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Broadband Radar™

Reinventing Radar

ESSENTIAL GUIDE



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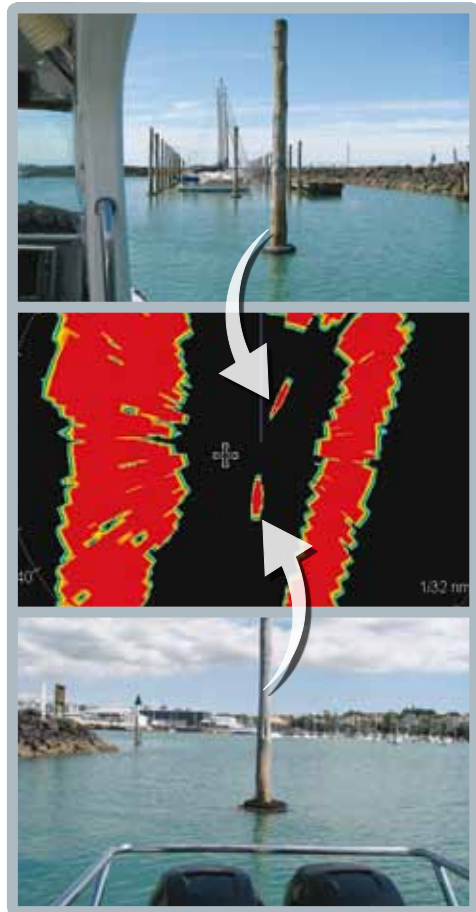
Broadband Radar™

Reinventing Radar



The most significant radar breakthrough since 1940

- 
Crystal clear imagery
 Miss none of your immediate surroundings. Fantastic for tight manoeuvres in marinas or in conditions of limited visibility.
- 
InstantOn™
 Solid-state technology produces an immediate, accurate on-screen image.
- 
Low power consumption
 Broadband Radar™ requires very little power: ideal for all types and size of recreational boat.
- 
Extremely low emissions
 This safest of all radar, it can be mounted anywhere! Broadband Radar™ has fewer emissions than a mobile phone.
- 
Quick installation
 No reason to open the dome, no tune or zero mile adjustment, and best of all – no radar-licensed technician required.
- 
Automatic clarity
 Proven Auto Harbour and Offshore modes completely optimise the radar image – even on our shortest range of 200 feet. Just steer.



www.lowrance.com | www.bandg.com | www.simrad-yachting.com

Leaders in Marine Electronics

The world's leading marine leisure electronics brands: Lowrance, Simrad Yachting and B&G are proud to develop and manufacture the full range of navigation and communications equipment for use by boaters in the leisure and coastal commercial sectors.

As research-driven organisations, these leading marine electronics brands maintain centres of technological excellence around the world, including development facilities for GPS and echo-sounder products in the USA, autosteering in Norway, instrumentation in the UK and radar in New Zealand. The development of Broadband Radar is an excellent example of the long-term approach that Lowrance, Simrad Yachting and B&G take to ensure that they remain at the forefront of marine electronics.

Over seven years of R&D and the application of substantial funding, including a grant from the New Zealand government, went into achieving these revolutionary advances in marine navigation. The enthusiastic response to the introduction of the Broadband Radar family of products from the worldwide boating community demonstrates the benefits of investing time and resources in seeking radical new solutions to the challenges of the marine environment.

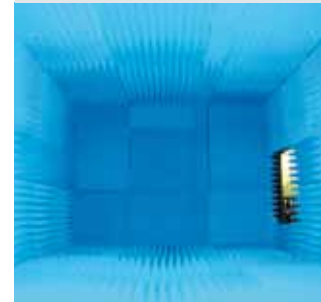
Yachtsmen, anglers and professional mariners can expect to see a steady flow of similarly exciting new products from the three brands in the coming years. With a commitment to ever-enhanced performance, ease of operability and seamless systems integration, they will continue to set the pace in innovation for the marine electronics industry for the foreseeable future.

“Over Seven years of R&D went in to achieving these revolutionary advances in marine navigation”

Broadband Radar Engineers in New Zealand



Pyramidal foam inside an anechoic chamber to eliminate internal signal reflections when testing Broadband Radar



The Broadband family of Radomes have undergone demanding waterproof testing



How does it work?

Broadband Radar™ compared to conventional pulse radar

Conventional pulse radar uses a magnetron to generate a pulsed microwave signal that is transmitted from the rotating radar antenna. This “bang” of microwave energy is reflected off targets that it hits and returns to the radar, the time it takes determines the range and bearing.

This type of radar transmission is, in layman’s terms like shouting loudly in one direction and then listening to see if you hear an echo, turning your position and then repeating the process.

Broadband Radar uses a different type of technology, allowing the radar to send out a continuous radar signal. The continuous signal has a changing tone or frequency (at a much lower power than a pulse radar) and the Broadband Radar constantly listens for the change in that signal. This is more like you whispering a tune continuously and listening at the same time for the echo. This is made possible by using two antennas, one which whispers and one that listens.

The change in the tone of the transmitted radar signal (or in our example the notes of the tune) determines the time taken for the signal to reach the target and return. This time determines the range and the bearing.

Broadband Radar simultaneously receives as it transmits, unlike a pulse radar that pulses loudly then has to switch the internal circuits from transmit to receive. This causes all pulse radars to have an unavoidable “main bang” which appears in the centre of the screen as a sunburst. This covers up any close targets, reducing the effectiveness of the pulse radar at short range.



