



National Coastwatch Institution
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NCI FLEETWOOD TRAINING MANUAL



PART 15B
RADAR PRINCIPLES
&
SIMRAD RADAR/CHARTPLOTTER
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Understanding the Radar Chartplotter

The Display

Must be set correctly before the information it provides can be used effectively. This next section demonstrates how to use the radar efficiently. To do this the information on the display needs to be understood. Here is an operating display:



On this display, the radar contacts are shown in Red and note they are transparent showing the chart beneath.

Bottom Left: Latitude & Longitude of contact under cursor **+** also range and bearing.

Wherever the cursor is placed the grey box provides Lat/Long and Range/bearing

Top Centre: CLEAR CURSOR removes the position box and aligns the screen on own ship

Bottom Right:

⊙ 2.0nm Range rings on display: *Note this changes as the range is changed on the display.*

┌──┐ Scale 1nm also changes with range selected.

Top Right:

⊙ North Pointer

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Measuring a Bearing and Range between 2 Objects

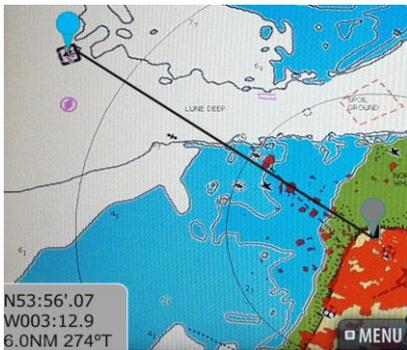


Select Menu on display

Select Measure on Chart Menu



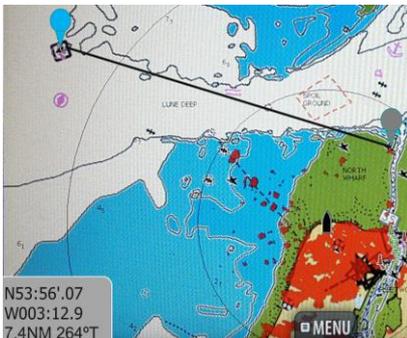
2 balloons appear on the display – one behind the other – 1 blue and 1 grey.



Touch the Blue balloon and move it to the desired object

Note the Blue position + Range & Bearing are displayed in the bottom left box

The grey balloon is the origin and the blue the destination



Touch the grey balloon and move it to the desired object/position

Note the Blue position remains the same but the range and bearing is changed to reflect the new position of the grey balloon

To close the Measure select **FINISH MEASURING** at the top of the display.

How is this useful? Remember at sea level the lifeboat crew have great difficulty seeing very far ahead of the lifeboat, particularly the ILB. Provided time permits this can be used to give the lifeboat crew an initial bearing and range to a casualty.

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Waypoint for Mayday/PANPAN

When a Mayday, Pan Pan or other important information is heard over the radio, it is our duty to plot the position and check if we can be of any assistance.

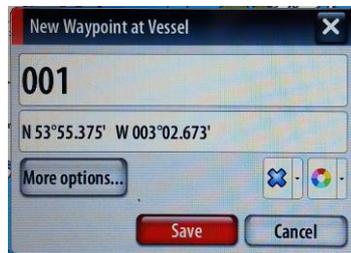
Remember if we can hear the vessel on the radio it must be in our general area – 'Line of Sight' rule.

Frequently the vessel position is off of our chart. Any such positions can be plotted on the Radar/Chartplotter by use of **'Waypoint'**

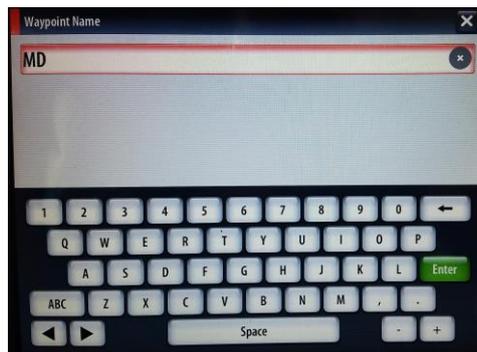
Select 'Menu' to display the Chart menu.



