RADAR
WHAT, ON A RIB?

BY PAUL GLATZEL

Over the last couple of years the rapid reduction in the price of radar equipment coupled to the availability of multi function displays means that putting a radar onto a RIB is both (more) affordable and feasible on a space constrained console.

So whilst radar might be affordable and can be fitted to a console, the question remains of whether it is actually a worthwhile addition to your RIB?

When we think of radar our first thought tends to be that it is a great tool for spotting other craft and objects in limited visibility or at night. Indeed radar is great for doing this but it's also an excellent aid to navigation - but more of that later.

So how does radar work? There are two main components of a radar setup - the display and the scanner. The scanner contains a transmitter and a receiver and sends out a short burst of radio waves (a 'pulse') which, if it hits an object, is reflected back to the receiver. By calculating the time to travel to the object and back the distance the object is away is calculated, knowing the direction the rotating scanner is pointing at the moment the pulse is sent means that the position of the 'contact' can be represented on the display.

THE QUALITY OF THE RADAR IMAGE THAT YOU SEE DISPLAYED IS AFFECTED BY A NUMBER OF FACTORS:

- The power of the scanner. Typically a RIB would have about a 2Kw scanner - a fairly low power versus the 25-50Kw versions found in commercial vessels - the higher the power the better the definition of the contacts and the more likely 'weak' targets are detected.
- The size of the antenna - the larger the antenna the narrower the width of the beam thus increasing the accuracy of what is displayed. (Conversely therefore, on a RIB, lack of space will mean a smaller antenna and thus a wider and less accurate beam width.)
- The display - the size of the display itself and the resolution of the screen will materially influence the user's ability to interpret what is seen on the screen.

As the sophistication of the sets increases, then so the sets are better able to auto adjust themselves to optimise the quality of the radar image produced - this can be of great benefit on a RIB where adjusting the set in difficult conditions can be challenging to say the least. For manual adjustment the operator will need to continually fine tune the controls adjusting the 'gain' (like a squelch on a VHF), the 'brilliance' (like on a TV), the 'range' (to 'look' further away from the craft or focus in close) and the 'tuning' (to ensure the set is optimised to detect the reflected waves).

The consoles on larger RIBs can easily cope with radar installations.

As the image shows the radar can show both the coastline and contacts such as buoyage and other craft. By utilising a variety of techniques the operator can calculate whether other vessels are on a collision course and thus decide what action to take to avoid them.

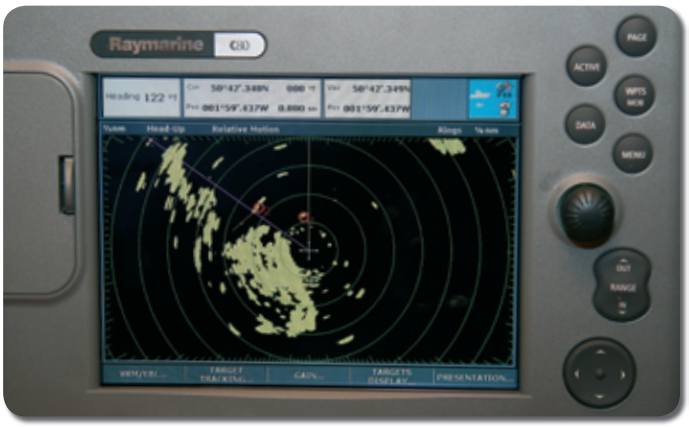
The radar image overlays the chart in pink, newer sets offer this useful feature.

If you have a radar then you have an obligation to use it (Rule 5 of the Collision Regulations states"…maintain a proper lookout by all available means appropriate") and to understand how to use it properly and competently (Rule 7 states "proper use shall be made of radar… including long range scanning and radar plotting").

When assessing whether a risk of collision exists with a contact you will need to take account of the relative motion of both the contact and your own vessel. All of the methods you can use to do this are beyond the scope of this article suffice to say you will plot the movements of both vessels to ascertain the risks of a collision and take avoiding action accordingly. ►

On a RIB 'simplest is (often) best' though, and one good method to use is to rotate the Electronic Bearing Line ('EBL') around the display until running through the contact you are assessing the risk of collision with. If the contact appears to be 'sliding down' the EBL towards your craft then a collision will occur (this is just like taking bearings on a closing craft - a constant bearing indicates a collision will occur if action is not taken). Equally, if a target slides down the 'heading marker' (the line indicating the direction the craft is pointing) then the same rules apply.

Newer sets often offer an extremely powerful option called MARPA (Mini Automatic Radar Plotting Aid). MARPA requires a set to know its precise heading (hence it needs an electronic compass interfaced to it) and then allows the user to highlight a number of contacts on the screen from which it calculates the heading and speed of each and thus the risk of collision. Whilst an excellent and powerful feature, making the most of this necessitates constant management of the radar's controls - which can be difficult in anything but the calmest seas.



Two targets are being tracked by the MARPA system - their direction of travel is indicated by the thin red lines

Interestingly if you can only 'see' the other vessel by radar then there ceases to be a 'stand on' or 'give way' vessel and Rule 19 comes into play in terms of the action you must take.