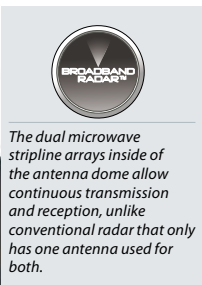
An example of Main Bang interference on a 4kw radar screen

Many types of pulse radar “blank” this main bang artificially this also hides any short-range targets which blinds the radar to close by targets.

With Broadband Radar only sending out a “whisper” the main bang is just not there, so there is no sunburst in the centre of the screen and no need for main bang suppression. The benefit of this is that close targets are not lost or hidden, with the radar able to show targets right up to the bow of the boat. This short-range performance is exclusive to Broadband Radar.

Conventional radar emits a pulse, and this pulse varies in length depending on the range. This pulse length determines the ability of the radar to distinguish between close targets on a similar bearing. Usually this can be around 80ft at short ranges and up to 500ft at longer ranges. Broadband Radar, using a continuously transmitted signal, is able to see targets as close as 6ft from the dome on the shortest scale and separate targets 30ft apart in range on the scales used for navigation.

This short-range performance is also enhanced with the minimum range scales now going beyond the conventional 1/8th of a nm range down to just 200ft with three additional scales. With Broadband 4G™ Radar including an additional 36nm long range scale, there are 18 range scales now available.



The dual microwave stripline arrays inside of the antenna dome allow continuous transmission and reception, unlike conventional radar that only has one antenna used for both.

The outcome of this whisper technology is, better short range detection, better visibility of close in targets and better target range resolution in comparison to conventional radar.

The better target range resolution also helps in reducing sea clutter. This is due to the radar being able to detect different targets at small range difference, much more clearly than with pulse radar.

A continuous radar wave is much easier to filter for individual targets as the echoes returned are smaller.

Pulse radar sends several waves which tend to return a single large echo that can display as one target. Broadband Radar therefore provides a far clearer display and enables detection of smaller floats or buoys in the water.

“It’s Magic”

Greg Konig, Sr. Vice-President for Navico’s Product Line was asked at a Press lunch if he could explain how Broadband Radar works “in Layman’s terms”. Konig obviously did not want to launch into a lengthy discourse over salad and sandwiches. “In Layman’s terms” he said, pausing for effect “...it’s magic!”

With help from Konig and other folks at Navico, we’ll now try to explain how Broadband Radar works and how it differs from conventional Pulse Radar

Conventional or pulse radar is generated by a magnetron, which has been compared to a valve opening and closing to release pulses of energy.

In layman’s terms: Imagine you are standing blindfolded near a house. You holler “hello!” and then listen to hear the echo. Let’s assume you are changing direction like a rotating radome as you continue to call “hello!” and listen again. You holler, pause, listen; holler, pause, listen. Your sense of hearing is more finely tuned than most, and the echoes tell you that there is an irregular object nearby in a particular direction at a specific distance.



Broadband Radar is a marketing name for what engineers call frequency-modulated continuous-wave (FMCW) radar. The word “broadband” nowadays is associated with good computer connectivity; Navico justified use of this term because its radar emits signals along a broad range of frequencies. It does this without a magnetron, instead using two solid-state amplifiers: one to transmit waves at continuously increasing frequencies, the other to simultaneously receive their echoes.

Now, Mr. Layman, you are standing near the same house, not hollering. You are whispering, “do, re, me, fa, so, la, ti, do; do, re, me, fa, so, la, ti, do,” etc. As you rotate and whisper, you listen for echoes, with an ear for nuance. You don’t pause; you whisper and listen simultaneously. You clock the echo from each discreet note and use these streaming time-stamps to build a mental picture of a building with a tree in front of it, but not touching.

“You are able to match what you see on the screen to reality quicker than you ordinarily could. It also eliminates sea clutter and rain clutter about five times better than your traditional radar, and you don’t have to tune the radar to get the signals to pop out from the noise” Konig said.

Excerpts from “Radar Love” in Passage Maker Magazine, courtesy of Peter Swanson

Advantages of Broadband Radar

Introducing a revolutionary radar system unlike anything else on the recreational boating market. Utilising solid-state technology, these breakthrough radar solutions provide superior target detection and separation, ease of operation, and a new level of navigational safety to a wide range of boats.

The exclusive technology and performance characteristics of Broadband Radar make them an ideal match for almost any vessel. Unparalleled resolution and discrimination make it an ideal complement to large radar systems on power and sailing yachts. User-friendly operation makes it an ideal primary radar for small to medium-sized vessels. Its small size, minimal power requirements and safer transmission energy levels open up the advantages of sophisticated radar to all boats.

Crystal clear image

The images displayed on the screen are incredibly clear and easy to understand due to the use of amazing FMCW (Frequency Modulated Continuous Wave) technology. The signal sent from the radar is simply a range of frequencies; hence the term Broadband. This signal is radiated from the rotating part of the antenna in much the same way as normal radar.

The real difference is in the way the radar looks out for the returned signal. Sending this signal out continuously and listening with a very sensitive receiver allows the radar to detect the change in frequency. From this change it is possible to calculate the range and bearing of the target. Broadband Radar has two antennas inside, one transmitting all the time and the other dedicated to receiving the radar signals.

This clear signal back is what provides such a crystal clear image on the radar display, making it very quick and easy to understand the radar picture. No complicated tuning or learning curve makes it easy to operate and understand.

Low power consumption

Using new solid state technology reduces the power consumption of the radar significantly over conventional radar. Perfect for use on recreational and Sail boats where battery reserves are limited.

Extremely low emissions

Unlike any other radar, Broadband Radar is completely huggable. In fact, the Broadband 4G™ Radar and Broadband 3G™ Radar emit one-fifth the emissions of a common mobile phone. No other radars are this safe! Broadband 3G Radar and Broadband 4G Radar transmit only 1/5th of one Watt, whereas pulse radar on a small boat emits a substantial 2000+ Watts. This enables the radar to be mounted in many more positions than conventional radar, which is ideal for small power boats where radar was previously not an option.

