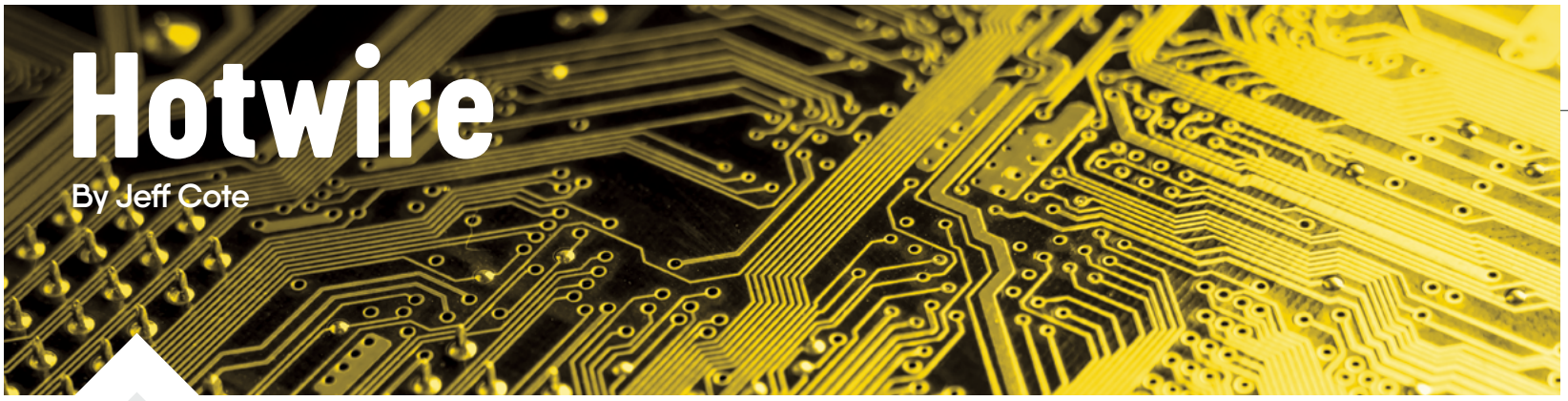


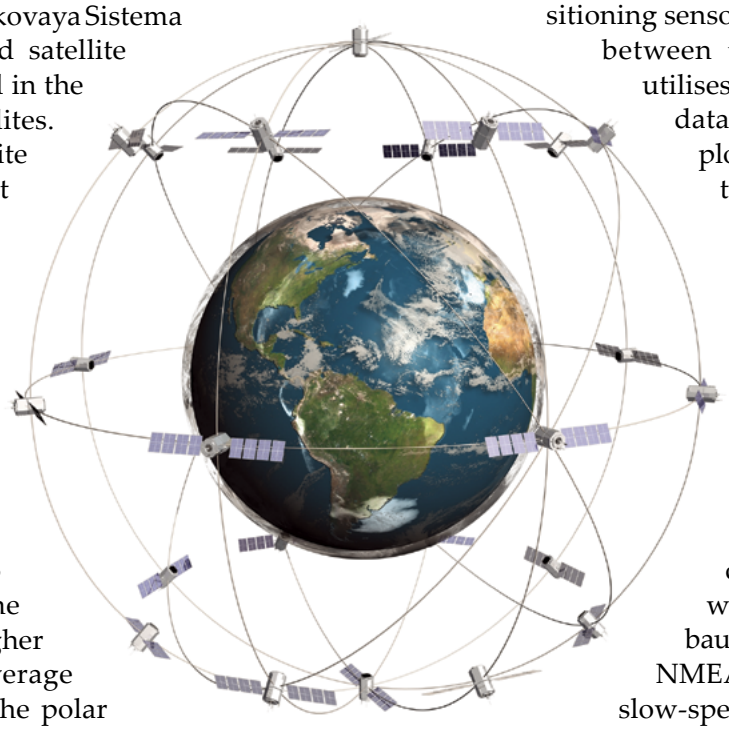
Hotwire

By Jeff Cote

GPS + GLONASS = Navigation Perfection?

