar

AUTO	Engage the autopilot and hold the current course (available when the autopilot is in Track or Standby mode).
ENGAGE PILOT -TRACK-	Track to the current target waypoint.
STANDBY	Disengages the autopilot (only available when the autopilot is engaged).

To go back to the Active Navigation screen without activating AUTO or TRACK, press **OK** or **CANCEL**.

Note: *The STANDBY key replaces the REVIEW AND EDIT THIS ROUTE key.*

10.3 Waypoint arrival

…when there are more waypoints in your route

The E-Series display:

• sounds the waypoint arrival alarm

• displays the Pilot Control screen, with information about the next waypoint

The toolbar gives you four options:

Press the **ENGAGE PILOT -TRACK-** softkey to engage the autopilot and continue to the next waypoint in your route.

Press the **CLEAR ALARM** softkey to silence the alarm and keep the autopilot engaged in auto mode, continuing on the current heading.

Press the **STANDBY** softkey to cancel the alarm and disengage the autopilot.

Press the **AUTO** softkey to cancel the alarm and engage the autopilot in auto mode.

Note: *If you make no selection within 30 seconds, the Next Waypoint alarm will sound.*

…when you reach the last waypoint in your route

The E-Series display:

• sounds the waypoint arrival alarm

• displays the Pilot Control screen with 'Last Waypoint' in the Next Waypoint field.

The toolbar gives you three options:

Press **CLEAR ALARM** to silence the alarm and keep the autopilot engaged in auto mode, continuing on the current heading.

Press **STANDBY** to silence the alarm and disengage the autopilot.

Press **AUTO** to silence the alarm and continue on the current locked heading with autopilot engaged.

Chapter 11:Video

11.1 Introduction

The video application allows you to use your E-Series Display to view images from a video player, on board camera or DVD player. Your Display is supplied with cabling to connect to equipment using a composite input source. You can also connect s-video inputs to your Display. Video images can only be seen by the Display they are connected to and are therefore not viewable across the E-Series network.

Up to four video inputs, dependent on the type, can be viewed on each E-Series display. You can set up the video application to cycle the display of each video input. You can also adjust the brightness, contrast, color and aspect ratio of the image.

Note: *For details of how to connect such equipment to your E-Series display and the possible input configurations, please refer to your installation guide.*

11.2 Setting up the video application

Displaying a video application

Before you can use the video application, you will need to include a video application window in a page set. For details of how to select a particular window and application, please refer to *page 221*.

Notes: (1)   *Only one video application can be viewed per page.*

(2)   *The video application settings are locally applied and will therefore only affect the individual display on which you are working.*

Customizing the video application

When you first use the video application, it defaults the input source type to *Composite*, labels the video images *Video 1, 2, 3 or 4* and sets the *Cycle Video* option to OFF. You will need to change these defaults in the following circumstances:

- If you have installed cabling for use with equipment using S-video.
- If you wish to give each video input a more meaningful name e.g. engine room, view stern etc., DVD player etc.
- If you wish to set up the option to cycle through the available images.

All these options are accessed via the Video Setup Menu:

You can now:

- Edit the input source type i.e. Composite to S-Video.
- Edit the video source name.
- Set up video cycling.

Selecting the input source type

Your Display is supplied with cabling to connect to a composite input source. If your camera, DVD etc. uses S-Video input, you will need to purchase and fit the appropriate cabling in the configuration detailed in the Installation Guide.

Each item of S-video equipment uses 2 of the 4 video inputs i.e. Video 1/2 or Video 3 / 4. Once installed the Video Setup should be adjusted to reflect this alternative input:

1. Open the Video Setup Menu, as previously described.
2. Set Video 1 to S-Video:

3. Save and return to Video Setup Menu:

Note: *Video 1 mirrors your choice for Video 2 and is no longer selectable.*

4. Repeat steps 2 and 3 for Video 3. Video 4 mirrors your choice for Video 3 and is no longer selectable.

Editing the video source name

By default your 4 video sources are labelled Video 1 - 4. If required, you can change these to a more meaningful name e.g. engine room, stern, bow etc.:

1. Open the Video Setup Menu, as described on .

2. Select the video source whose name you wish to change:

3. Change the name and save:

Note: *For details of how to edit a dialog box, please see *

4. Repeat if necessary for the videos 2, 3 and 4.

Any changes that you have made are reflected in the Video Setup Menu and on the video application's soft keys e.g.

Engine room	Bridge	Aft	Stern	PRESENTATION

Cycling through the video inputs

You can set up your video application to automatically cycle through the images being received. This is particularly useful if you have on-board cameras and wish to use them to obtain a regular overview of your boat, engine room etc.