Typical Pulse Rader safe distance table

Power	Public Safe Distance
2kW	4.6ft (1.4m)
4kW	9.3ft (2.8m)

No need to worry about microwave radiation with the new Broadband Radar.



Instant On™

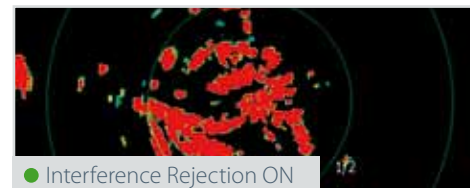
Broadband Radar provides instant radar transmission, ideal for on a sail boat where you may not wish to have the radar running continuously. Compare this to waiting 90 to 180 seconds as you may have to do with conventional pulse radar. Broadband Radar gives you the radar picture the moment you need it.

Automatic clarity

The Broadband 3G and 4G Radar operate mostly automatically, with user selectable auto modes. No need for special tuning of the radar at start up or to adjust the tune when changing range, all this is taken care of with the auto modes. In Harbour or inshore use the Auto Harbour mode, when offshore fishing, use the Auto Offshore mode. Broadband Radar takes care of all the fine-tuning automatically. In addition the Broadband 4G Radar has Direction Clutter Rejection that allows smaller targets to be seen in sea clutter like never before.

IR Interference rejection

Broadband Radar automatically tunes out interference that may come from other radars operating in the vicinity. Multiple levels of interference rejection remove all noise depending on whether you are in a busy commercial harbour, shipping lanes or just out fishing with another boat. The special IR software will remove other radar noise; yet still maintain a perfect radar picture around the boat. Simple to use and the results are impressive.



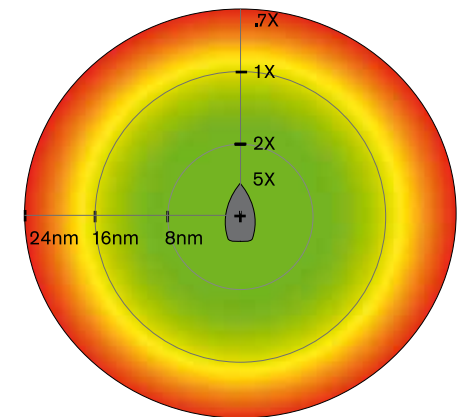
Range discrimination performance

Range discrimination is a measure of the radar's ability to distinguish closely spaced targets on the same bearing. FMCW technology provides unsurpassed performance for your maximum safety and precise navigation. At 16nm and less Broadband 3G Radar and Broadband 4G Radar have from 1 to 5 times more range discrimination capability to see smaller targets than conventional 2kW pulse radars. This greatly improves your situational awareness.

The below graph uniquely demonstrates range discrimination performance of Broadband 3G and 4G Radar Vs. pulse radar.

Range Discrimination Performance

Green = better than 2kW / 4kW Red = worse than 2kW/4kW



See the radar target return chart on Page 17 demonstrating typical Broadband Radar range performance.

All weather performance

In bad weather, when visibility is low, that is when you will want to rely on your radar.

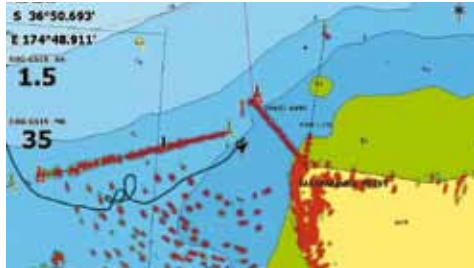
In a rain shower or snow the radar signal will penetrate and show you the radar picture you expect to see. The Rain Clutter feature on the radar reduces noise on the picture associated with rain, yet still provides you with a clean picture of the radar targets around you.

Advantages of Broadband Radar™

Close Range Performance

Enhance your situational awareness thanks to Broadband Radar with chart overlay. Radar Chart overlay is the perfect way to determine what are fixed targets and what could be moving targets such as ships.

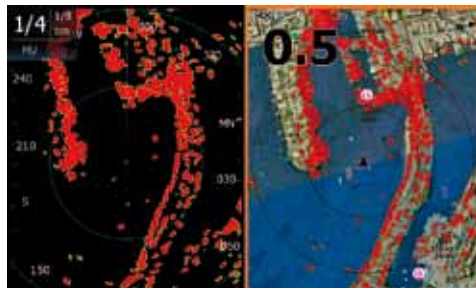
Even at night or in fog or mist, by using Broadband 3G™ Radar and Broadband 4G™ Radar it is possible to vastly improve safe navigation in restricted conditions at close range.



The image above shows a boat safely navigating through a vessel mooring field at close range with Broadband 4G Radar

The same vessel mooring field as seen by eye is incredibly crowded and challenging to navigate through without the aid of radar

Exceptionally sharp target resolution is seen with Broadband 4G Radar in a busy Florida Harbour when using split screen radar with overlay mode.



“A lot safer..”

At 200ft away from the boat on the port side are a series of very small channel marker floats, these are clearly visible, yet are made of plastic and are probably only 6 inches above the water.

The skipper of the boat who is used to this harbour says that at night being able to see these markers will make coming into this harbour a lot safer.

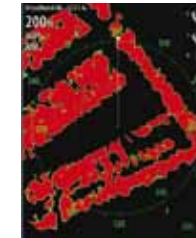
Channel markers are easily associated to visible surroundings ▼



See what you need to see, when you need to see it

Broadband 4G Radar clearly sees both inside and outside rows of poles ▼

Only possible at this range as Broadband Radar has no main pulse suppression that a conventional radar suffers from. Possible to see targets close together and yet they are clearly shown as separate targets.