The worldwide generic term for satellite navigation systems with global coverage is Global Navigation Satellite System (GNSS), often referred to as GPS by boaters here in North America. The truth is that there are several different GNSS systems in operation, such as BeiDou/Compass (China), IRNSS (India), Galileo (Europe), and QZSS (Japan). For boaters of the Pacific Northwest, we are going to look at two in particular: GPS (USA) and GLONASS (Russia).

The Global Positioning System (GPS) was created in the USA with 31 satellites and two levels of security: Precise Positioning Service (PPS) for military and Standard Positioning Service (SPS) for everyone else. The Global-naya Navigazionnaya Sputnikovaya Sistema (GLONASS) is a radio-based satellite navigation system developed in the Soviet Union with 24 satellites. Both global navigation satellite constellations use signals sent to Earth from multiple space satellites. The signals are then analyzed, and location data is determined by how far the receiver is from the satellite.



There are 31 GPS satellites, more than necessary, so there is back-up to ensure that 24 GPS satellites are always operational. GLONASS has 24 satellites orbiting the earth that are inclined to a higher angle, providing better coverage at higher latitudes such as the polar regions.

Originally, marine manufacturers used only GPS. The implementation of GLONASS for recreational users has been a huge step in maritime navigation. Manufacturers are now able to use GPS and GLONASS, which allows navigation devices to access all 55 satellites. Combining the two systems offers a faster fix and better accuracy. Two GNSS systems also provide redundancy if one goes down, and, if both position fixes are the same, there is a higher chance of accuracy. GPS and GLONASS are also being used in cars, smart devices, and sport watches. Sometimes referred to as "assisted" or A-GPS and A-GLONASS.

Garmin GLO takes signals from both GPS and GLONASS. It connects wirelessly to many Bluetooth enabled smart devices, BlueChart Mobile, and Fishing My-Cast. This allows GLO to lock on satellites approximately 20 percent faster and remain connected even at high speed.

The Bad Elf 2300 Bluetooth GPS and GLONASS receiver and data logger adds barometric readings for boaters with the built-in barometric sensor. The advanced USB connectivity allows streaming of National Marine Electronics Association (NMEA) data directly to your device and adds easy access to recorded data logs just like a thumb drive.

If you currently have a GPS-only chartplotter, it may be time for an upgrade. Most manufacturers are now offering a GPS/GLONASS antenna such as the Garmin GA 38, the Furuno GNSS receiver, or the B&G ZG100. DualNav, the GPS/GLONASS antenna from Digital Yacht, is a positioning sensor that automatically switches between the two systems. DualNav utilises the industry standard NMEA data format allowing older chart plotters as well as current generation products to take advantage of this new technology. It also allows the user to select a variety of different NMEA baud rates (4800, 38400 and 115200) to allow interfacing with legacy and newer systems. As an added feature for sailboat racers, it also supports a new TurboNav™ mode where GPS/GLONASS data is output at 10 Hz and with an interface speed of 115200 baud (24 times the speed of normal NMEA 0183 data). This improves slow-speed navigation data, as well as provides the best course and speed data in navigational situations.

Tip: The 31-satellite GPS network has broader coverage than GLONASS. However, GLONASS has the edge in higher latitudes. Why not use both?

Next time you are at your boat, check the "settings" menu and determine which type of antenna your navigation equipment is accessing. Situational awareness on the water saves lives, no doubt about it, and knowing what capabilities you have is a part of that awareness. If you can swing it, having the ability to access both sophisticated satellite systems just makes sense. NWY

Jeff Cote is a systems design engineer and owner of Pacific Yacht Systems—a full-service shop delivering marine electrical and navigation solutions for recreational and commercial boats. Visit their website and blog for info and articles on marine electrical systems, projects, and more at pysystems.ca.