Setting up a video cycle

To specify which video inputs are to be included in the cycle and their order:

1. Open the Video Setup Menu, as described on *page 216*.

2. Highlight and select Cycle 1:

3. Repeat this process for Cycle 2, 3 and 4.

Note: *If you wish to exclude an input, switch its status to NONE.*

Setting up the cycle period

By default the cycle period is 10 seconds. This can be changed (1 to 99 seconds) if required.

To specify the number of seconds between shots in the cycle:

1. Open the Video Setup Menu, as described on *page 216*.

2. Specify the cycle period:

Running the video cycle
With a video application active:

Note: *You will not be able to change the aspect ratio, contrast, brightness or color levels of any video image when the video cycle is running.*

Stopping the video cycle

You can stop the video cycle at any time by either pressing any of the 4 video soft keys or by toggling the CYCLE VIDEO option to OFF.

Adjusting the image

Correcting a distorted image

The video application should automatically detect the appropriate aspect ratio for each input source. If an image appears distorted (squashed or stretched) you should override this automatic setting and select the appropriate aspect ratio manually; 4:3 (standard format) or 16:9 (wide screen) to rectify the distortion.

Note: *You will not be able to change the aspect ratio of any video image when the video cycle is running.*

Adjusting the contrast, brightness or color

If necessary you can adjust the level of contrast, brightness or color:

Note: *You will not be able to change these settings for any video image when the video cycle is running.*

Chapter 12: Using the Course Deviation Indicator

12.1 Introduction

With your display receiving accurate heading and position information, you can use the Course Deviation Indicator (CDI) to monitor your course and accurately steer to a target waypoint.

The CDI application is pre-configured to display the CDI graphic. You can customize the panel to display any available data.

12.2 The CDI screen

The CDI gives a graphical representation of yours boat's course in a 'rolling road' format.

The 'rolling road' represents a width of sea equal to the Cross Track Error (XTE) limits that you have specified in the Setup menu. As you travel towards the target waypoint, the checkered pattern and the waypoint will move down the screen at a rate proportional to your boat's speed.

Navigation data is displayed alongside or below the rolling road.

Steering instructions

The steering instructions below the rolling road tell you what correction is needed to maintain your course and arrive at the target waypoint.

Instruction	Cause
STEER STARBOARD	XTE error to port is more than a 1/4 of the maximum XTE error limit in the Setup menu
STEER PORT	XTE error to starboard is more than a 1/4 of the maximum XTE error limit in the Setup menu

Indication arrows are placed either side of the steering instruction, pointing towards the centre line. The greater the error the more arrows appear. You should correct your course by steering in the direction indicated by the arrows.

12.3 Selecting the CDI application

To select the CDI application:

1. Select a page set which includes a CDI application:

Note: *If the CDI application is placed in multiple windows, the same data is displayed in each.*

2. Select a page which includes a CDI window:

Once the CDI application is displayed, no use is made of the soft keys. You will therefore need to open a radar, chart or fishfinder window in order to access any functions activated via the soft keys.

12.4 Modifying the CDI application

If required, you can modify the information displayed in the CDI application window to meet your own particular requirements. For details, please refer to *page 175*.

Chapter 13:Using the Engine Monitor

13.1 Introduction

The engine monitor application enables you to view information in the form of gauges and digital data, from up to three compatible engines. To provide a fast update rate, the engine data is transferred from the engine's serial interface to your E-Series display via NMEA2000/SeaTalk[2].

Note: *For details of compatible engines and related software updates, please refer to the Raymarine website on www.raymarine.com.*

If the pre-configured content of these panels and/or the layout of the individual data boxes is not suitable, you can configure the system to display the data and layout of your choice - see *page 175*.

13.2 Displaying and setting up the engine monitor

Before using the engine monitor application you should set up your system as follows:

1. Customize a page set to include an engine monitor application window. For details of how to select a particular window and application, please refer to *page 221*.

