



Islander July 2009 Technology Update

Navico's New Broadband Radar

Rarely do we come across a complete redevelopment of a conventional product, especially when this conventional product has been around since World War II, and has been based on the same technology since then. This product is radar.

What is radar?

Radar is a device that produces a rough picture of anything hard that is sticking up above the sea that you wouldn't want to hit. Radar can look as far away as the horizon. This is extremely useful when trying to detect cliffs or other ships in thick fog. Radar can look through fog and darkness. However it will not look through harbour walls or ships.

If you look up the mast of a yacht or a ship the radar scanner is the white bar that rotates about its central point. On smaller yachts, the rotating bar is housed inside a radome to get it out of the wind, and to avoid it getting tangled in ropes and sails.

It works by firing microwaves at the far horizon from the rotating scanner. When these microwaves hit something solid they bounce off it and the echoes are reflected back to the vessel and picked up by the rotating bar. The radar measures the time taken between the transmission and reception and does a quick calculation to work out how far away the solid thing it hit was, and puts a blob in that position on the screen. Like most clever electronic devices radar does this thousands of times per second, scanning the whole 360 degrees around the vessel and putting loads of phosphor blobs on the screen. This eventually builds a picture that requires quite a lot of interpretation for the rookie radar operator, but is quite obvious to the expert.

So in a nutshell, that's how radar works.

Inherent problems with conventional pulse radar

However, there are a couple of things you may have noticed in my "Radar for Dummies" explanation above. Firstly, radar uses microwaves, and secondly the image created requires some expertise to interpret.

Most people associate microwaves with the oven in the kitchen, which cooks anything which you put inside it, including small pets, so long as the door is closed. And that is the key – the door has to be closed because microwaves are dangerous. Ergo, radar is dangerous. Rather like the door on the microwave, a number of

HEAD OFFICE

Palma de Mallorca, Spain

TEL +34 971 404 208

www.e3s.com

FAX +34 971 404 431

info@e3s.com



yachts create a virtual door by putting a sign across the radar controls to prevent anyone from switching on the radar whilst crew are working up the mast, as it is a health hazard.

Secondly radar images on the screen are tricky to interpret. Over the years different microwave wavelengths have been used to try and make the radar image clearer. This is why we have S Band and X Band radars to name just two. X Band is conventionally used for greater resolution at shorter distances but is of no use at longer ranges. S Band is used for longer ranges, but the antenna is too large for smaller yachts. Thus X Band is the best microwave frequency for better images.

In 2003 there were changes to the regulations governing radar transmitters to reduce spurious emissions and out of band emissions. This led to some manufacturers looking for an alternative to the conventional pulse radar that uses a magnetron.

Why is Broadband radar different?

For these reasons, Navico considering Frequency Modulated Continuous Wave (FMCW) transmitters, otherwise know as Broadband, as the energy source.

Navico spent more than five years of intense research, development and testing, before they launched the first Broadband radar at METS in November 2008.

The Navico broadband radar - which utilises solid-state technology similar to that used in military and IMO-certified radar applications - is unlike anything else on the recreational marine market. It brings a host of important performance and safety benefits to navigators, including improved target definition and target separation in close quarters, and it is safe.

According to Navico, the broadband radar is much better at seeing and identifying anything hard that sticks up above the sea. Evidently, it can clearly differentiate between docks, channel markers, pilings, moored vessels and other targets at ranges down to 1/32 nm. Navigators can also expect 2 to 3 metre target resolution to 10 miles with a maximum range of 24 nautical miles.

One of the other neat features is the InstantOn™ operation. The radar requires no warm up time, unlike conventional radar. This unique feature is ideal for sailors wishing to remain ready while saving power, as well as for sailors at anchor who want instant information without running their radars continuously.

Rain and waves (sea) can clutter the images on conventional radar. Tuning is important and not a lot of sailors are experienced enough with their radar to tune it efficiently, so they simply leave it on auto tune.

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Navico is applying today's most advanced technology to make radar easier to use. They say sea clutter rejection is inherently five times better with broadband technology. Broadband technology also automatically and instantly tunes the radar for optimum performance whenever the range scale is changed, eliminating guesswork and allowing navigators to keep their eyes on their surroundings.

Another important advantage of broadband technology is that it transmits at less than 1/2000 the power of conventional radar emitting no harmful radiation outside the dome. This means that not only does it draw far less DC power (an important advantage for sailboats and smaller vessels), but also the compact radome can be mounted in places never before possible such as on an arch of a rib, at head height.

The new Broadband radar from Navico was expected to be commercially available from end of 2nd quarter 2009. We haven't seen one yet, but have been promised one to test in the near future. Navico own many brands including B&G, Simrad, Northstar, Lowrance, Eagle, Navman and MX-Marine, so expect to see the same product under a number of different brands.

Roger Horner of E3 Systems

For further information on any of the above, please contact us.

email on info@e3s.com and website www.e3s.com

Tel: +34 971 404208/400738/702975

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Palma de Mallorca, Spain

TEL +34 971 404 208

www.e3s.com

FAX +34 971 404 431

info@e3s.com