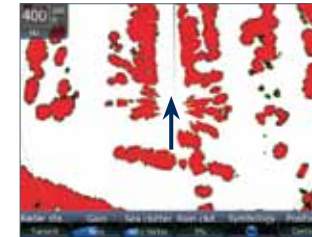
Broadband 3G Radar sees breakwater to port, with three mooring buoys close in ▼

The Broadband Radar is able to separate targets that are close together much clearer than a conventional radar, here we see the three buoys clearly visible close to the breakwater.



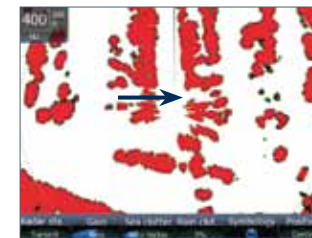
Left turn complete, moving along a row of boats ▼

In narrow harbours it is possible to use Broadband Radar to find your berth. Often harbours have confusing background lights that can make a night harbour entrance seem overwhelming. The radar at this scale makes it all very clear.



Vacant berths in a marina are easily identified ▼

At short ranges Broadband Radar shows up the individual yachts in their berths, ideal at night when visibility may be compromised. In this type of situation conventional radar would only show a merged target possibly obscured by the main pulse.



Images courtesy of James Turner

Broadband 4G™ Radar, What's New?

The Broadband 3G™ Radar followed in the footsteps of the award-winning BR24™ Broadband Radar and has two times higher RF energy transmitted at the antenna than the original BR24, resulting in a 30% increase in range.

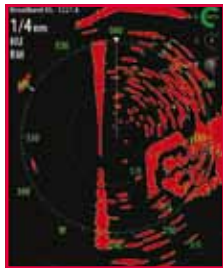
The newest member of the Broadband Radar range, the Broadband 4G Radar continues in this tradition offering all the benefits of the Broadband 3G Radar, as well as some spectacular extra features .

The Broadband 4G Radar has an impressive 50% improvement in range and target detection capability, with a new 36nm range and 18 range scales to accommodate the increased performance.

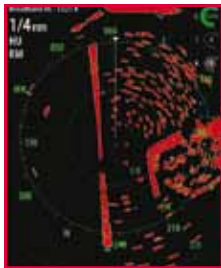
Broadband 4G is the first dome radar to employ Beamsharpening. This technology enables a new feature called Target Separation Control, which

improves the Azimuth resolution, or effective antenna horizontal beam width, up to double the resolution of any 18-inch dome radar. This is the equivalent of a three and a half foot open array radar!

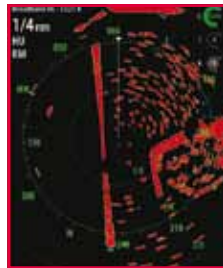
When paired with the Simrad NSE and NSO or B&G Zeus series, the Broadband 4G Radar is capable of high speed operation up to 48rpm. It also has a new Dual Range feature which allows unprecedented simultaneous working ranges, anywhere from 200ft up to 36nm - no other radar in the world can do this.



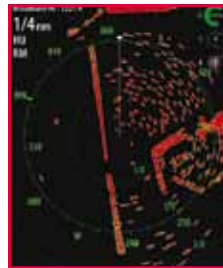
Target Separation Control OFF
~5.2°



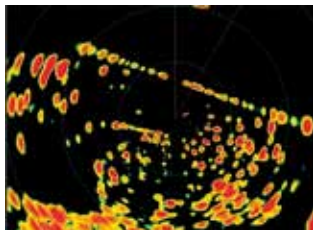
Target Separation Control LOW
~4.4°



Target Separation Control MED
~3.5°



Target Separation Control HIGH
~2.6°



4kW pulse radar showing inferior target separation

Both Broadband 3G Radar and Broadband 4G Radar work with the entire range of Simrad Yachting, Lowrance and B&G award-winning multifunctional displays., these include the B&G Zeus, Simrad NSE, Simrad NSO, Simrad NSS and Lowrance HDS series.

Broadband 4G™ Radar, What's New?

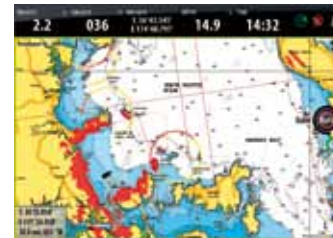
Improved Range Performance with Noise Rejection Control

Broadband 4G Radar uses advanced levels of Digital Signal Processing to reduce the amount of noise picked up by the radome's surroundings. Users can choose the levels of Noise Rejection via an onscreen menu and decide between LOW or HIGH rejection to customise their views*.

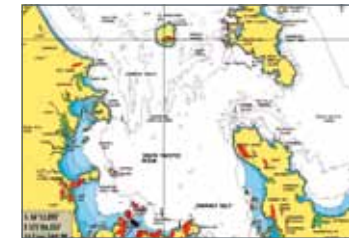
Noise Rejection Control increases the Broadband 4G Radar range by up to 50% and also increases target detection sensitivity.



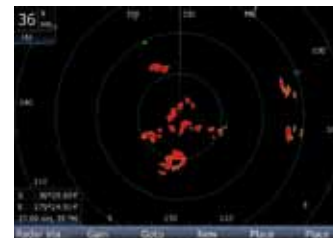
Little Barrier island clearly seen over 32nm away with Broadband 4G Radar



Broadband 4G Radar clearly detects the New Zealand Coromandel Peninsula .>29nm away with the B&G Zeus



Omaha Beach and Little Barrier island are seen at over 32nm away by Broadband 4G Radar



Broadband 4G Radar provides a 36nm usable display range as shown here on the Lowrance HDS



Broadband 3G™ Radar sees some of the Coromandel Peninsula at 23nm.