Select 'New Waypoint'

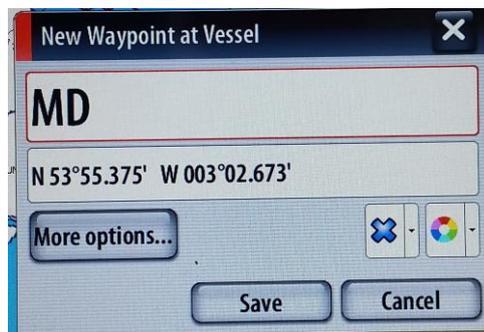


Touch the 001 window to obtain on screen keyboard



Type a name for the point. E.g. Mayday if you wish to record that position

Select Enter



Touch the position to obtain a keyboard and set a new position



Select OK

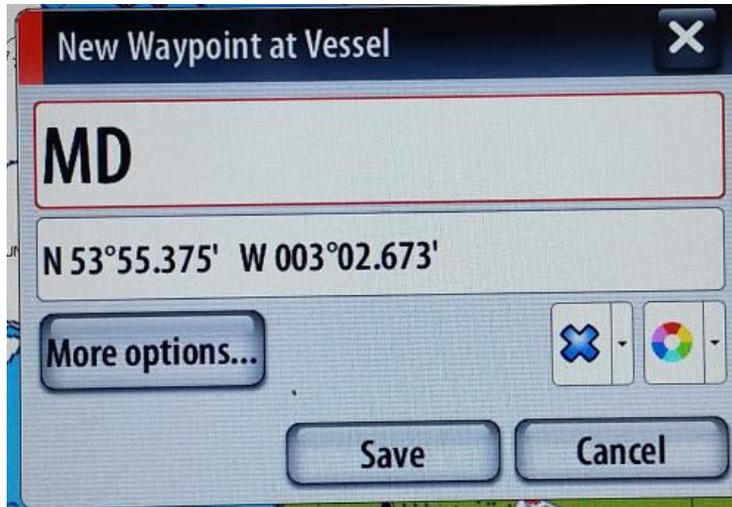
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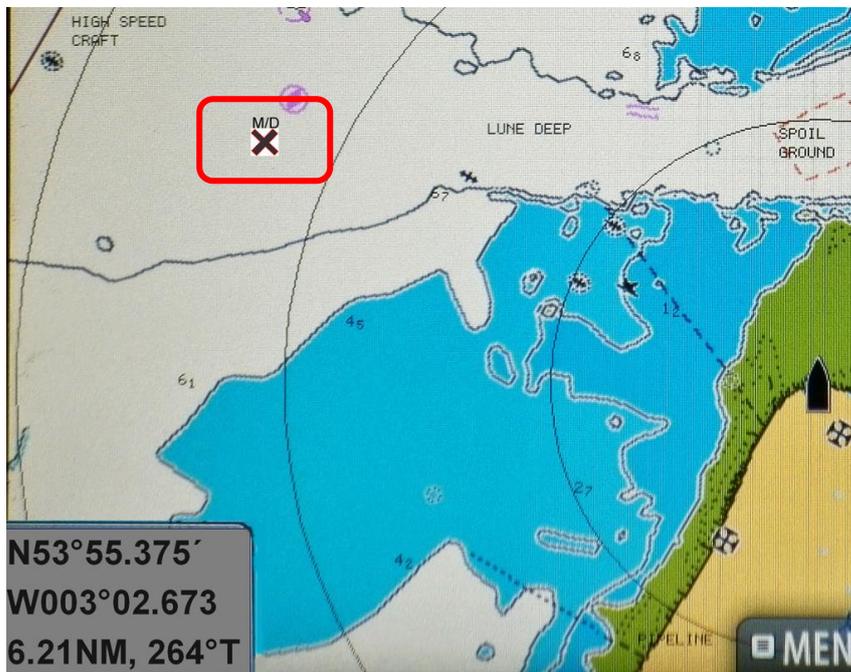
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When all information has been input the following window is displayed:



When 'Save' is selected a waypoint symbol is created at the position input and the Display will move to that waypoint position with Range and Bearing displayed in grey box bottom left of display.



