

RADAR

In this article we would like to cover the basics of radar and some of the considerations prior to making a purchase

RADAR Stands for Radio Deflection and Ranging

Radar becomes your eyes in limited or no visibility. Your GPS chartplotter will show you where you are on a chart but you have no idea who else is in the vicinity or there movements.

How does it work?

A radar unit consists of a display. This may be a dedicated display or more common now it will be integrated with your Chartplotter/GPS. The second part is an antenna which can be an open array or an enclosed dome mounted on your radar arch or hardtop.

The radar array rotates 360 degrees when turned on. Radar pulses (3cm or just under 10,000 megahertz) of the microwave spectrum are generated by a magnetron in the antenna transmitter. The pulses are, in effect, timed as they leave the antenna, bounce off a target, and return to the receiver. From there they are amplified and sent to the display. The information now creates an image of land mass and all objects above the water surrounding your vessel.

With advanced technology the radar image can be viewed on a dedicated display or the image can be overlaid on the charts on your chartplotter display. This makes identifying targets easier as you can view the image picking up the land mass, islands and navigation markers. Other images are going to be a target of concern such as a moving vessel or obstruction in the water.

FEATURES

Range

The distance the radar image covers can be adjusted to cover an area from 1/8 up to 24 or 72 miles dependant on the unit purchased. You can zoom in or out dependant on what you need to view. For example you may use a 1/2 to 1 mile range in a confined area for best detail and a 12 mile range in more open water for best overview.

Note: The total distance you can see is a factor of how far your antenna is mounted above the water and the distance to the horizon. For an average boat this may only be 6 to 8 miles. Also how high is your target above the horizon on the opposite side, such as a mountain range?

Range Rings

Range rings on the display allow you to judge distances on the radar picture. The number and distance between rings changes as you zoom in or out. This feature can be turned off

Measuring Range and Bearing to a Target

A feature which can be turned on is VRM/ELB which is Variable Range Marker/Electronic Bearing Line. This will allow you to move a cursor on the screen onto a target and determine the distance to a target and the bearing relative to the ships heading.

Guard Zones and Alarm

We can set up a guard zone around our boat. Should another boat or object appear in the zone an alarm will sound to warn us to check for targets and take necessary action.

MARPA (Mini Automatic Radar Plotting Aid)

This is a collision avoidance system which allows us to track a number of different targets. MARPA will then calculate the targets bearing, range, true speed and course. Also CPA (closest point of approach) and TCPA (time to closest point of approach) Therefore you can make an informed decision to avoid a collision

AIS (Automatic Identification System)

This requires a separate receiver to be interfaced with your radar. Commercial ships are required to have AIS receiver/transmitters. You will then pick up an AIS target on your radar screen. When clicking on this icon you can receive all relevant data on the ship.

PURCHASING CONSIDERATIONS

You have to look at what your expectations are and where you will use the radar. One of the main items is the best definition that the unit will provide. For this you should be looking at the beam angle. Some smaller units will have a wide horizontal beam angle such as 5 degrees. The higher end open arrays may be as narrow as 1.5 degrees. Therefore the high end unit is essentially sending out 3 times as many pulses and obtaining a much more detailed image. A 5 degree beam may show 2 small boats together as one target. A 1.5 degree beam will show it as 2 targets. For sail boats power consumption is of a concern. A 2 KW unit uses the least power.

Following are some general specs on radar units

| | |
|-----------------|--|
| 2KW dome | - 24 mile range - 24" diameter - 5 degree horizontal beam not best definition Low power consumption and size good for sailboats |
| 4KW dome | - 48 mile range - 48" diameter - 3.9 degree horizontal beam Average definition Good unit of average midsize boat. |
| 4 KW open array | - 72 mile range - 48" long array - 1.8 degree horizontal beam. Good definition. Good quality unit for mid to upper boats |

10 KW open array - 72 mile range
 - 72" long array
 - 1.15 degree horizontal beam Beam definition
 Top end quality for an ocean going vessel

Before purchasing a new radar make sure you check all the manufactures specs. A unit may be a great price but not perform to your expectations.
Good luck and happy boating