*Displays without Noise Rejection Control automatically default to High, in this case Target Separation will also be High

Broadband 4G™ Radar, What's New?

Weather Detection

Broadband 4G™ Radar benefits from increased weather detection of around 10% when compared to Broadband 3G™ Radar. In on-water testing, Broadband Radar has detected strong rain cells in Florida, USA more than 17nm away.



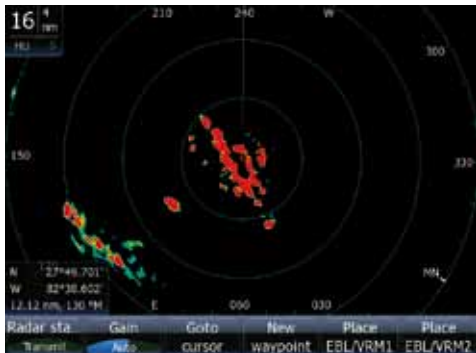
A concentrated Summer Storm cell is seen over the coast



Broadband 4G Radar shows three individual rain cells inside the storm pictured on the left > 17nm away

Ballpark Distances Rain Pattern	Typical maximum range of Broadband 3G Radar in good propagation conditions*	Typical maximum range of Broadband 4G Radar in good propagation conditions*
Wide weather front with heavy rain	8-15nm	9-17nm
Dense rain cell 100mm/hr	7-13nm	8-15nm
Heavy shower 25mm/hr	2.5-5.5nm	3-6nm
Light Rain	1.3-2.6nm	1.5-3nm

*Distance data represents typical detection distance, not guaranteed



When using Broadband 4G Radar, a powerful storm greater than 12nm away is displayed on a Lowrance HDS with multiple gradient colours

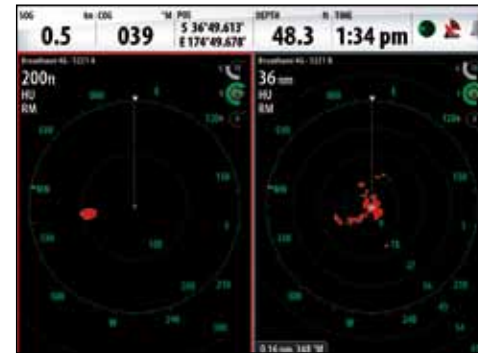


Broadband 4G Radar detects many separated cells inside a Florida rain storm overlaid on a chart greater than 16nm away

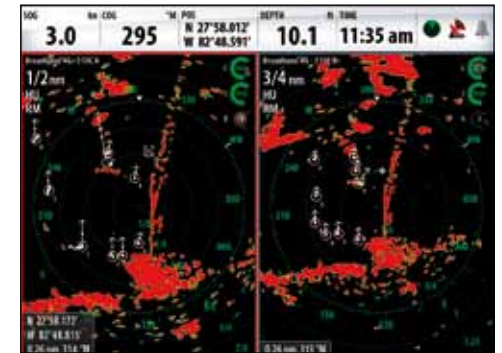
Broadband 4G™ Radar, what's new?

Dual Range with Advanced MARPA, High Speed

With compatible displays including the Simrad NSE, Simrad NSO and B&G Zeus series, Broadband 4G Radar is capable of simultaneous Dual Range operation from a single dome, allowing 10 MARPA targets on each side of a split screen. This allows unprecedented independent working ranges from 200ft right up to 36 nautical miles - no other recreational radar in the world can provide this scaling! Up to 48rpm high speed operation is available for single range operation at less than 1nm.



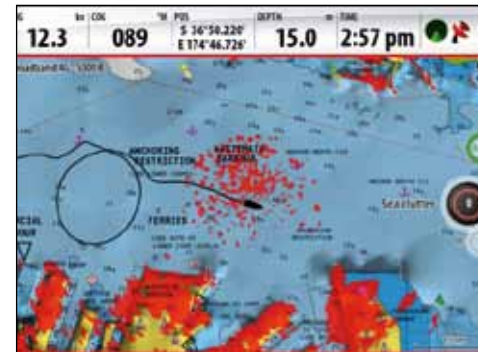
A Buoy is seen 86' away, while using the long 36nm simultaneously



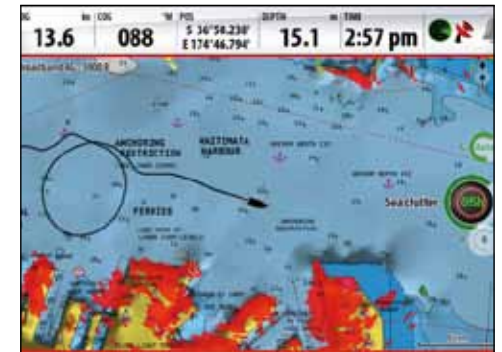
Broadband 4G Radar Dual Range mode tracks up to 10 MARPA targets on each side of the screen with independent controls, allowing 20 MARPA targets to be tracked in total.

Improved Sidelobe Clutter Rejection

Broadband 4G Radar has improved sidelobe clutter rejection for large targets, such as tankers and tall buildings on the coastline. In addition, directional sea clutter processing improves the ability to see smaller targets in heavy sea states.



Sea Clutter is set to OFF in a strong Sea State 3-4 to demonstrate sea clutter around the boat.