Selection of symbol displays information and allows for delete

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Loss of Radar on the Chart

There are situations that can arise which prevent the overlay of radar information on the chart display. Failure of the GPS or compass systems will cause this and the chart display will show a warning 'Radar Overlay Invalid'.

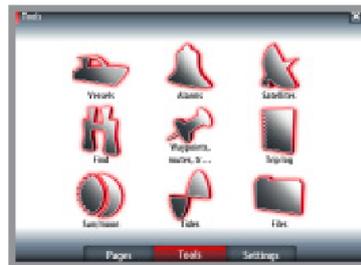
When this happens the radar itself is still available and can be used. However, the operator needs to change the display over. This is achieved via the 'Control Pages'.

Control Pages

The Control pages give access to page selection, tools and settings. The Pages overview panel (Home) is displayed by pressing the PAGES key. Repeated presses on this key will toggle between the control panels. You can also switch between the control panels by dragging your finger horizontally on the screen. When you close one of these panels the



Pages overview (Home page)



Tools



Settings

display will return to last active page

The tools panel include options that are not specific to any panel e.g. status regarding vessels, alarms, satellites, sun/moon and tides. Also included are waypoints, routes and tracks library, trip log, sun/moon status, find function and files. If a C Zone system is connected, this function is access from the Tools panel.

The Settings panel gives access to system and vessel setup, application settings, and to the simulator.

Warning: Do not enter the Settings Pages and make changes. The setup of the system can be altered which may not be obvious but can seriously deteriorate the performance of the radar.

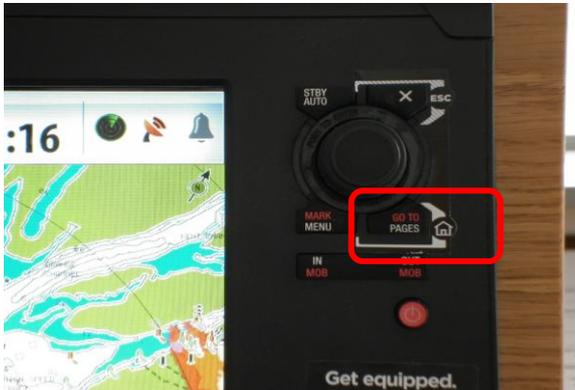
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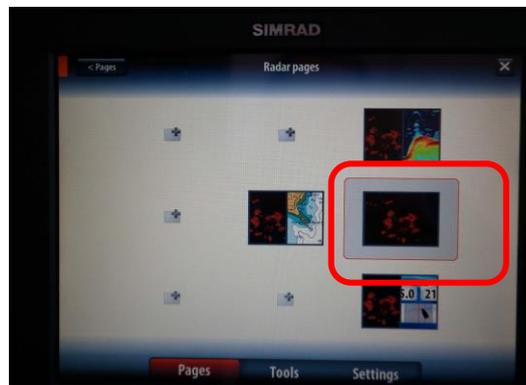
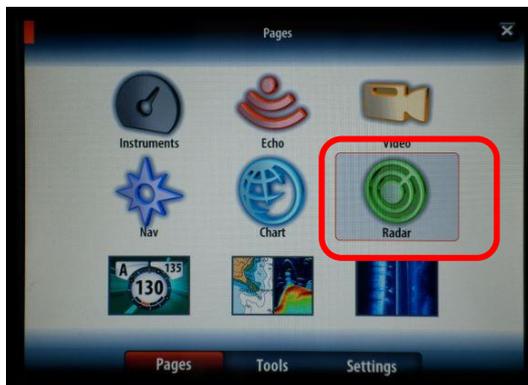


Switching from Chart to Radar



Select the 'PAGES' button

The Display will change to the 'Control Pages'. This is the default page which allows the display to be switched from one equipment to another.

