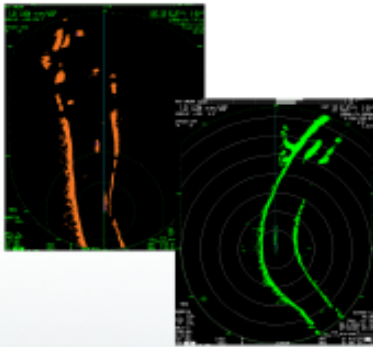


New Furuno FR19X8VBB River Radars

Ultra-Short Pulse Lengths, Innovative Signal Processing & Low Noise Receivers Take Inland Radar Performance to a Whole New Level

FR1908VBB / FR1918VBB **RIVER RADAR**

*See more detail ahead of
the vessel, where it counts.*



Furuno has been manufacturing River Radars for many years. From the first FR2120 that was installed on an inland vessel in 1982, to the modern day FR19X8VBB, thousands of Furuno Radars have been installed and are helping inland pilots safely navigate their tows through night, fog and heavy rain. But what is a River Radar, and how does it differ from any other Radar?

Inland navigators operate in a unique environment, specifically:

- Inland vessels normally only use Radar at ranges under 3-mile ranges
- Units need to be shown in statute miles (US and Canada)
- A portrait-oriented screen is beneficial, as it allows the operator to offset their screen and display as much distance and area ahead of own ship as possible
- The Radar must be able to detect and show small buoys/markers with a very low target cross section
- The Radar must be able to show river banks with excellent resolution
- The Radar must deal with a wide array of noise issues like second echoes, ghosting, and multi-path
- The Radar must be simple to operate, as the navigator must access commonly used functions quickly

The new FR19X8VBB series River Radar accomplishes all the above and more, due to vastly improved technology, developed over many years of building Radars for commercial inland markets. Most of the operator-oriented software requirements are relatively simple to accomplish. But how do Furuno River Radars show targets and banks with such clarity, while eliminating clutter, second echoes and noise? Multi-path, second echoes, ghosting and clutter are all challenges for any Radar. Furuno River Radars apply multiple methods of reducing noise to present cleaner, crisper targets. Here are some examples of challenges, and how Furuno's industry-leading Radar science solves them.

Quieter, More Intelligent Radars

Historically, the only way a Radar was able to pick up weak buoys was to transmit an extraordinary amount of power. Typically, 25kW peak was the standard power "required" on large towboats, as it took that amount of power to illuminate buoys very close to the vessel. The challenge was that this high-power output propagated large amounts of RF energy all around the vessel, including river banks, other vessels, and steel structures. This is particularly true of the numerous empty hopper barges in commercial inland waterways, leading to a very messy target picture, called the "Hopper Barge Effect". This energy would bounce off metal objects and structures and appear on-screen as noise.

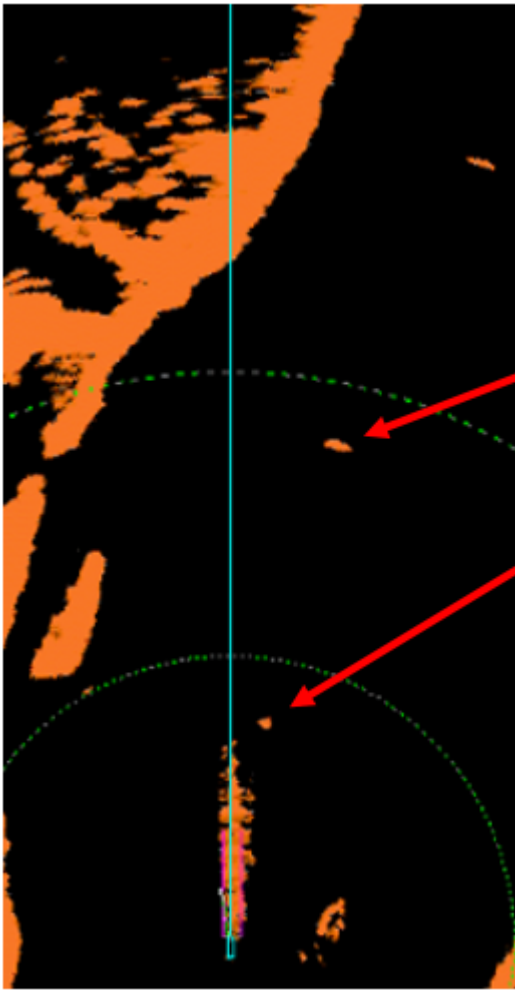
The new FR19X8VBB series "Black Box" Radar has a 40% LOWER noise floor, meaning it is much more sensitive and can detect much weaker return signals than previous models. Since the "V" Radars don't need to put out as much power, there are fewer second echoes and multi-path signals to compete with. While it seems counter-intuitive from a historical perspective, less power output and quieter, more sensitive microwave receivers help us eliminate noise and detect small targets reliably.