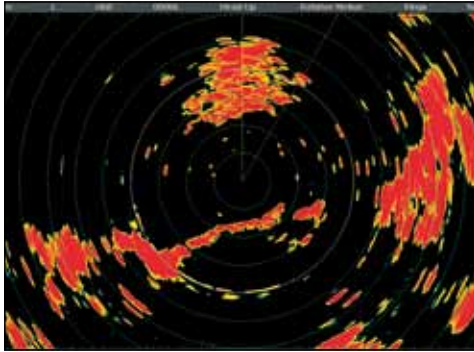


Automatic OFFSHORE mode totally eliminates sea clutter around boat while still seeing nearby targets.

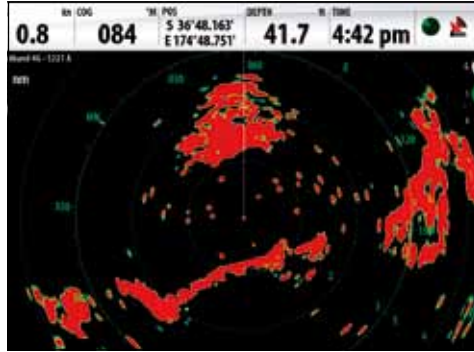
Broadband 4G™ Radar what's new?

Small Target Detection at 3nm Range

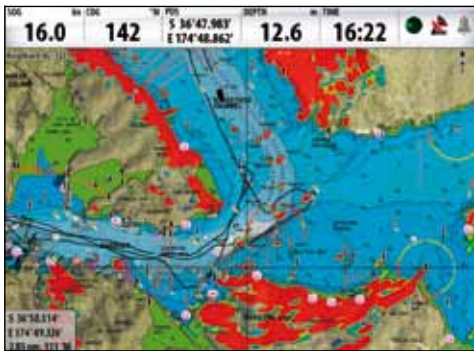
The 3nm range is especially important in the transition one from short to longer range radar performance. Broadband 4G™ Radar allows the clear detection of individual buoys, channel markers and coastline, while avoiding the sidelobe projections and target stretching that is common with pulse radar.



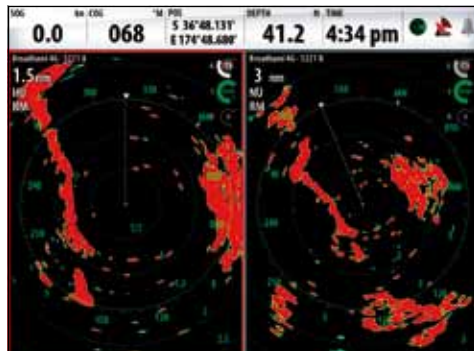
New Zealand Shipping channel at 3nm with 4kW Radar



New Zealand Shipping channel at 3nm with Broadband 4G™ Radar



New Zealand Shipping channel at 3nm with Broadband 4G™ Radar and chart overlay. Notice the crisp targets and markers.



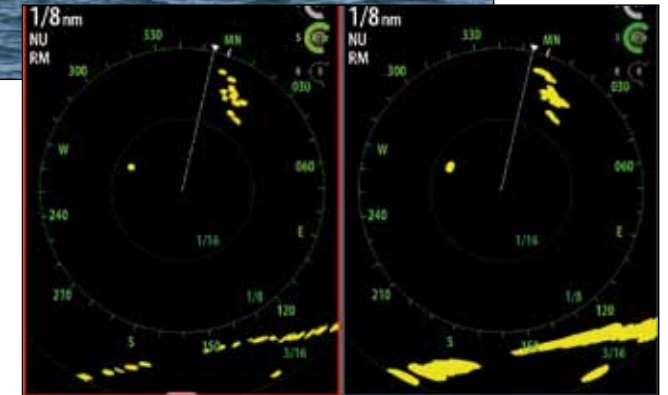
Broadband 4G Radar showing shipping channel details with 1.5nm and 3nm split screen

Broadband 4G™ Radar what's new?

The Broadband 4G Radar offers extraordinary all-round performance, including exception clutter rejection, which dramatically increases situational awareness among novice and professional users alike.



Broadband 4G Radar compared to Broadband 3G Radar (right Image) when looking at Kayakers (above)



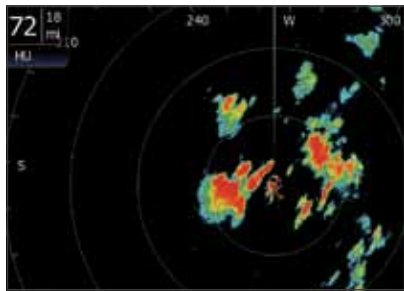
When to Use Pulse Radar vs Broadband Radar

Broadband 3G™ Radar and Broadband 4G™ Radar are ideal for

- Close range operation in tight quarters with an unmatched full screen radar scale of 200'
- Tall Coastline detection past 30nm with Broadband 4G Radar
- Weather detection greater than 15-17nm
- Precise navigation with high resolution target detection for collision avoidance situations up to 3nm
- Monitoring of both close and far ranges with Broadband 4G Radar
- Natural sea clutter rejection
- Directional sea clutter rejection with Broadband 4G Radar
- Easy installation with maximum RF emission safety
- Maximum safety and situational awareness

Pulse radar is ideal for

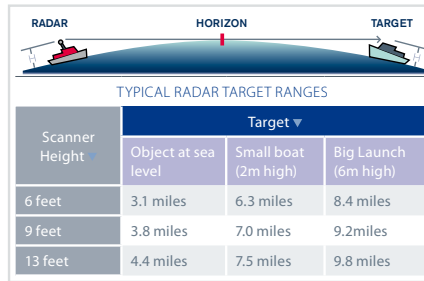
- Detailed visibility of storms and rain cells farther than 16-20nm away
- Seeing hard to detect sloping beaches and shorelines
- Triggering RACONS
- Cosmetic appearance of a turning open array



6kW HD Digital Open Array (Pulse) Radar on 72nm range with full colour storm cells

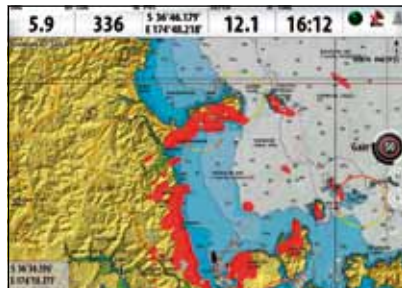
I can't see my friend's boat 6nm away. Why?

