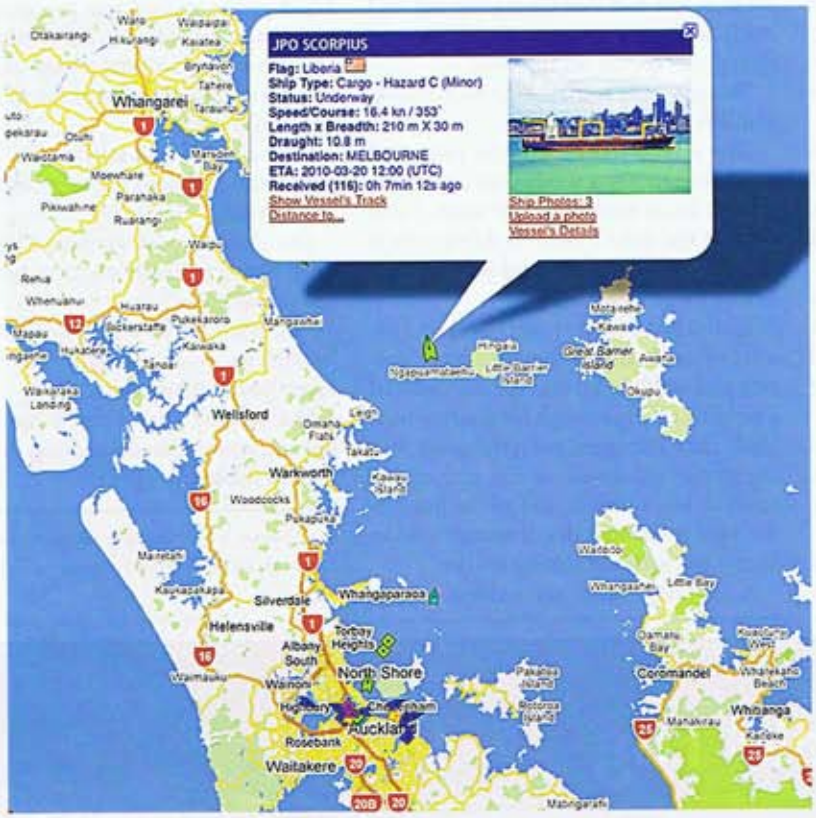
# REVIEWS




A quick visit to MarineTraffic.com gives you an indication of the amount of information available about ships you might meet in the night, say, along the east coast of New Zealand.

## Wonder Who's Out There?

Whether you want to join the Automatic Identification System or just listen in, your gear choices are multiplying.

**ELECTRONICS BY BEN ELLISON**

The Automatic Identification System is a tremendous advance in collision avoidance—and who doesn't want plenty of that? But just how deeply a cruising sailor should get involved with the technology is confusing.

Are there enough A.I.S.-broadcasting ships and boats passing through your cruising area to even bother purchasing the technology? If you do sometimes cross paths with vessels that automatically transmit their vital data out over the two dedicated A.I.S. VHF channels, is it good enough just to install a receiver? Or should you step up to a Class B A.I.S. transponder that will also put your boat's name, position, course, speed, and so forth onto those shared airwaves? And if you do adopt either form of A.I.S., how easy will it be to view the output target data with your plotter or PC charting program?

There are many ifs, ands, and buts involved in the answers to these questions, and the transponder decision has become even more clouded by a misunderstanding that's grown nearly to urban-legend status.

If A.I.S. basics are unfamiliar, please read "The ABCs of A.I.S." (see page 68), because I'm going to charge right into the myth that there's no point in carrying your own Class B transponder because ships just ignore those signals. You can find the legend expressed in many places, but this line from an online sailing forum sums it up well: "My recollection is that A.I.S. Class A transceivers fitted to commercial vessels have a big red IGNORE CLASS B button to declutter their displays and concentrate on avoiding vessels that will do more than smudge their paint in a collision."

Balderdash!

There's no such button; in fact, Class A transponders are required by International Maritime Organization regulations to show all targets on their included displays. The cynical presumption this myth grew upon—that big-ship crews don't care about small boats—is largely bogus, too. And besides, if the act of purposely ignoring an A.I.S. target causes a collision, it's likely to be documented by other A.I.S. users within range, and it's likely to get some officer in charge in serious trouble.