Better Interference Rejection

In all commercial waterways, some interference is simply inevitable, whether transmitted directly (i.e. from a Radar) or "bounced" off structures, like radio signals off silos or buildings. It's how Furuno Radars deal with interference that makes a BIG difference. When interference makes it into a Furuno Radar's processor, it has much more processing power that can first recognize these video patterns and anomalies, and then eliminate them. Second echoes, multi-path and other "ghosting" are eliminated before they hit the Radar processor, and before the operator even sees them!

Pulse Length – It Matters!

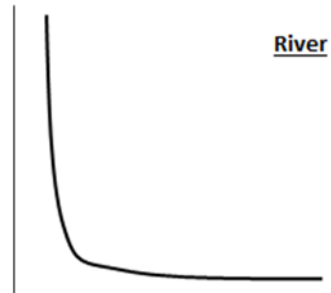
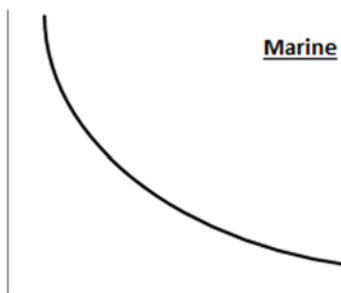
An inherently short pulse-length transmitter allows much better target resolution, and better detection of buoys very close to own ship. The .04 microsecond pulse length of the FR19X8VBB is the lowest of any Radar we manufacture.