- Always be careful with distance and line of sight- all radars need to be higher to see farther, and the farther you look, the bigger and taller the object needs to be



I can see coastline in the distance but my radar cannot see it. Why?

- This is true of all radars in some conditions due to the slope of the land, height of the coastline, vegetation, humidity and distance.
- Broadband Radar target detection ability decreases more rapidly than pulse radars as the radar range scale is increased while adequately seeing important larger targets far away. Broadband 3G Radar is good at seeing targets at distance, but Broadband 4G Radar is 50% better, with a working range up to 32nm and a useable display range of 36nm.



Broadband 4G Radar sees solid coastlines and three freighters in line approaching Auckland on this map overlay

When to Use Pulse Radar vs Broadband Radar

How far can I expect to see with Broadband Radar?

Ballpark Distances	Target Height (ft)	Radar Horizon (nm)	Broadband 3G Range	Broadband 4G Range*
Typical Maximum range in good propagation conditions**				
Marine Targets				
Large Power Station/ wind farm	300	21.3	18-25nm	25nm+
Long coastline with 100m high cliffs	300	21.3	13-25nm	19-25nm+
High density urban coastline	150	15.1	8-15nm	11-19nm+
Forest-covered coastline gently sloping to 250m	750	33.7	5-10nm	8-15nm
Low lying suburban coastline	150	15.1	5-10nm	8-15nm
Large container ship (ship dependent)	100	12.3	10-17nm	13-17nm+
Low lying coastline ,50m dense vegetation	100	12.3	4-8nm	6-11nm
small low lying island	50	8.7	2.5-5nm	4-7nm
Medium sized power boat	13	4.4	1.3-2.6nm	2-3.5nm
Channel markers with radar reflectors	10	3.9	1.3-2.6nm	2-3.5nm
Small power or sail boat	13	4.4	0.7-2nm	1-3nm
Small marker buoy	10	3.9	0.25-0.7nm	0.25-1nm
Kayak 300-800ft	6	3.0	300-800ft	300-800ft
Birds 160-500ft	100	12.3	160-500ft	160-500ft
Sandbars	1	5.7	0.2-0.6nm	0.3-0.9nm

Ranges above with radome height of 13ft.
 *Broadband 4G Radar - single range noise reduction = high
 ** Above data is typical target distances, not guaranteed

General Recommendations for selecting Broadband or Pulse Radars

- Broadband 3G Radar is the best value choice for the vast majority of radar applications and addresses the need for superior all weather navigation usage. Broadband 4G Radar is the best 18" dome radar available combining the best resolution for navigation and for offshore operation from 20-30nm
- Low emissions combined with the fact that "all collision incidents occur with objects less than 10' of the boat" - where radar visibility is now possible with Broadband Radar, makes you and your family safer in every way
- Pulse radars are for operators that regularly go further than 20nm offshore and need to keep tabs on distant storm cells and detect far away coastlines - in addition to seeing these objects on their chartplotter map. For these applications, HD digital open array radars are recommended



Broadband 4G Radar easily displays a small power plant more than 15 nm away on a Lowrance HDS

Can I improve maximum usable range by using manual controls?

- In some cases, yes, but introduces more noise in the image and not recommended for non-experienced radar users.

Is my display compatible?

Broadband 3G Radar and Broadband 4G Radar are compatible with many different modern Lowrance, Simrad and B&G displays. To see if yours is compatible, see below.