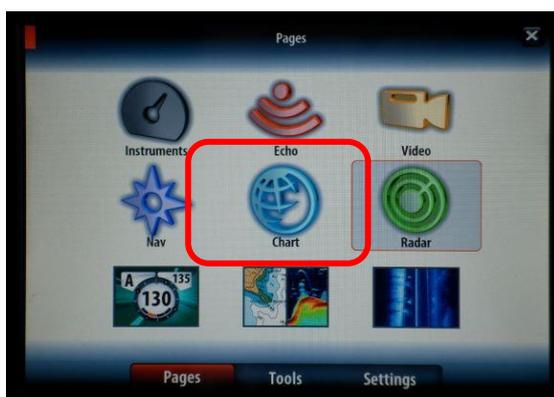


Select the Radar ICON

followed by

Radar Only Icon

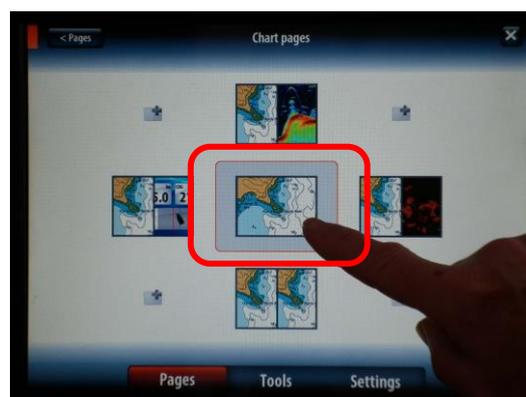
To return to the Chart Display: Select the 'PAGES' button



Select the Chart ICON

followed by

Chart Only Icon



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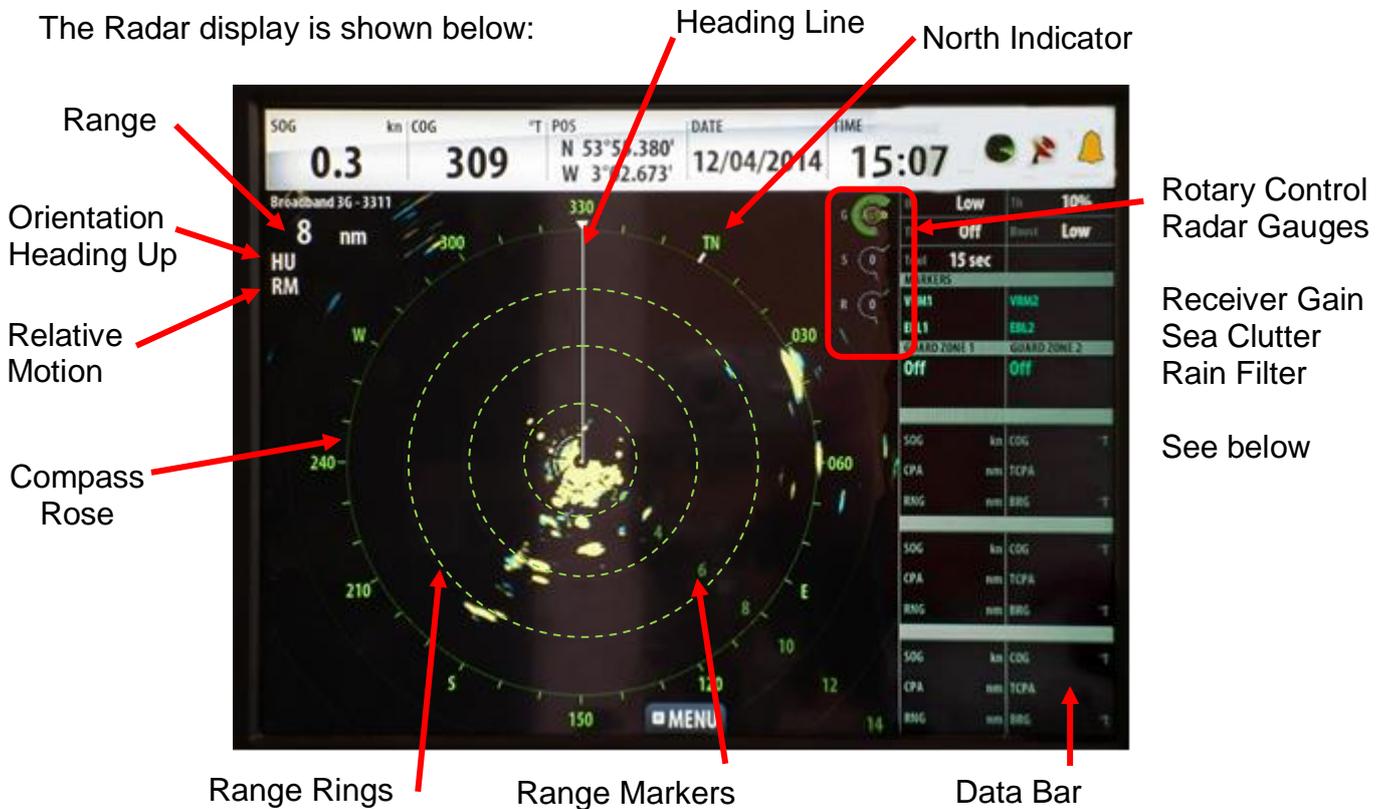
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Radar Display