The misunderstandings go the other way, too. I've seen sailors get so excited about how well A.I.S. plotting works that they jump to the conclusions that just a receiver costing a few hundred dollars can take the place of a radar for minding dangerous traffic and that a Class B transponder—costing from about $600 to $1,500, depending on optional features—makes a radar reflector obsolete, too. Neither notion is true. While all international ships over

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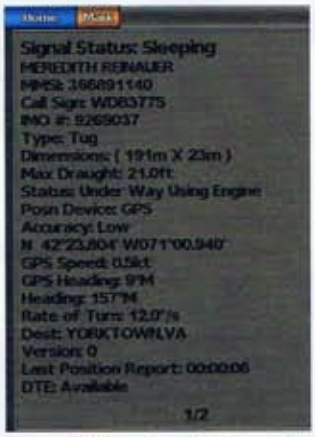
300 gross tons now carry Class A transponders, as required by the I.M.O., and many other commercial vessels carry them under individual national mandates, there are still many sizable boats that you'd really like to find in the system—like the fast ferries of Long Island Sound—but aren't. I'd argue that many such vessels should have voluntarily incurred the approximate $4,000 cost of a Class A transponder, like most megayachts have, but that issue should become mute in about a year when the U.S. Coast Guard enacts a proposed ruling that will require Class A or Class B transponders on some 15,000 U.S. ferries, tugs, fishing vessels, and passenger boats, depending on their size and speed.

Add all those commercial vessels—some of the busiest and scariest along our coasts—to the recreational boats that are rapidly adding Class B transponders since the F.C.C. belatedly made them legal in late 2008, and the "Do I need it?" calculation will change significantly. Still, radar will remain the preferred collision-avoidance tool, especially in areas like the foggy coast of Maine, at least until the swarming lobster boats are transmitting A.I.S., which will happen eventually, I believe.




**If you drill down to a ship's profile on a chart plotter like the Garmin 5212, this is the type of information that you're likely to find.**

Ultimately, though—if power, space, and financial budgets permit—it's wiser to think of A.I.S. and radar not as an either/or decision but rather as two very useful and complementary technologies. If you see them working together on a good display, you'll soon learn that A.I.S. is better than such a radar feature as MARPA—Mini Automatic Radar Plotting Aid—at clarifying target dangers and that, like radar chart overlay, it's another valuable tool for helping a navigator distinguish the many knowns from the unknowns.

However, note that I wrote "good display." Some sailors are justifiably concerned about A.I.S. screen clutter, and while I've yet to see any screen shots illustrating a real problem, it could become one in some areas unless some good work is done on optimizing A.I.S. plotting presentations as well as the associated alarms. While just about every multifunction display and charting program made today will overlay A.I.S. data input from a receiver or transponder, the techniques vary a great deal, and not one seems just right yet. This situation applies to ship bridges, too, and Class B enthusiasts should note that today the A.I.S. plotting on many of those bridges is actually less effective than it is on many yachts. While it's true, as noted earlier, that a Class A transponder must display all targets, often that just means a list of the transmitting ships' names, ranges, bearings, C.P.A., and T.C.P.A. (these two terms, calculated Closest Point of Approach and the Time of that event, are carried over from radar target plotting) rather than a graphic display of their position.

Sometimes when I've called ships to ask if they could see

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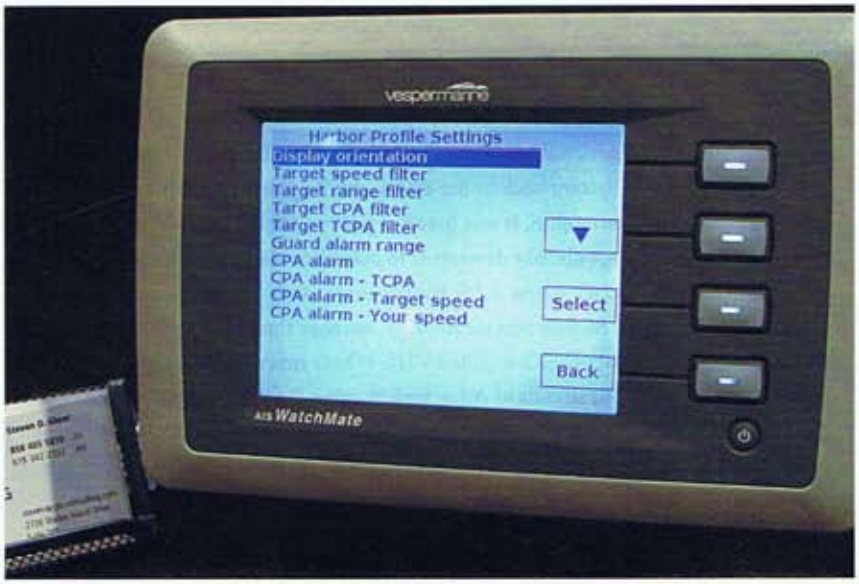
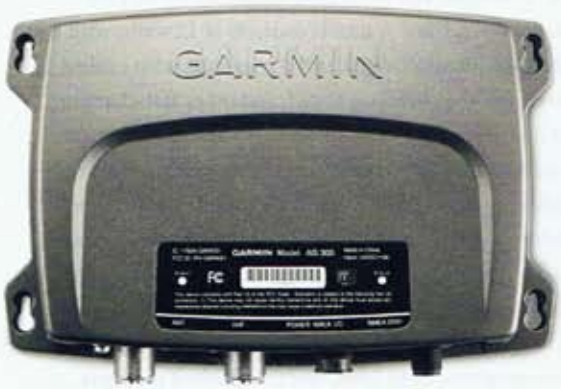