2. Set the number of engines and the maximum tachometer range to reflect your particular vessel:

i.   With an engine monitor window active, select the Panel Setup Menu:

ii. Set the number of engines:

iii. Set the maximum tachometer range:

Note: *The engine temperature unit (^0F or ^0C) and the fuel unit (litres, imperial gallons or US gallons) is defined in the System Setup Menu (Units Setup) and is detailed on page 227.*

13.3 The engine monitor display

Engine data is displayed in a series of pre-configured panels. Each panel contains a particular set or data. You can choose the panel that suits your requirements via the soft keys:

		Panel Type				
		Engine	Engine & fuel	Fuel resources	Engine & resources	Multi engines (3)
Data content	Tacho & engine hours	✓	✓		✓	✓
	Oil pressure	✓	✓		✓	✓
	Engine coolant temperature	✓	✓		✓	✓
	Boost pressure	✓	✓		✓	✓
	Alternator	✓	✓		✓	✓
	Fuel level (tanks 1 & 2)		✓	✓	✓	
	Fuel rate			✓	✓	
	Total fuel			✓	✓	

13.4 Configuring the engine panels.

You can configure each panel by changing the size and number of data cells and the data contained in each cell. You can also rename each panel. For further detail, please refer to *page 174.*

Note: *Configuring engine panels is a local setting and will therefore only affect the individual display on which you are working.*

13.5 What should I do when an alarm is triggered?

Your engine monitor application will trigger an alarm (via NMEA/SeaTalk[2]) and display an engine alarm warning message when a problem is detected. When this occurs, you should check your engine monitoring system and if necessary refer to the documentation supplied with your engine system. Press ACKNOWLEDGE to silence the alarm.

Note: *When engine monitoring is active, all other system alarms continue to trigger.*

Chapter 14:Weather (US only)

This application is only available for the Unites States. Weather information for the Rest of the World can be obtained via a Navtex receiver. Please refer to *Chapter 13:Navtex*.

14.1 Overview

The weather application superimposes historical, live and forecasted weather graphics on a world map. It also provides textual forecasts and warnings. These graphics and their associated weather data enable you to determine the actual conditions in your vicinity or at a particular location. Weather forecasts and warnings, detailing current and predicted conditions, are regularly updated.

For a basic weather glossary, please refer to the appendix at the rear of this manual. For types of warnings, watches and advisories, please refer to the NOAA website at www.nws.noaa.gov

14.2 Important information

Disclaimer

All information presented by this service is advisory only. You acknowledge the risk of incomplete and erroneous information and assume complete responsibility and risks associated with this device, and accordingly release Raymarine, Sirius Satellite Radio Inc. and WSI Corporation from any and all claims arising from the use of this service. By using this service, you acknowledge and agree that you have read the terms of the subscription agreement for this service and agree to all of the terms contained therein. If you do not have the subscription agreement, you may view a copy on the internet at www. Sirius.com/marineweatheragreement or call 1-800-869-5480 for a copy to be sent to you.

The full disclaimer is detailed on the inside front cover of this manual. Each time you power on your E-Series Display, if weather data is being received this disclaimer will be displayed.

14.3 Setting up the weather application

Before you are able to use the weather application you will need to:

- Obtain a Sirius ID number. For full details, please refer to your Sirius Installation handbook.
- Check the pre-requisites for using this application (see below).
- Customize a page set to include a weather application.
- Specify the weather elements that you wish to display.

Pre-requisites for using the weather application

For your E-Series to display weather data, your system must be connected to a Raymarine SR100 Sirius weather receiver which is supplying the appropriate data. For your vessel to be displayed and for weather reports to be available at your position, you will need a fix for your boat's position and be within US coastal waters.

Note: *For further information on installing and commissioning a weather receiver, please refer to the Weather Receiver Installation Guide.*

Adding a weather application

A weather application does not appear in the pre-configured page sets. You will therefore need to customize a page set to include a weather application window. Please refer to *page 221* for details.

Specifying the weather elements

You can view textual reports or animated graphics and specify the weather elements that you require:

1. Open a weather application window.

2. Display the weather graphics menu:

3. Select the weather elements for display:

14.4 The weather display

The main features of the weather display are as follows:

Weather soft keys

14.5 Moving around the weather map

When you open the Weather application, a world map is displayed. If the system has a position fix for your boat, the map will be centred on your boat.

As in the Chart application, use the cursor to move around the map and view different locations, and the range button to zoom in and out. For further details, see *page 50*.

Note: *As resolution in the data is lost when you zoom out a long way, you should zoom in to display more detail.*

To re-centre the map on your boat, use the FIND SHIP soft key.
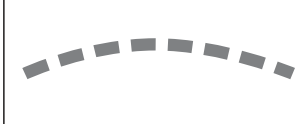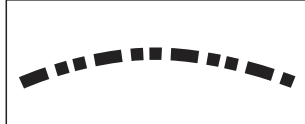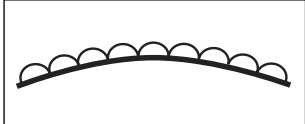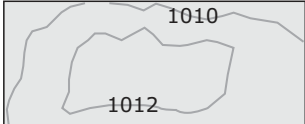
14.6 Placing waypoints

The waypoint button and its associated soft keys operate as normal when you are in the weather application but you will need to move the active window to a radar or chart application in order to see any waypoints that you have placed.