THE OFTEN OVERLOOKED ASPECT OF RADAR IS ITS USE AS AN AID TO NAVIGATION.

RADAR IS USEFUL FOR:

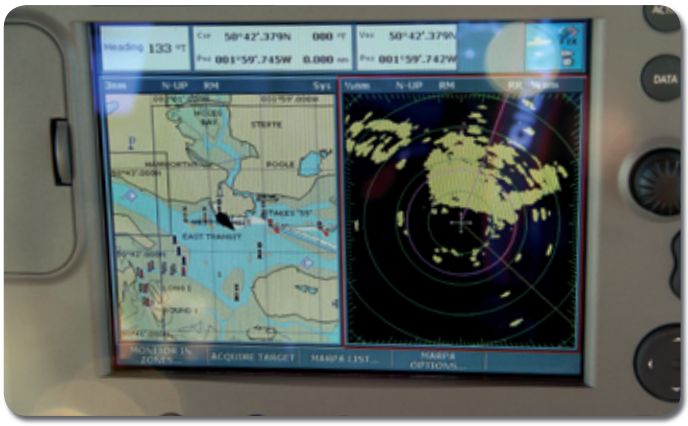
- **Position fixing:** The display allows you to superimpose a variable range ring (known as a Variable Range Marker - 'VRM') on the screen, positioning this range ring on a known object tells you how far from it you are. Equally an EBL can be rotated around the display until running through this object giving the bearing of it from the craft. The combination of the EBL and VRM gives a distance and bearing to a known object allowing a position to be easily plotted onto a chart. Alternately a three point fix can be undertaken using the EBL in the same way that you would use a hand bearing compass to do so. Another method (and indeed more accurate than using the EBL either alone or with the VRM) is to plot ranges from known objects gained from positioning VRMs to intersect known points; plotting these ranges on a chart with a compass will show the position of the craft at the intersection of the plot.
- **Clearing ranges:** A range ring can be set to mark a safe distance off a hazard.
- **Mark 1 eyeball:** The craft can be helmed to keep the craft in the middle of a channel (or similar) as shown on a radar display.

So is it worth fitting radar to a RIB? There is no doubt that radar is an extremely effective aid to navigation and collision avoidance. If you have an A-frame that can handle the scanner with little modification then the existence of radar compatible chart plotters on many RIBs means the cost of adding radar can be quite low.

Bear in mind though that fiddling with the settings of a radar and trying to interpret what you are looking at is a full time (and challenging) job when underway, so ensure there is someone on board capable of doing it and dedicated to the task. If your RIB can accommodate a radar it and the budget allows you'll never regret adding a radar but like anything computer related what you get out of it will be proportional to what you put in.

RYA RADAR COURSE'S AVAILABLE

Understanding and getting the most from your radar is a complex subject so those with radars are well advised to book onto the one day RYA Radar Course (see www.rya.org.uk for schools running the course). Schools will either train you on real radar sets on craft or on simulators - or both.



Splitting the screens allows easy comparison between radar and chartplotter.

RAYMARINE FOR RIBS

Raymarine is one of the leading providers of radars suited to RIBs, a good number of RIBs have the new C or E series plotters fitted or the older SL or RL series. A radar scanner can be plugged into these sets giving a radar option within an existing display. As a guide a 2Kw scanner costs about £700 (inc VAT) giving a radar capability to these sets. Alternately a C80 plus a scanner and GPS receiver costs around £1650 (inc VAT) 'on the street'. If specifying a new craft that you may add radar, consider ensuring the A frame is built to accommodate it avoiding costly alterations later.

RADAR GLOSSARY:

Obviously the screen on which the image is displayed is the 'display'. The 'scanner' contains the transmitter and the receiver and is either an 'open array' type (where you can see the long thin rectangular transmitter physically rotating) or a 'dome' type where the rotating antenna in encased in a plastic dome. The 'magnetron' is the valve which produces the pulses of waves. When switched on typically the magnetron takes a minute or two to warm up then puts the set to 'stand by'. Pressing 'transmit' then starts the antenna rotating and transmitting. Transmitting sends 'pulses' (the burst of microwaves emitted by the scanner) whilst the 'echo' is the returning pulse.

A 'target' returns the echo appearing as a 'contact' on the display, adjusting the 'brilliance' can make the image more or less visible in various levels of lighting whilst adjusting the 'gain' can highlight weaker contacts or reduce background 'noise'. The 'range' can be changed to limit the display to show only contacts a few miles away or increased to show those 12 - 16 miles from the vessel. 'Tuning' can help identify weaker targets. Automatic setup can reduce the need for tuning but may not be as precise as manual tuning.

On the display you will see 'range rings' in circles progressing away from your craft, the distance between these rings varies according to the range the display is set to show. A Variable Range Marker - 'VRM' can be adjusted to or from your position and displays the distance from your craft. An Electronic Bearing Line ('EBL') can be rotated around the screen and displays the bearing of the line relative to your own heading.