The Radar display is shown below:



Radar Gauges: These are all selected using the hard Rotary Control knob – a short press steps between each gauge – a long press changes mode for each gauge.



Receiver Gain – 2 modes, **Auto gain** is set by the processor to achieve the best picture as determined by prevailing conditions. **Manual Gain** is set by the operator to obtain best picture – ***Beware if conditions change the radar gain remains the same.***

Sea Clutter – 3 Modes – **Offshore** and **Harbour** are auto systems using the processor to reduce Sea clutter returns for those situations. **Manual** is set by the operator to set a reasonable level of clutter rejection based on the displayed picture. ***Beware if conditions change the radar gain remains the same.***

Rain Filter – Used to remove Rain clutter which may be obscuring contacts. ***Beware this control must be returned to zero asap since it also affects the main receiver gain.***

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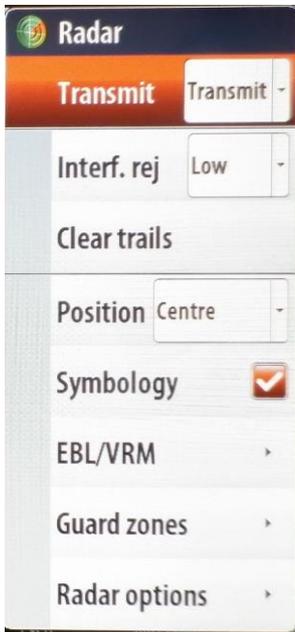
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Radars General Controls:

To ensure the radar is operating correctly – Select 'MENU' on the screen to bring up the Radar general controls as shown below.



Transmit Control provides for **Transmit**, **Standby** and **OFF**. **Warning the Radar should always be set to Standby before the set is turned OFF.**

Interf.Rej – **Off**, **Low**, **Med** and **High**. Used to suppress interference from radars with a similar frequency (Spoking). Proximity determines the level required

Clear trails Clears direction of travel trails from contacts (If ON)

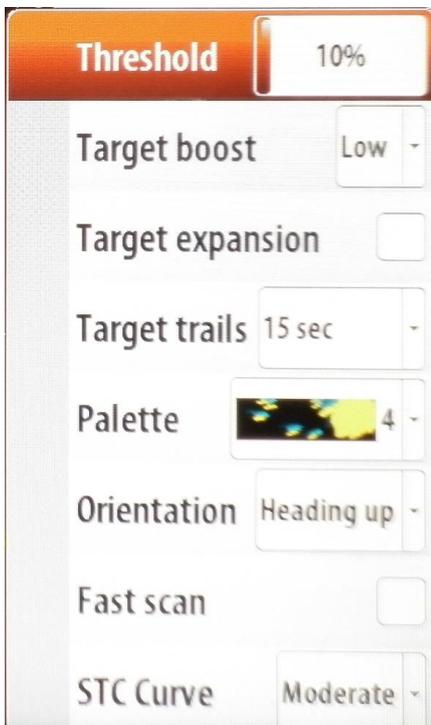
Position – **Centre**, **Look Ahead** or **Offset** sets Ownship position as described

Symbology – Screen symbology may be removed from display.