**The Vesper Marine AISWatchMate (above) is a dedicated A.I.S. display and offers a sophisticated system of collision-avoidance alarms. The Garmin AIS 300 (left)is a receiver that distributes NMEA 2000 data to a sailboat's chart plotter. A Class B transponder is also available. Icom offers its own Class B transponder (see page 68) that includes its own display, and it can be integrated with some Icom radios.**

my Class B transponder, it's taken a few minutes for someone on the bridge team to look it up. In other words, don't presume that a transponder-equipped ship will necessarily see your transponder-equipped boat, not because they've turned you off, as the legend purports, but because they don't yet have A.I.S. overlay on their primary plotter and radar screens. But this, too, shall pass.

The I.M.O. is working on mandates for such A.I.S. integration along with guidelines on how to do it well. And some of those good ideas are already being borrowed by the recreational marine-electronics developers. A Garmin update last summer, for instance, started treating targets as either Active—a bold icon with name, heading line, and speed—or Inactive—a small, simple, nondistracting icon. A user can activate a target manually or let it happen automatically when its C.P.A. comes within a user-set threshold, which also turns the icon red and graphically marks the C.P.A. spot. This plotting scheme works quite well, minimizes clutter, and will, one hopes, become common, but Garmin still needs to add several parameters so users can avoid unnecessary and irritating A.I.S. audible alarms. You don't need to be buzzed, for instance, just because you putter close to a docked vessel with its transponder on.

For a good look at how nuanced A.I.S. alarms can and should be, check out the Vesper Marine AISWatchMate (www.vespermarine.com), an unusual low-power A.I.S. plotting display designed especially for bluewater sailors. The original $500 model takes NMEA 0183 output from any receiver or transponder, while the new $700 RX model includes its own receiver. Even if its 5-inch grayscale screen isn't something you want aboard, the AISWatchMate may teach you some tricks you'll want to pass along to whoever develops the plotter or software you do use to monitor A.I.S. data.

Though A.I.S. target plotting and alarming is variable and dynamic in ways that new users may find daunting, the transponder hardware element is fortunately much more stable. In fact, I doubt that there's another niche in marine elec-

COURTESY OF THE MANUFACTURERS; BEN ELLISON (TOP)

# THE ABCS OF A.I.S.

The International Maritime Organization created the Automatic Identification System back in the 1990s, and it's proven itself exceptionally robust and useful. It was based in part on the digital-selective-calling technology already developed to automate some marine-radio functions. In fact, a new A.I.S. transponder has to be programmed with the same unique Maritime Mobile Service Identity number that, one hopes, is already programmed into a boat's D.S.C.-enabled VHF. What's more, some integrated systems can easily "direct dial" VHF calls to A.I.S. targets using D.S.C. As an aside, M.M.S.I. numbers for vessels intending to head overseas should be obtained along with an F.C.C. ship's license, but boats staying within U.S. waters can use free ones available from BoatU.S., SeaTow, and other organizations.

All A.I.S. transponders use two redundant dedicated VHF channels, 87B and 88B, to broadcast standardized digital messages at carefully organized intervals. Class A was the first style of transponder developed and is the type mandated on SOLAS ships (though any boat can install one). A Class A unit broadcasts at 12 watts, with a range of 20 to 60 miles, depending on antenna height, and it transmits what's called a dynamic data message—a vessel's lat/long, heading, speed, and other fast-changing values, plus its M.M.S.I.—every 2 to10 seconds when under way, depending on speed and rate of turn. The longer static data message—vessel name, dimensions, type, destination, E.T.A., and the like—goes out every six minutes, which explains why you'll often see a target plotted well before it gets a name. But such data thrift, along with the underlying scheme of time-slot sharing, is why hundreds of nearby vessels can all receive each other's data without interference.

Class B transponders, meant for smaller vessels, were always part of the I.M.O.'s plan, but the specification wasn't completed until 2006, and the finished products weren't available in the United States until late 2008. A Class B transmits at 2 watts, with a range of 5 to 12 miles. Its dynamic data message goes out every 30 seconds if

tronics where basic features and performance is so similar and reliable from model to model. That makes sense both because these devices are built and tested to very strict rules and also because most of them contain core circuit boards made by a specialty company in the United Kingdom, SRT. The important differences between Class B transponders, then, are extra features.