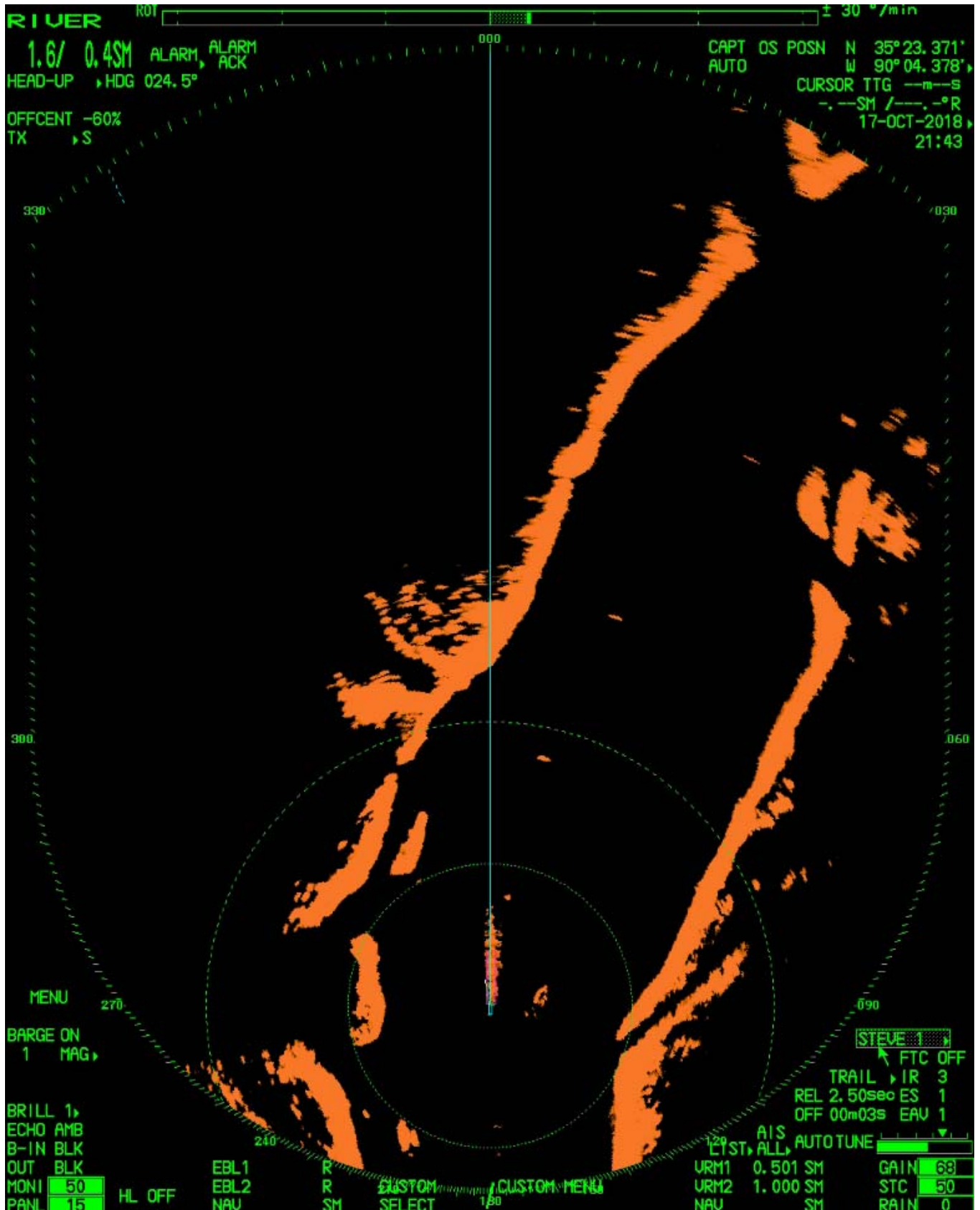


Note buoys being consistently marked very near own ship. This gives navigators the confidence they need when pushing large tows in night or fog.