EBL/VRM – Electronic Bearing Line and/or Variable Range Marker can be placed on display for bearing and range options

Guard Zones - Allows the setup of various zones to warn of impending collisions or Contacts entering a zone

Radars Options displays a further sub menu: The sub menu displayed allows radar display controls to be set:



The **threshold** sets required signal strength for the lowest radar signals. Radar returns below this limit will be filtered and not displayed

The **target boost** option is used for increasing the size of radar targets – a display function

Target expansion will override and increase the default radar pulse length, providing larger target returns

You can define how long time the trail that each target leaves should remain on your radar panel. You can also turn OFF target trails

Different colours (**palettes**) can be used to represent detail on your radar panel

Radars **orientation** is indicated on the upper left corner of the radar panel as either HU (Heading UP), NO (North Up) or CU (Course up)

Increases the speed of the radar scanner when the range is set to 2 nm or less. This option gives faster updates on target movements within this range.

STC (Sensitivity Time Control) reduces receiver gain of radar returns close to your vessel(out to approx 2nm).

Normally set to LOW unless sea conditions dictate otherwise.

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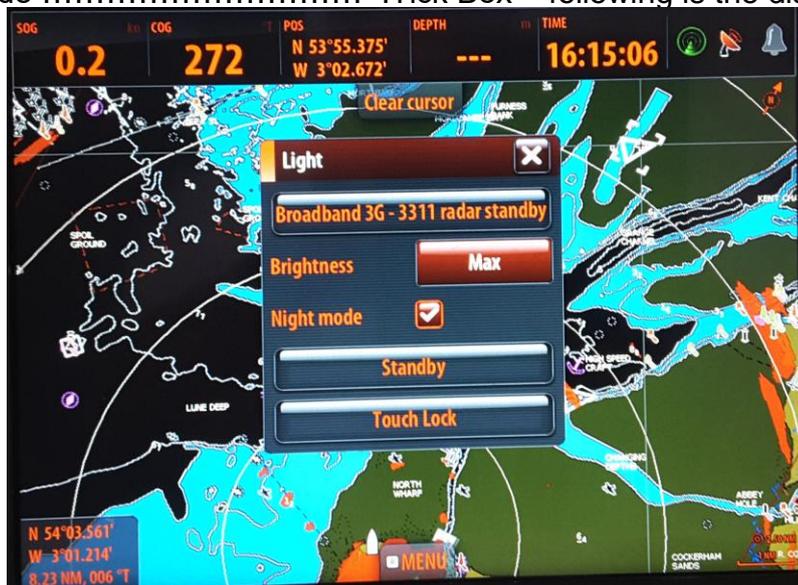
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Night Operations

Should the station need to work at night any equipment would need to be operated to avoid disrupting the night vision of anyone in the station. The Chartplotter/Radar has a night vision mode which is activated as follows

1. Radar Power Button..... Short Press – Menu displayed
2. Night Mode Tick Box – following is the display



3. Night Mode Untick Box to recover Day picture

N.B. Do Not Operate Touch Lock or Standby Control on this Menu

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ADJUSTING RADAR – SEA or WEATHER CONDITIONS

It will be necessary on some occasions to adjust certain controls for the radar due to poor or improved Sea/Weather conditions.

It is important to understand which radar controls are affected by different types of Sea/weather conditions.

Although some of the radar controls are available in the Chart with radar overlay mode, it is much better/easier to judge the effect of radar controls in the Radar Only Mode.

Therefore before attempting to adjust the radar **switch to Radar Only** and decide what conditions have changed; is it:

1. Sea conditions – Controls are:
 - a. **Gain** – Select from Auto to Manual and start at 50 adjust up/down as required to obtain the best picture
 - b. **Sea Clutter** – Select from Offshore to Manual and start at 50 adjust up/down as required to reduce the clutter to an acceptable level
 - c. **STC** – Sensitivity Time Control – provides further control of gain in the initial 2 miles range.
2. Weather – Hail/Rain/Heavy Mist – Control is:
 - a. **Rain** – Increase gently from '0' in small steps and allow radar display to stabilise before increasing further

Notes:

1. **Remember you are setting these controls manually – the system can no longer adjust automatically for changes to the conditions. You must make any changes as necessary**
2. **If you have had to change the settings in the morning ensure that the oncoming afternoon shift are told about the manual settings.**
3. **At the end of the day shift return the controls to the normal automatic settings for the following day shift.**