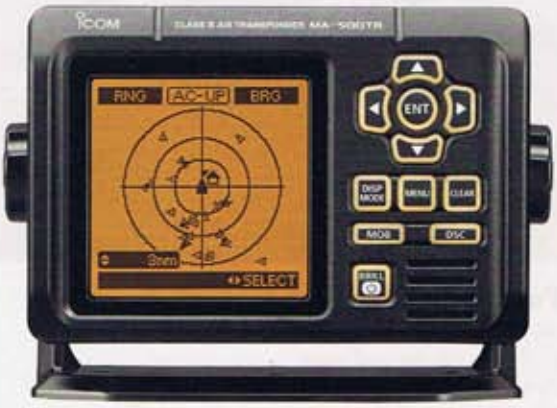
For instance, the high-end Simrad AI50 includes a 4-inch color plotting screen with a global basemap, the ability to record voyages and targets to an S.D. card, and a SimNet/NMEA 2000 interface (in addition to the standard 0183 interface). A stand-alone A.I.S. screen is useful if you want your main navigation and plotting screen more zoomed in or turned off altogether when out to sea or in port. (Safety aside, A.I.S. can be fun for boat watching, and all Class B transponders can be switched to Silent Mode if you don't want to be watched yourself.) NMEA 2000 is an easier, more robust protocol for sharing target data around a boat and also for getting optional heading data to the transponder (so your bow plots correctly even when you're stopped or being set by current). Simrad also uses SimNet to connect the AI50 with certain of its VHF radios, so you can place a direct D.S.C. call to a target without having to key in its Maritime Mobile Service Identity number. Just being able to call target vessels by name is often cited by A.I.S. users as a major benefit; making the target's radio ring distinctively is even better.

Icom has just introduced the MA-500TR Class B transponder, which has its own monochrome plotting screen and that same automated target-calling feature if interfaced with certain Icom radios (via NMEA 0183).

The new Garmin AIS 600 Class B, like the Raymarine AIS 500, features NMEA 2000 interfacing and a built-in antenna splitter so that you can use a single stick

your vessel is going over 2 knots, and the every-6-minute static data isn't as detailed. Class B transponders have dual receivers to get all Class A and Class B transmissions, as do Class A transponders. Devices that only receive A.I.S. signals are sometimes called Class C, but that's a misnomer as they're not regulated, while the transponders are built and tested to very tight specs.

The success of A.I.S. is hard to overstate. Glitches have been relatively minor, while the extended-use possibilities are major. Some buoys already exist that identify themselves using A.I.S., including a few that also transmit local weather phenomenon, such as currents in hairy passes, using especially designed A.I.S. messages. Lifeboat rescue beacons (called SARTs) using A.I.S. instead of electronic radar reflectors are just becoming available, and A.I.S.-enabled crew-overboard devices are being studied. The U.S. Coast Guard is building a system to monitor all A.I.S.-equipped traffic within 200 miles of the coast, and though the goal is primarily homeland security, the safety implications are significant. Hobbyists have also set up shore listening stations, many of which are tied in with various websites. In fact, one of the best ways to learn about A.I.S. is via MarineTraffic.com (www.marinetraffic.com). Choose "English Channel" in the upper left "Go to region" box, then contemplate what a difference A.I.S. would make if you were crossing that busy waterway.

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for A.I.S. tx/rx and regular VHF (which is tricky electronically). The FA-50 from Furuno, which built many of the Class A transponders in use, features the only Ethernet data output. But mind you, all these extra features add cost, and in my experience, none of these higher-end transponders transmit or receive A.I.S. any better than the more conventional models from ACR, West Marine, Shine Micro, Comar, Digital Yacht, and the like.

A.I.S. receivers are unregulated and thus vary more, even in raw performance. For instance, I think that you should avoid the older, extra-inexpensive models, which only listen to one A.I.S. channel at a time. They worked OK when all A.I.S. was Class A, but they cause especially jumpy Class B plotting because B only transmits dynamic data every 30 seconds on alternate channels. Besides, there's a new generation of small, inexpensive true dual receivers that are popping up everywhere. Digital Yacht has one entirely built into what looks like a GPS mushroom with a stubby VHF on top; another is built into a 5-inch C-Map plotter.

And perhaps the hottest A.I.S. product of the season is Standard Horizon's GX2100, which combines a full-feature DSC VHF with an A.I.S. receiver, including a small plotting screen, automated target calls, and even backup navigation functions, for about $400. We'll no doubt see A.I.S. receivers built into more plotters, radios, and who knows what else.

So what should you do about A.I.S.? Many sailors are already using receivers or transponders (my preference) and loving them. But if you wait, A.I.S. will become more widespread, easier to use, and less expensive. You can't lose or win, depending on how you look at it!

To keep up with the latest developments, stop by my blog (www.cruisingworld.com/panbo).

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Ben Ellison is *CW*'s electronics editor.