14.7 Weather graphics

This section summarizes the weather symbols used within the weather application. For details of each weather type, please refer to the appropriate section.

Weather symbols

Storm cast

Waves (blues)

Canadian radar (Dark greens-yellow)

Lightning

Wind

Sea surface temperature
(green-yellow-orange)

Surface observation stations (pink)

Cities (grey)

NOWRad (green-yellow-red)
Snow (Blues),Mixture (Pinks)

Storm Tracks symbols

Hurricane (Category 1-5)

Tropical storm

Tropical disturbance,
tropical depression

Surface pressure

High / low pressure (blue & red)

Warm front (red)

Cold front (blue)

Occluded front (purple)

Stationary front (red-blue)

Trough (brown)

Squall line (red)

Dry line (red)

Isobars (grey)

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Precipitation (NOWRad)
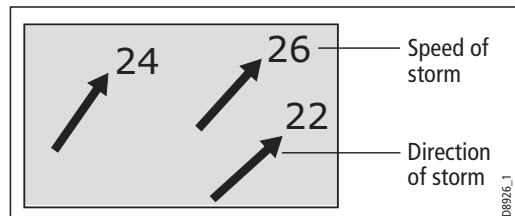
NOWRad displays the type and level of precipitation:

Note: *Dashes indicate that data is not available.*

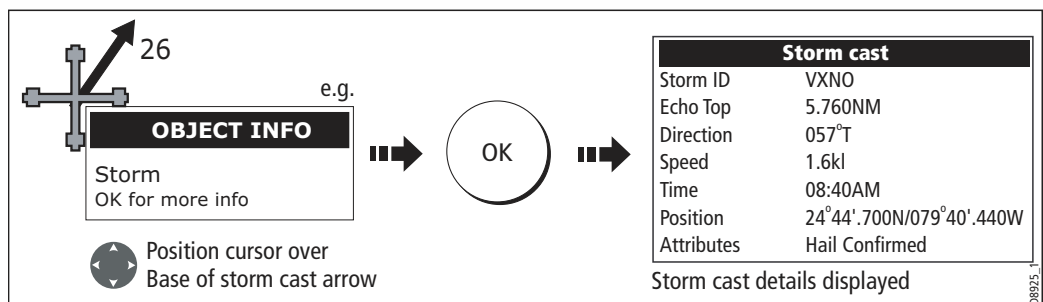| Color code	Precipitation type	Intensity
Light green	Rain	(15-19 dBz)
Medium green	Rain	(20-29 dBz)
Dark green	Rain	(30-39 dBz)
Yellow	Rain	(40-44 dBz)
Orange	Rain	(45-49 dBz)
Light red	Rain	(50-54 dBz)
Dark red	Rain	(55 + dBz)
Light Blue	Snow	(5-19 dBz)
Dark blue	Snow	(20 + dBz)
Light pink	Mixed	(5-19 dBz)
Dark pink	Mixed	(20 + dBz)

Storm Cast

Storm cast arrows indicate the direction and speed of a storm.
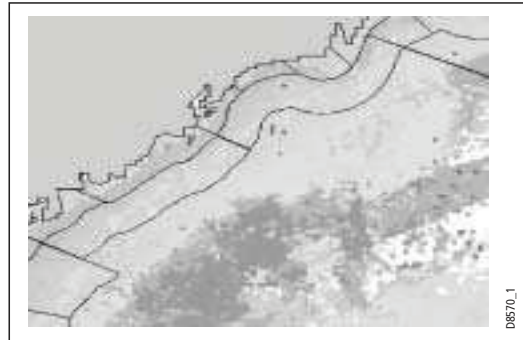

To display details of the storm:

Sea surface temperature (SST)

The temperature range of the sea surface is indicated by shading. This shading ranges through blue/green/yellow/orange/red.

For details of how to view the sea surface temperature at a specific point, see *page 236*.

Canadian radar

Canadian radar shows the intensity of precipitation for Canada. Unlike NOWRad, Canadian radar does not show the precipitation type.

Color code	Intensity in mm per hour
Transparent (nothing shown at very low precipitation)	0.00 to 0.20 mm/hr
Light green	0.21 to 1.00 mm/hr
Medium green	1.01 to 4.00 mm/hr
Dark green	4.01 to 12.00 mm/hr
Yellow	12.01 to 24.00 mm/hr
Orange	24.01 to 50 .00 mm/hr
Light red	50.01 to 100 mm/hr
Dark red	100.01+ mm/hr

Tracking storms

You can use the STORM TRACK function to monitor significant storms in your area. These include tropical disturbances, depressions, storms and cyclones, hurricanes, typhoons and super typhoons.