B&G

www.bandg.com



B&G Zeus: 8-inch / 12-inch

SIMRAD

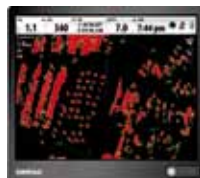
www.simrad-yachting.com



Simrad NSS Sport:
7-inch
8-inch
12-inch



Simrad NSE Expert:
8-inch
12-inch



Simrad NSO Offshore:
15-inch
17-inch
19-inch

LOWRANCE

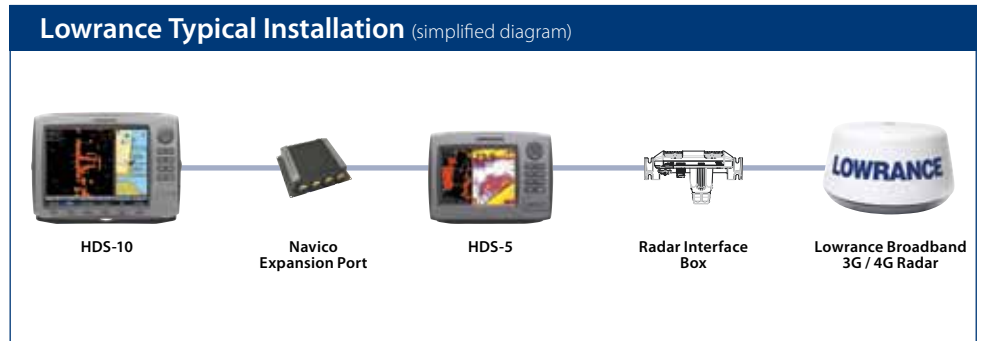
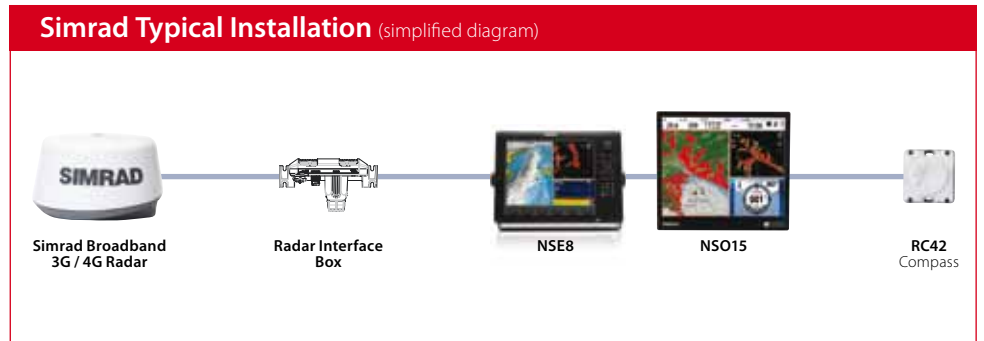
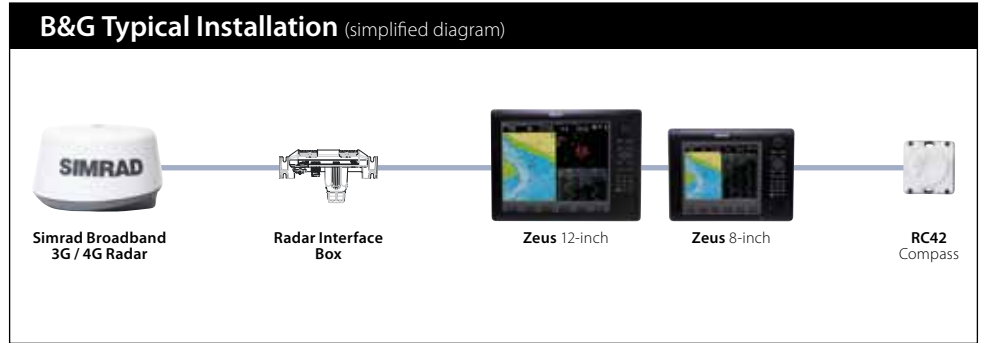
www.lowrance.com



Lowrance HDS: 5-inch / 7-inch / 8-inch / 10-inch

Note: Your display may require a software upgrade to be Broadband 3G and 4G Radar compatible. Available features may vary according to unit

Typical installation options



What are the press saying?

“It’s (Broadband Radar) pretty close to a 10.”

Peter Swanson, Passagemaker

“Broadband solid-state radar is a quantum jump in recreational marine radar.”

Chuck Husik, Southern Boating

“After several hours of scoping target-rich Biscayne Bay, my impression (of the Broadband Radar) was a qualified “wow!”

Ben Ellison, Cruising World

“It’s going to revolutionise the way people navigate basically”

Dave Barham, Boat Fishing Monthly

“Great screen clarity, it’s really a game changer!”

John Burnham, Yachtworld.com/Boats.com

“The low power consumption makes it easier to run on a small boat with a two battery system.”

“I like the fact that it’s instant on and that you don’t have a 90 second warm up period. Half the time when you want (conventional) radar, by the time the 90 second period is over, what you wanted to see is already gone.”

“The detail that allows you to distinguish a guy’s tender idling around a boat from your boat 50-feet away ... that was pretty nice!”

Lenny Rudow, Marlin

“There haven’t really been any structural breakthroughs in radar in a long time. What we saw today would enable people to use the product, really effectively, in close quarters, better than any radar product than I’m aware of.”

“This (Broadband Radar) gives people a reason to choose one radar product over another!”

Bruce Pelkey, Navigate-us

“Broadband Radar is a major development in radar technology.”

Chris Labozza, Nor’East Magazine

“(Broadband 3G Radar) offers excellent close quarters performance. Best On Test!”

David Pugh, PBO Magazine

“If I want to buy a new radar, I would choose this one”

Dieter Wanke, Skipper Magazine

“I would say the performance of this new radar technology is nothing short of remarkable”

RIB Magazine

“Being that inexperienced user, I found it very very easy to use”

Peter Nash, Boating Business Magazine

“It’s so simple that everyone can just open it, switch it on and use it”

ars- Åke Redeén, Båtliv Magazine

“Compared to conventional radar, I found Broadband Radar amazingly clear for up close targets”

Toby Hodges, Yachting World Magazine

“I’ve run out of superlatives. Just buy one”

Simon Everett, Sports Boat & RIB Magazine

“Broadband marine radar is a game changer in the recreational marine market.”

Chuck Husik, Southern Boating

“It’s early days, yet, but I’m convinced that we’re in at the start of a revolution that could well mean the end of radar as we know it.”

Tim Bartlett Technical Editor, Motor Boating



Broadband Radar™ was awarded the 2009 National Marine Manufacturers Association (NMMA) and Boating Writers International (BWI) Innovation Award

Broadband Radar wins Sail Magazine Freeman K. Pittman Award

Broadband Radar wins Motorboating Magazine’s “Best of the year” award 2011



Broadband Radar wins NMEA Technology Award & Innovation Award 2009

Broadband Radar wins EDN Innovation Award for the “Best Application of RF Design”

B&G

SIMRAD

LOWRANCE

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www.bandg.com
www.simrad-yachting.com
www.lowrance.com