STC – Sensitivity Time Control

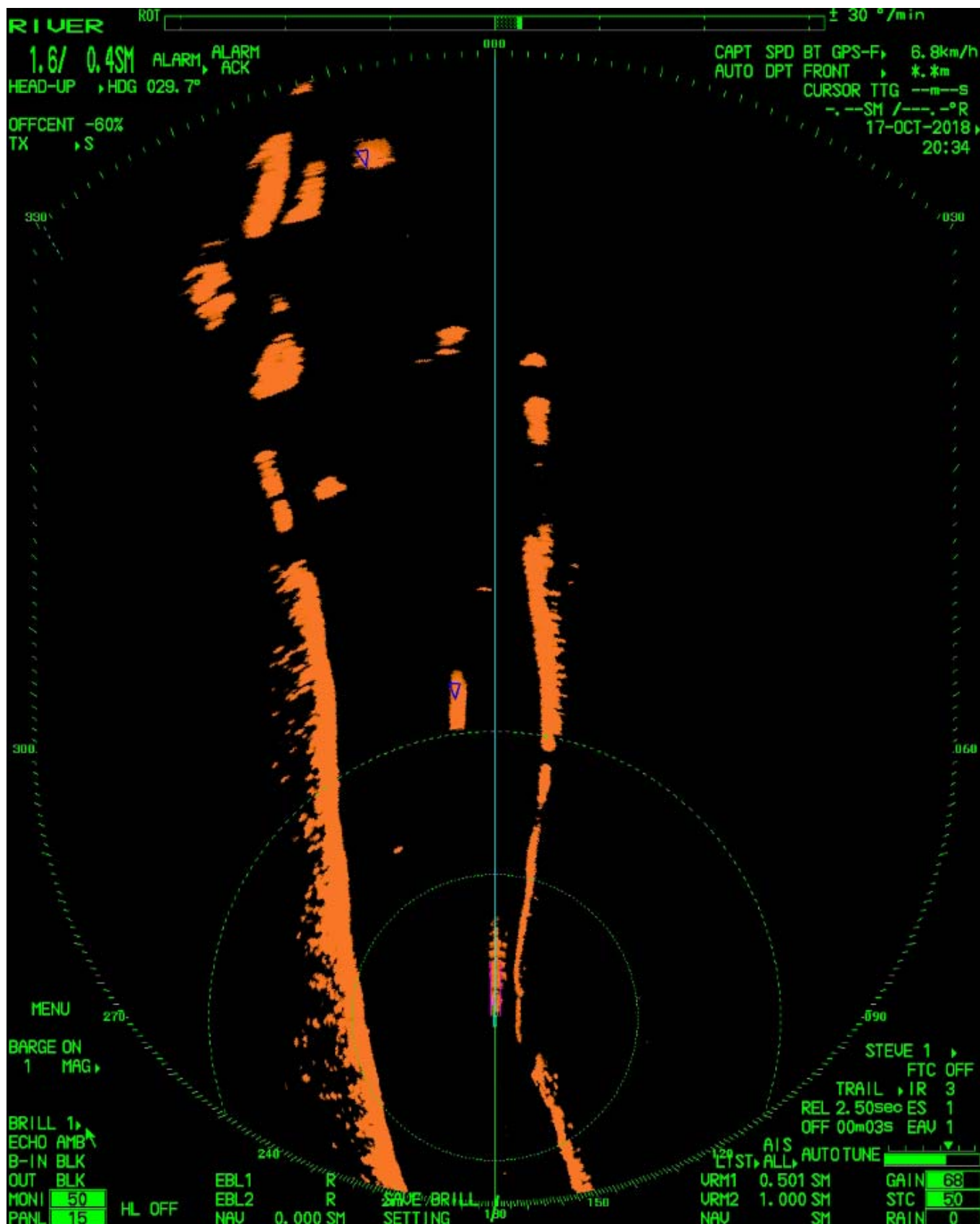
The STC (Sensitivity Time Control) curve of the FR19X8VBB is optimized for the inland environment. On the open ocean (marine environment), Radar is supposed to eliminate interference from waves, which normally aren't found on rivers. When we optimize STC and gain for an inland Radar, we make sure the STC curve is steeper (more gain), so we can keep gain high where we need it – close to our own ship - and mark river banks and buoys clearly and consistently.





River banks, even banks with gradual slope, are shown clearly with good resolution

Other useful river functions include Rate-of-Turn display bar, 12 preset tow configurations and nameable/storable profiles.



Note Rate of Turn (ROT) indicator at top of Radar screen

Finally, what is built into every FR19X8VBB Radar is the strength and durability mariners around the world have come to expect from Furuno. The gearbox is robust cast aluminum with the famed “bell housing” that has been the hallmark of Furuno commercial Radars for over 30 years. This housing serves a dual purpose – it protects the critical signal processing components from the brutal vibration that all riverboats face daily, while offering easy and convenient access to installers and technicians for fast installation and regular maintenance (magnetron replacement). Antenna array options (6.5 or 8 feet) are the same as the arrays used with our time-tested FR21X5 and FAR21X7 series.

The RPU025 processor unit is a compact and easily-installed black box processor, offering high-resolution SXGA (1280 x 1024) outputs to one or multiple monitors via DVI or RGB ports. The new RCU032 keyboard offers familiar knob control of main functions along with a touchpad controller. The RCU032 will offer familiar laptop-style control capability for younger mariners, while the optional RCU030 trackball may be more comfortable for “old salts”.



Buckeye State



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