The system displays the track the storm has taken, its current and forecasted position, the wind radii (current position only), direction and speed of travel.

Storm Tracks symbols

These symbols are displayed on screen in three different colours:
Grey - historical, Red - current, Orange - forecast

Hurricane (Category 1-5)

Tropical storm

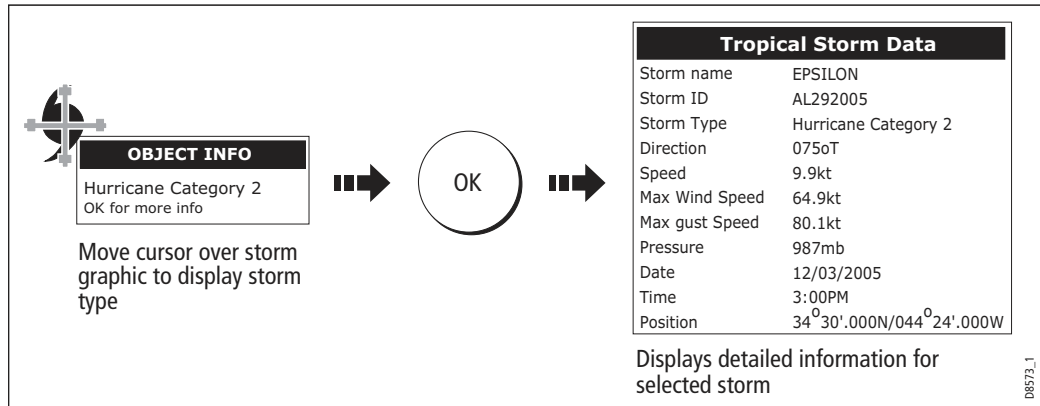Tropical disturbance, tropical depression

Move the cursor over the symbol for additional information.

Tropical storm data

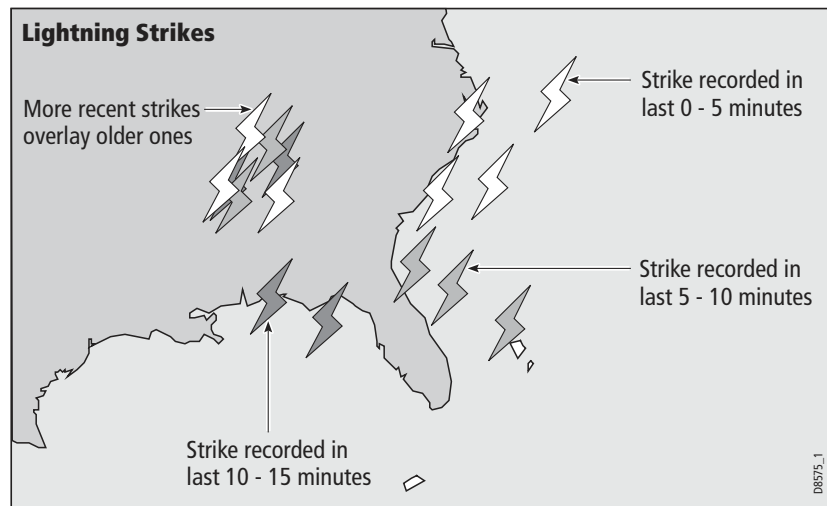Tropical storm data can be displayed for a selected storm. This includes:

- The storm's name, type, date and time.
- The position, direction and speed of travel of the storm.
- The pressure and maximum wind speed and gusts.

To display tropical storm data:

OBJECT INFO

Hurricane Category 2
OK for more info

Move cursor over storm
graphic to display storm
type

OK

Tropical Storm Data	
Storm name	EPSILON
Storm ID	AL292005
Storm Type	Hurricane Category 2
Direction	075oT
Speed	9.9kt
Max Wind Speed	64.9kt
Max gust Speed	80.1kt
Pressure	987mb
Date	12/03/2005
Time	3:00PM
Position	$34^{o}30'.000N/044^{o}24'.000W$

Displays detailed information for
selected storm

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Lightning

The system displays a lightning symbol at each cloud-to-ground strike recorded within
the last 5, 10 and 15 minutes:

Lightning Strikes

More recent strikes
overlay older ones

Strike recorded in
last 0 - 5 minutes

Strike recorded in
last 5 - 10 minutes

Strike recorded in
last 10 - 15 minutes

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Surface observation stations

You can view current or historical weather data at surface observation stations.

All surface observations stations are represented by a pink symbol:

Buoy Station   C - MAN   WSI   NWS

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